

Lecture 12 Interaction Design Process

User-Centred Design Interaction Design Models

Heim, Chapter 3



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User-Centered Design (UCD)

- Pioneered by Donald Norman's research laboratory at the University of California at San Diego.
- The objective of UCD is to develop a design framework that enables interaction designers to build more usable systems.
- ISO Standard—Human Centered Design Processes for Interactive Systems

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User-Centered Design

- Design should emerge from the user's
 - tasks
 - goals
 - environment
- Focuses on human-centric issues
 - cognition
 - perception
 - physical attributes and conditions
 - user
 - environment

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User-Centered Design

- The basic tenants of user-centered design:
 - Early focus on users and their tasks
 - Continuous evaluations to determine ease of learning and ease of use
 - Iterative design

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User-Centered Design

- UCD projects generally involve the following methods:
 - User Participation
 - Focus Groups
 - Questionnaires
 - Ethnographic Observations
 - Walkthroughs
 - Expert Evaluations
 - Usability Testing

Interaction Design Models

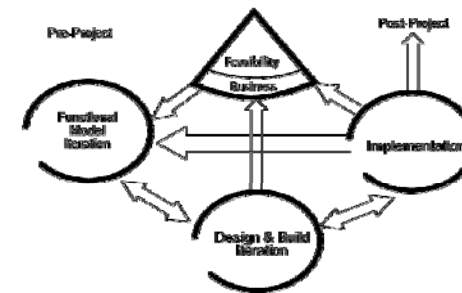
- Waterfall Model
- Spiral Model
- Dynamic Systems Development Method
- Prototype-Based Models
- Discount Usability Engineering
- Contextual Inquiry



Interaction Design Models - Dynamic Systems Development Method (DSDM)

- Rapid Application Development (RAD)
- The Dynamic Systems Development Method (DSDM)
 - Not-for-profit consortium www.dsdm.org
 - Currently in version 4.2

Interaction Design Models - Dynamic Systems Development Method (DSDM)



Interaction Design Models - *Dynamic Systems Development Method (DSDM)*

- Time-sensitive
- Business-centered
 - Main focus – on-time delivery of high-quality software for current business needs
 - 80% of a software solution can be developed in 20% of the time required to complete a total solution.

Interaction Design Models - *Dynamic Systems Development Method (DSDM)*

- Time frame and allocated resources are fixed
- Functional requirements are flexible
- Three stages
 - Pre-project, feasibility study, and business study phases
 - Iteration between the functional model iteration, design and build iteration, and implementation phases
 - Post-project phase

Interaction Design Models - *Dynamic Systems Development Method (DSDM)*

- The DSDM framework recognizes nine principles:
 1. **Active user involvement** is imperative.
 2. The **team must be empowered** to make decisions.
 3. The focus is on **frequent delivery of products**.
 4. **Fitness for business purpose** is the essential criterion for acceptance of deliverables.
 5. **Iterative and incremental development** is necessary to converge on an accurate business solution.

Interaction Design Models - *Dynamic Systems Development Method (DSDM)*

- The DSDM framework recognizes nine principles:
 6. All **changes** during development **are reversible**.
 7. **Requirements** are baselined at a **high level**.
 8. **Testing is integrated** throughout the life cycle.
 9. **Collaboration and cooperation** among all stakeholders **is essential**.

Interaction Design Models - *Dynamic Systems Development Method (DSDM)*

- The DSDM Core Techniques
 - Facilitated Workshops
 - Timeboxing
 - Investigation
 - Refinement
 - Consolidation
 - MoSCoW (prioritize requirements)
 - Must have
 - Should have
 - Could have
 - Won't have

Interaction Design Models - *Dynamic Systems Development Method (DSDM)*

- The DSDM Core Techniques
 - Modeling
 - Prototyping
 1. **Business**—Demonstrate the business processes being automated.
 2. **Usability**—Demonstrate how the user interacts with the system.
 3. **Performance and Capacity**—Test for system robustness.
 4. **Capability/Technique**—Test conceptual designs.
 - Testing
 - Configuration Management

Interaction Design Models - *Dynamic Systems Development Method (DSDM)*

- Advantages of the DSDM:
 - Provides a technique-independent process
 - Flexible in terms of requirement evolution
 - Strict time and budget adherence
 - Incorporates stakeholders into the development process
- Disadvantages of the DSDM:
 - Involves progressive development of requirements
 - Focus on RAD can lead to decrease in code robustness
 - Requires full commitment to DSDM process
 - Requires significant user involvement
 - Requires a skilled development team in both the business and technical areas

Interaction Design Models - *Prototype-Based Models*

- Prototypes are used to develop, demonstrate and test design ideas
- Appropriate for small-scale projects
- Enable discussions of:
 - Look and feel
 - Scope
 - Information flow
 - Product concept

Interaction Design Models - Prototype-Based Models

- Throwaway Prototyping Model
- Evolutionary Prototyping Model
- Advantages of prototyping include the following:
 - Easy for users to give feedback
 - Reduced development time and cost
 - Involvement of the user in the development process
- Disadvantages of prototyping include the following:
 - Can be viewed by client as the final product
 - May lead to insufficient analysis due to the ease of development
 - Difficult for developers to discard and start creating the final product from scratch

Interaction Design Models - Discount Usability Engineering (DUE)

- Jakob Nielsen (1994)
- Nielsen argued that the benefits derived from even small amounts of user testing would have a significant impact on the usability of the design.
- DUE is based on the use of the following three techniques:
 - Scenarios
 - Simplified thinking aloud
 - Heuristic evaluation

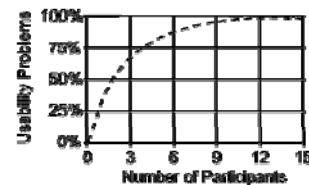
Interaction Design Models - Discount Usability Engineering (DUE)

- Nielsen suggested that the number of problems that could be identified from a usability test with n users can be calculated according to the following equation:

$$N [1 - (1 - L)^n]$$

where:

N total number of usability problems in a design
 L proportion of usability problems discovered with a single participant



Interaction Design Models - Discount Usability Engineering (DUE)

- Nielsen proposed a set of 10 usability heuristics that could be used by designers to investigate and document usability problems.
 - DUE requires some experience
 - Should be done by a few reviewers to avoid personal bias
 - Will help to indicate issue frequency
 - Should be done early in the design process

Interaction Design Models - *Contextual Inquiry*

- Hugh Beyer and Karen Holzblatt 1998
Contextual Design: Defining Customer-Centered Systems.
- Involves
 - Observation
 - Inquiry
 - Interpretation
- It is based on four main principles:
 - Context
 - Partnership
 - Focus
 - Interpretation

Interaction Design Models - *Contextual Inquiry*

- Context
 - how and why people use software products
- Partnership
 - partnering with a typical user in a master/apprentice relationship.

Interaction Design Models - *Contextual Inquiry*

- Focus
 - Observations are focused on collecting information, which can be categorized as follows:
 - **Tools**—The various applications people use to perform their tasks.
 - **Artifacts**—Nondigital tools required by the work but not part of the design.
 - **Terminology**—The labels and terms people use to identify objects and processes.
 - **Sequences**—The order in which people perform their tasks.
 - **Methods**—Organization techniques used by the workers.
 - **Interactions**—How and why people interact with each other.

Interaction Design Models - *Contextual Inquiry*

- Interpretation
 - An affinity diagram is a way to sort, organize, and prioritize observations
 - They involve post-it notes and grouping observations
 - The team creates models of :
 - Communication flows
 - Information sequences
 - Physical environments
 - Corporate culture structures
 - They lead to the conceptual models of the design

Overview of Interaction Design Models

- Elements that appear in many of the standard models
 - Cost and risk analysis
 - Observation
 - Task analysis
 - Requirements assessment
 - Conceptual design
 - Physical design
 - Prototyping
 - Evaluation
 - Usability testing
 - Implementation
 - Maintenance

Discount Usability Engineering is based on the use of three techniques. Identify one of these techniques and describe how it could encourage User Centred Design.

Summary

- User centred design ensures an evolving product takes into consideration user needs
- Various design processes can be utilised within UCD. The choice of a design process will be dependant upon the needs of the project and the approaches utilised within an organisation.