

# User-centered approaches to interaction design



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# Overview

- Why involve users at all ?
- What is a user-centered approach ?
- Understanding users' work
  - Coherence
  - Contextual design
- Involving users in design
  - PICTIVE
  - CARD

# Why involve users at all ?

- Expectation management
  - Realistic expectations
  - No surprises, no disappointments
  - Timely training
  - Communication, but no hype
- Ownership
  - Make the users active stakeholders
  - More likely to forgive or accept
  - Can make a big difference to acceptance and success of a product

# Degrees of user involvement

- Member of the design team
  - Full time: constant input, loose touch with users
  - Part time: patchy input, and very stressful
  - Short term: inconsistent across project life
  - Long term: consistent, loose touch with users
- Newsletters and other dissemination devices
  - Reach wider selection of users
  - Need communication both ways
- Combination of these approaches

# How Microsoft involves users ?

- Users are involved throughout the development
  - Activity-based planning: studying what users do to achieve a particular activity/task
  - Usability tests: Office 4.0 – over 8000 hrs
  - Internal use by Microsoft staff
  - Customer support lines

# Case study

## (discount usability engineering)

- 3-week project to develop interaction for new web shopping application
- Hand-draw paper prototype
- Customers asked to perform tasks with the prototype, which was manipulated by one of the team in order to simulate interaction
- Customers enthusiastic about using the paper prototype and were keen to offer improvements

# What is a user-centered approach ?

- User-centered approach is based on:
  - Early focus on users and tasks: directly studying cognitive, behavioral, anthropomorphic & attitudinal characteristics
  - Empirical measurement: users' reactions and performance to scenarios, manuals, simulations & prototypes are observed, recorded and analyzed
  - Iterative design: when problems are found in user testing, fix them and carry out more tests

# Early focus on users and tasks

- Users' tasks and goals are the driving force behind the development
- Users' behavior and context of use are studied and the product is designed to support them
- Users' characteristics are captured & designed for
- Users are consulted throughout development, from earliest phases to latest, and their input is taken seriously
- All design decisions are taken within the context of the user, their work and their environment



# Understanding users' work

- Understanding users' work is significant
- Ethnography
  - From anthropology
    - 'writing the culture'
    - Participant observation
- Difficult to use the output of ethnography in design

# Framework for using ethnography in design

- *Distributed co-ordination*: distributed nature of the tasks & activities, and the means and mechanisms by which they are co-ordinated.
- *Plans and procedures*: organizational support for the work, such as workflow models and organizational charts, and how these are used to support the work
- *Awareness of work*: how people keep themselves aware of others' work

# Coherence

- A method which offers appropriate questions to help address these key dimensions
- For example:
  - Distributed coordination: How is the division of labour manifest through the work of individuals and its coordination with others ?
  - Plans and procedures: How do plans and procedures function in the workplace ?

# Contextual Design

- Developed to handle data collection and analysis from fieldwork for developing a software-based product
- Used quite widely commercially
- Contextual-design has seven parts:
  - Contextual inquiry, Work modelling
  - Consolidation, Work redesign
  - User environment design
  - Mock-up and test with users
  - Putting it into Practice

# Contextual inquiry

- An approach to ethnographic study where user is expert, designer is apprentice
- A form of interview but
  - At user's workplace
  - 2-3 hours long
- Four main principles
  - Context
  - Partnership
  - Interpretation
  - Focus



# Work modelling

- In interpretation, models are drawn from the observations
- Workflow model: the people, communication, and co-ordination
- Sequence model: detailed work steps to achieve a goal
- Artifact model: the physical “things” created to do the work
- Cultural model: constraints on the system from organizational culture
- Physical model: physical structure of the work: e.g. Office layout

# Consolidation

- Each contextual inquiry (one for each user/developer pair) results in a set of models
- These need to be consolidated into one view of the “work”
- Affinity diagram
  - Organizes interpretation session notes into common structures and themes
  - Categories arise from the data
  - Diagram is built through induction
- Work models consolidated into one for each type

# Participatory Design

- Scandinavian history
  - Workers having democratic control over changes in their work (Nygaard 1990)
- Emphasizes social and organizational aspects
- Based on study, model-building and analysis of new and potential future systems



# Participatory Design

- Aspects to user involvement include:
  - Who will represent the user community?  
Interaction may need to be assisted by a facilitator
  - Shared representations
  - Co-design using simple tools such as paper and video scenarios
  - Designers and users communicate about proposed designs
  - Cooperative evaluation such as assessment of prototypes

# Benefits of participatory design

“Computer-based systems that are poorly suited to how people actually work impose cost not only on the organisation in terms of low productivity but also on the people who work with them. Studies of work in computer-intensive workplaces have pointed to a host of serious problems that can be caused by job design that is insensitive to the nature of the work being performed, or to the needs of human beings in an automated workplace.”

[Kuhn, S. in *Bringing Design to Software*, 1996]

# PICTIVE

- Plastic Interface for Collaborative Technology Initiatives through Video Exploration
- Intended to empower users to act as full participants in the design process

# PICTIVE

- Materials used are:
  - Low-fidelity office items such as pens, paper, sticky notes
  - Collection of (plastic) design objects for screen and window layouts
- Equipment required
  - Shared design surface, e.g table
  - Video recording equipment

# PICTIVE

- Before a PICTIVE session
  - Users generate scenarios of use
  - Developers produce design elements for the design session
- A PICTIVE session has four parts :
  - Stakeholders all introduce themselves
  - Brief tutorials about areas represented in the session (optional)
  - Brainstorming of ideas in the design
  - Walkthrough of the design and summary of decisions made

# CARD

- Collaborative Analysis of Requirements & Design
- Similar to PICTIVE but at a higher level of abstraction
- Uses playing cards with pictures of computers and screen dumps
- Similar structure to the session as PICTIVE
- PICTIVE and CARD can be used together to give complementary views of a design

# Summary

- User involvement helps manage users' expectations & feelings of ownership
- A user-centered approach has three main elements: early focus on users, empirical measurement & iterative design
- Ethnography is useful for understanding work, but can be difficult to use in design
- Coherence and Contextual Design support the use of ethnographic data in design
- Participative design involves users taking an active part in design choices
- CARD and PICTIVE are example techniques