Contextual Design: A Participatory Design Method

Introduction

The expectation of computer technology is to improve our productivity and enhance our quality of life. The study of HCI indicates the ability for computer technology to deliver on its promises rests squarely on how well applications fit our conceptual understanding of how things work. In the area of HCI research, a number of approaches have evolved to meet this challenge. These include User-Centered Design [Landauer], Human-Centered Systems [Flanagan, Huang, Jones, and Kasif], Participatory Design [Muller and Kuhn], and Contextual Design [Beyer and Holtzblatt]. The different techniques find ways to interject the designer in the user's world and the user in the designer's world in order to develop a shared conceptual model of the tasks and the context in which they are being done [Muller and Kuhn]. Early in the design process, the designer engages in analysis activities that provide an insight into the user's mental model of the tasks for the system being developed [Liddle]. A *mental model* is the user's cognitive representation of the target system, while a *conceptual model* is a reasonably accurate and consistent representation of the target system. If the designer can devise the conceptual model in ways that reflect a user's mental model, then the application designed from the conceptual model will be more easily understood and fit more naturally into the user's activities [Norman].

Contextual Design

Contextual Design (CD) is a customer-centered or participatory design method developed by Hugh Beyer and Karen Holtzblatt. The CD process stresses the use of customer data to drive the design process. Steps in the process attempt to engage the user as a partner in the design process. This is done in the beginning with collection of data through ethnographic techniques of observation and interviewing. Later the user is invited to be a co-designer by engaging them in a dialog over an iterative refinement process using paper prototypes.

Steps in the CD Process

1. Contextual Inquiry.

   Raw customer data is collected using ethnographic techniques of observation and interviewing. Through a series of in-class and out-of-class exercises students are taught techniques for gathering and organizing data into field notes. A partner relationship is established using a model of master/apprentice between the user and the designer. This model sets the stage for the user to "teach" the designer what they know and how they go about doing their tasks.

2. Work Modeling

   Work models provide a language to describe the work being done and a visual representation of the data collected. The models are created in a team Interpretation session. This allows team members to share their views and drive toward a shared understanding of the data. Students are asked to focus on three of the five possible models:

   1) Flow model – indicates who is performing what tasks and how they coordinate their activities. Reveals roles and lines of communication

   2) Sequence model – indicates the steps taken to perform a task. Reveals strategies for accomplishing tasks.

   3) Artifact model – model of items used in the process. Reveals ways of organizing and communicating information.

3. Consolidation

Using a process of induction, the design team looks across each of the different types of work models of the individual users to create a single work model of each type. Conclusions are drawn about the general population of users from the individual users. This gives the team a picture of the overall user population they are designing for, providing a picture of common and divergent patterns that will have implications to the design.

   In addition, an Affinity Diagram is created to help organize the individual user's interests, concerns, and issues. An Affinity Diagram is built from the bottom-up using notes from each of the individual user and grouping them together when they have some similarity or affinity. When a group of notes are placed together, an abstract label created to indicate their similarity. Additional levels of abstraction can also be added to help further organize the data and reveal more structure across of the user data.

4. Visioning

Using the data to guide, suggest and constrain, the design team brainstorms multiple ideas for possible solutions. Because the design ideas are driven by the data this can be termed "grounded brainstorming". After evaluating the positive and negative points a consensus idea is derived from the different brainstorms. Storyboards are used at this point to work out the details of the design.

5. User Environment Design

The User Environment Design (UED) is a "blue print" for the overall organization of the application. It organizes the functionality of the application into *places* where specific *tasks* are to be preformed and *corridors* that link places together that indicate connections between coordinated activities or supporting activities to accomplish a task. The UED provides a clear representation of the organization of the design. It also serves as a specification for the User Interface Design. Typically each place in the UED is a single window, the tasks are functions that the window should support, and the corridors are some type of link, such as a button or menu, to another place. The UED is created from the storyboards.

6. Paper Prototyping

From the UED an interface for the application is designed. The interface is created first using pencil and paper. With the paper prototype the user is asked to try out specific set of tasks. This type of lo-fidelity testing allows the designer to get quick feedback, and to iteratively refine the design. It also serves to invite the user in the design process. Because it is accepted as a "rough draft" rather than a nearly complete product, users feel comfortable suggesting possible changes. Changes can be made very quickly and tested with other potential users.