AH COMPUTING SCIENCE
Information Systems design techniques
INFORMATION SYSTEM DESIGN & DEVELOPMENT
INFORMATION SYSTEM DESIGN TECHNIQUES

Human Computer Interaction (user centred)

User Centred Design
- Principles of User Centred Design
- Stages of UCD
- Capturing Requirements
- User Stories
- User Scenarios
- Use Case

User Interface Design
- Wireframes
- Low fidelity prototypes
- High fidelity prototypes
- Application Style types

User Centred Design & Scrum
Human Computer Interaction (HCI) is a major part of system design and development. Creating good user interfaces and User eXperiences (UX) are critical to the success of a system. The design of HCI is a specialised area of system development and blends together ideas from Art, Design, Psychology and Computing.
User Centred Design (UCD) is a way of designing a system that will be easy for the user to use.

UCD focuses on the user **Needs, Wants & Limitations** and repeatedly considers these aspects during the development process.
Why do we need UCD, What does it mean?

Don Norman on UCD

Don Norman Design & Happiness

Don Norman
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USER CENTRED DESIGN

Principles of UCD

• Designs should be based on:
  • an understanding of users
  • tasks
  • environment in which product will be used

• Users should be involved throughout design and development

• A final design should be refined by user centred evaluation

• It should be an ITERATIVE process

• Design should encompass the whole User eXperience

• Design teams should be multi disciplinary for skills and perspectives
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USER CENTRED DESIGN

Stages of UCD

1. Identify the need for User-centred design
2. Understand and specify context of use
   - Who will use the program/product and under what conditions?
3. Program/Product meets user and organisational requirements
4. Produce design solutions
   - Prototype the design, build from initial concept to complete design specifications
5. Evaluate designs against requirements
   - Test the design with real users, to ensure it meets the user and organisational requirements
6. Specify the organisational and user requirements
   - What are the business and user goals for this program?
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Understand and Specify context of use
Users, Environment and Tasks should be described.

- Understand Users by creating User Personas (Typical Users) from user profiles (Wants, Needs & Expectations of the product)
- Understand Tasks by developing User Stories/Scenarios & Use Cases (Tasks and Motivations)
- Identify the Technical and ‘environmental’ constraints (Hardware, OS, Organisation, Technical and Physical Environments)
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Techniques

User Personas:

Create Characters who are fictional users to represent each final type of user of the system.

User Story:

Is a brief statement that describes each type of user and their needs, motivations, goals and limitations. The story should link directly to a persona and detail real life tasks they are involved in. A persona may have several stories attached to it.
Techniques

User Scenarios:

Are more detailed expansions of the user stories and include details on how the user will experience, interact and use the system.

Assumed knowledge on the user’s behalf will be identified.

Again a single user persona may involve several scenarios.
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USER CENTRED DESIGN

Techniques

USE CASE:

Is a list of steps a user would take to complete an action.

Use Case 1  
Buy Stocks over the Web

Primary Actor: Purchaser
Scope: Personal Advisors / Finance package (PAF)
Level: User goal

Stakeholders and Interests:
- Purchaser—wants to buy stocks and get them added to the PAF portfolio automatically.
- Stock agency—wants full purchase information.

Precondition: User already has PAF open.

Minimal Guarantee: Sufficient logging information will exist so that PAF can detect that something went wrong and ask the user to provide details.

Success Guarantee: Remote web site has acknowledged the purchase; the logs and the user’s portfolio are updated.

Main Success Scenario:
1. Purchaser selects to buy stocks over the web.
2. PAF gets name of web site to use (E*Trade, Schwab, etc.) from user.
3. PAF opens web connection to the site, retaining control.
4. Purchaser browses and buys stock from the web site.
5. PAF intercepts responses from the web site and updates the purchaser’s portfolio.
6. PAF shows the user the new portfolio standing.

Extensions:
2a. Purchaser wants a web site PAF does not support:
   2a.1. System gets new suggestion from purchaser, with option to cancel use case.
3a. Web failure of any sort during setup:
   3a.1. System reports failure to purchaser with advice, backs up to previous step.
   3a.2. Purchaser either backs out of this use case or tries again.
4a. Computer crashes or is switched off during purchase transaction:
   4a.1. (What do we do here?)
4b. Web site does not acknowledge purchase, but puts it on delay:
   4b.1. PAF logs the delay, sets a timer to ask the purchaser about the outcome.
5a. Web site does not return the needed information from the purchase:
   5a.1. PAF logs the lack of information, has the purchaser update questioned purchase.
User and Organisational Requirements:

- Shows understanding of the context of use
- Performance and satisfaction criteria
- Test methods

To produce the specification the following techniques may be used:

Interviews, Surveys, Focus Groups, field Studies, Task Analysis, Benchmark Usability Tests and Paper prototyping
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Producing Design Solutions

Typically a solution will start with a simple sketch/wireframe and through successive refinement be developed into a low fidelity prototype then a high fidelity prototype.
A easily understood and useable interface can greatly enhance Human Computer Interaction.

Interfaces will go through development from Wireframes through low fidelity prototyping to high fidelity prototyping.
The design journey from low to high fidelity prototypes will see addition of functionality to the user interface.

**Low & High Fidelity Prototyping**

<table>
<thead>
<tr>
<th>Low Fidelity</th>
<th>High Fidelity</th>
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</thead>
<tbody>
<tr>
<td>Usually paper based</td>
<td>Usually computer based</td>
</tr>
<tr>
<td>May or may not have user interactions detailed</td>
<td>Show user interactivity</td>
</tr>
<tr>
<td>Quick to create</td>
<td>As close to the final product as can be simulated</td>
</tr>
<tr>
<td>Can show early alternative designs</td>
<td>Take longer to work up</td>
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<tr>
<td>Less worked on mock ups encourage final users to comment reducing likelihood of rejection of the design</td>
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Application Style Guides

- Colour palette (maybe reinforcing brand identity)
- Fonts
- Grid layout system
- etc

some application style guide examples
Scrum development involves SPRINT phases in the product development. At each sprint phase can follow the user-centred design cycle.