Lecture 3

Human-Centered Development and the Scenario-Based Approach

Part 1: Human-Centered Development
Three Approaches to UI Design

- Attitude of technology-centered development
  - Progress made by technological advances
  - The more bells & whistles the better
- Attitude of designer-centered development
  - Progress made by considering the intuitions of the designer
  - Imagining what the user will do and feel
- Attitude of human-centered development
  - Progress made by incorporating the users into the design process
  - Empirical studies integrated early into the design

The User “Interface” as Human-Computer Interaction

Definition

- Any part of the computer system that the user comes in contact with either physically, perceptually, or conceptually.

Human-centered software development

Definition

- Early and Continued Focus on Users
  - Direct contact through interviews, observations, surveys, participative design in order to understand characteristics of users and their jobs
- Integrated Design
  - All aspects of usability evolve in parallel; all aspects of usability under one focus or person
- Early and Continued User Testing
  - Throughout development, intended users do real work with simulations and prototypes, their performance and reactions are measured qualitatively and quantitatively
- Iterative Design
  - The system (functions, user interface, help system, mailing material, training approach) is modified based upon results of user testing; testing cycle is repeated
Iterative Model of Development

- Describe steps in method

![Diagram of iterative model]

Compare to the Waterfall Model

Steps in method (note: iterative!)

- Planning
  - Scope of project, investigate user population (document analysis, interviews, surveys, observation) & related systems
- Analysis (R&C Requirements Analysis)
  - Task analysis, problem scenario development, requirements for usefulness and usability
- Design (R&C Activity, Information & Interaction Design)
  - Specifications (yes!) for the human-computer interaction (HCI)
- Implementation (R&C Prototyping)
  - Storyboards, mock-ups, software prototypes
- Usability Evaluation (R&C Evaluation)
  - Evaluation without users: cognitive walkthrough, heuristic evaluation (guidelines), GOMS, Keystroke Level Model (KLM)
  - Evaluation with users (usability testing, interviews, questionnaires)

Purpose of Human-Centered Development

- Usefulness (Functionality)
- Usability for skilled users
  - Performance time
  - Failure (Errors)
  - Enjoyment
  - Robustness
  - Fatigue/Stress
  - Safety
- Learnability
  - Learning time
  - Misconceptions
What is a scenario?

- A story about people and their activities containing the five “W’s”
  - When
  - Where
  - Who
  - What (and How)
  - Why
### Matching the W’s to Scenario Components

- **When:** Setting
- **Where:** Setting
- **Who:** Actors/Stakeholders
- **What (and How):** Tasks, activities, plans, resources, events
- **Why:** Goals, rationale, claims, expectations, benefits

### Why scenarios?

- Context-sensitive: bring out the situation of use
- Vivid descriptions: Easy to create and remember
- Can be used in many ways during development
  - Current work practices scenario
  - Proposed system problem scenario
  - Activity scenario
  - Usability testing task scenario

### Requirements Analysis

- **Definition:** Early phase of software development in which needs of clients with respect to a proposed system are analyzed
- **Evolving detailed description of what the system should do and why**
- **Does not describe how the system should do it such as the detailed UI design**
Phases of Requirements Analysis

• Existing system
• Proposed system

Products of Requirements Analysis

• Root Concept
• Stakeholder profiles
• Tasks carried out by stakeholders
• Problem Scenarios

Root Concept

• high-level vision: problem statement and proposed solution
• basic rationale
• stakeholder groups & how they will benefit
• starting assumptions
Stakeholder Profiles

- Background
- Expectations
- Preferences
- Relationships

Task Descriptions

- Tasks carried out by stakeholders
- Hierarchical task analysis

Problem Scenarios

- the setting
- the people involved
- task goals, expectations, plans and actions of the people
- events created by the environment
- artifacts, technology, and systems involved (resources)
How do you get this information?

- Artifact analysis
- Interviews
- Observation
- Participation
- Survey/Questionnaire

Artifact Analysis

- Collect and examine the documents, objects and other resources that people use in their activities
- Try to understand the content of the information and the role it plays in activities

Interviews

- Advantages
  - Gathers opinion, Creates rapport
- Disadvantages
  - Must be well-planned
  - Bias: Information often filtered
- Types
  - Structured
    - Fixed set of questions with simple answers
  - Unstructured
    - More open questions
Observation

- **Advantages**
  - Not an opinion, but an objective record
  - Captures detail
- **Disadvantages**
  - Intrusive, Time consuming
- **Types**
  - Passive: “Hanging out”
    - Used in very early design when don’t have much information about user’s activities
  - Active
    - Provide users with problems to solve or tasks

Participation

- **When**
  - the observer learns and participates in the work activities
- **Overcomes**
  - the Hawthorne effect
    - Bias of being observed
- **Obtain**
  - otherwise privileged information
- **Creates**
  - first-hand domain knowledge

Survey/Questionnaire

- **Purpose**
  - Reaches lots of people
  - Perform statistical analysis on data
  - Avoids bias by anonymity
  - Consistent questions
- **Design Issues**
  - Must be carefully designed, do pilot
  - Must not be time-consuming & easy to reply
  - Must make sense
  - Must gather precise answers, not vague ones
  - Ask only questions which support the design
  - Sample vs. population