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W3C **Web Accessibility initiative**

WAI: Strategies, guidelines, resources to make the Web accessible to people with disabilities

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Notes on User Centered Design Process (UCD)

NOTE: This page is a collection of notes on user-centered design process (UCD). It is not intended to be comprehensive, and listing of any information here does not imply endorsement by W3C.

UCD in a Sentence

User-centered design process (UCD) is also called human-centred design process.

Human centred design processes for interactive systems, ISO 13407 (1999), states: "Human-centred design is an approach to interactive system development that focuses specifically on making systems usable. It is a multi-disciplinary activity."

In UCD, all "development proceeds with the user as the center of focus." (Jeffrey Rubin, Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests, John Wiley and Sons, Inc., 1984) Rubin depicts the User-Centered Design Process as follows:

- The users are in the center of a double circle.
- The inner ring contains: Context; Objectives; Environment and Goals.
- The outer ring contains: Task Detail; Task Content; Task Organization and Task Flow.

"User-Centered Design (UCD) is a user interface design process that focuses on usability goals, user characteristics, environment, tasks, and workflow in the design of an interface. UCD follows a series of well-defined methods and techniques for analysis, design, and evaluation of mainstream hardware, software, and web interfaces. The UCD process is an iterative process, where design and evaluation steps are built in from the first stage of projects, through implementation." (Shawn Lawton Henry and Mary Martinson, *Accessibility in User-Centered Design*)

UCD Principles

From Jeffrey Rubin, Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests, John Wiley and Sons, Inc., 1984:

1. Early focus on users and tasks
   - Structured and systematic information gathering (consistent across the board)
   - Designers trained by experts before conducting data collection sessions
2. Empirical Measurement and testing of product usage
   - Focus on ease of learning and ease of use
   - Testing of prototypes with actual users
3. Iterative Design
   - Product designed, modified and tested repeatedly.
   - Allow for the complete overhaul and rethinking of design by early testing

of conceptual models and design ideas.

Usability

The goal of UCD is to produce products that have a high degree of usability. ISO 9241-11 (1998) defines usability as the "extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use."

Jeffrey Rubin describes usability objectives as:

- Usefulness - product enables user to achieve their goals - the tasks that it was designed to carry out and/or wants needs of user.
- Effectiveness (ease of use) - quantitatively measured by speed of performance or error rate and is tied to a percentage of users.
- Learnability - user's ability to operate the system to some defined level of competence after some predetermined period of training. Also, refers to ability for infrequent users to relearn the system.
- Attitude (likeability) - user's perceptions, feelings and opinions of the product, usually captured through both written and oral communication.

UCD Process Steps

While the basic principles and techniques are the same, different variations of user-centered design processes exist. The following example is typical of a UCD process for designing Web applications.

1. **Analysis**
    - **Vision, goals, objectives**
      Image (feeling)
      Challenges and constraints
    - **User/Audience analysis**
      - User Categories List
      - User Categories Matrix with knowledge, experience, and skill (KES) in www, accessibility, html, etc.; connection, environment; hardware, software; AT; frequency of use
      - Profiles (details, facts, figures)
      - Personas/Characterizations (made up "person" with name, etc.)
      - Technique: Field studies, contextual inquiry
    - **Task/Purpose analysis**
      - Task List
      - User-Task Matrix
    - **Information architecture analysis**
      - Content list
      - Content-User Matrix
      - Hierarchy, Web relationships
    - **Workflow analysis**
      - Workflow
      - Scenarios
2. **Design**
    - @@ add the usability iceberg image 10% presentation, 30% interaction, 60% conceptual model
    - Conceptual/Mental model, metaphors, design concepts

Navigation design
- Storyboards, wireframes
- Detailed design
- Paper prototypes
- Online mockups
- Functional online prototypes

3. **Evaluation (iterate back to Design)**
   - Design walkthoughs ("cognitive walkthroughs")
   - Heuristic evaluation
   - Guidelines reviews
   - Usability testing - paper, low fidelity - high fidelity; informal - formal
4. Implementation
5. Deployment

More Information

The WAI Resource **Involving Users in Web Accessibility Evaluation** provides guidance on including people with disabilities ("users") in accessibility evaluation throughout Web development, including in user-centered design.

There are myriad resources resources on usability, UCD, and related topics available on the Web, in books, etc. Usable Web is a thorough list of resources on Web usability. It is no longer updated, yet does include other usability resource lists.

Justin Thorp compiled a short list of UCD and UT Resources, which provides links to on-line resources.

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