User Experience Design I
(Interaction Design)

Day 3 (April 26, 2018, 9am-12pm):
Usability II and Approaches to UX/IxD
Recap Session (Previous lecture): Process Models, Elements and Usability
Bill Verplank
1. “How do you do?”

How do you affect the world?
You can grab hold of a handle and manipulate it, keeping control as you do it.

2. “How do you feel?”

How do you get feedback?
That’s where a lot of feelings come from; a lot of our emotions about the world come from the sensory qualities of those media that we present things with.

3 “How do you know?”

The map shows the user an overview of how everything works, and the path shows them what to do, what they need to know moment by moment.

source: [3]
Interaction Design Paradigms

A paradigm is an example that serves as a pattern for the way people think about something.

It is the set of questions that a particular community has decided are important. For Interaction/UX Design there is often some confusion about what paradigm you are working with. The basic question is, What is a computer?

source: [3]
GRAPHIC DESIGN  

PRODUCT DESIGN

INTERACTION DESIGN

SERVICE DESIGN

2D

3D +Z-axis (spatial depth)

4D +T-axis (temporal dimension)

5D +W-axis (multi-local simultaneity)

Model: Benjamin N.N. Schulz; Icons: Dima Yagnyuk, Daphne Espinosa, George Agpoon / The Noun Project
Double Diamond

source: [2]
Double Diamond

source: [2]
Appearance/Affordances
Appearance

Appearance is the major source (texture is the other) of what cognitive psychologist James Gibson, in 1966, called affordances.


An affordance is a property, or multiple properties, of an object that provides some indication of how to interact with that object or with a feature on that object.

source: [2&5]
Heuristic Evaluation

Visibility of system status

Match between system and the real world

User control and freedom

Consistency and standards

Error prevention

Recognition rather than recall

Flexibility and efficiency of use

Aesthetic and minimalist design

Help users recognize, diagnose, and recover from errors

Help and documentation
User Experience Design I
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Usability II and Approaches to IxD/UX
Usability II and Approaches to UX/Interaction Design

• Usability II

• The Purpose of Different Approaches

• Four Main Approaches

• User Centred Design (UCD)

• Activity Centred Design

• Systems Design

• Genius Design
Deutsche Fassung

Ergonomische Anforderungen für Bürotätigkeiten mit Bildschirmgeräten
Teil 10: Grundsätze der Dialoggestaltung
(ISO 9241-10 : 1995)

Ergonomic requirements for office work with visual display terminals (VDTs) -

Exigences ergonomiques pour travail de bureau avec terminaux à écrans de
visualisation (TEV) - Partie 10: Principes de dialogue (ISO 9241-10 : 1995)
3 Grundsätze der Dialoggestaltung


3.1 Aufgabenangemessenheit

Ein Dialog ist aufgabenangemessen, wenn er den Benutzer unterstützt, seine Arbeitsaufgabe effektiv und effizient zu erledigen.

<table>
<thead>
<tr>
<th>Empfehlungen:</th>
<th>mögliche Beispiele:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Der Dialog sollte dem Benutzer nur solche Informationen anzeigen, die im Zusammenhang mit der Erledigung der Arbeitsaufgabe stehen.</td>
<td>Formatierungen wie z.B. Farbe und Informationen wie z.B. Wochentag, Datum usw. werden nur angezeigt, wenn sie die Erledigung der Arbeitsaufgabe erleichtern.</td>
</tr>
<tr>
<td>Die angezeigte Hilfe-Information sollte von der Aufgabe abhängen.</td>
<td>Wenn der Benutzer Hilfe aufruft, zeigt das Dialogsystem Informationen zur gegenwärtigen Aufgabe an (z.B. während des Editierens eine Liste der Editierbefehle). Wenn eine Dialog-Box angezeigt wird und der Benutzer Hilfe aufruft, zeigt das Dialogsystem Informationen zu dieser Dialog-Box an.</td>
</tr>
<tr>
<td>Alle Aufgaben, die sinnvollerweise dem Dialog-</td>
<td>Die Positionsmarke wird automatisch auf das</td>
</tr>
<tr>
<td>clearly gehen, sind von der Dialog-Box zu enthalten.</td>
<td></td>
</tr>
</tbody>
</table>

ISO 9241-10

Bei der Gestaltung des Dialogs sollte der Komplexität der Arbeitsaufgabe unter Berücksichtigung der Fähigkeiten und Fähigkeiten des Benutzers Rechnung getragen werden. In einem öffentlich zugänglichen Dialogsystem wird dort, wo es eine Reihe alternativer Eingabemöglichkeiten gibt, ein Menü verwendet, um die Auswahl zu erleichtern.
Usability concept

ISO 9241:
effectiveness (% of goal achieved)  
+ efficiency (time to complete a task, or the error rate, or the amount of effort)  
+ satisfaction (subjective rating scale)  
= **Usability**
(User) Satisfaction

Satisfaction: the level of comfort that the users feel when using a product and how acceptable the product is to users as a means of achieving their goals

- Subjective aspect
- Difficult to measure
- Often be strongly correlated with effectiveness and efficiency
Usability testing determines whether the users can find and use the features in the amount of the time and effort they are willing to expend searching.

- Primary goal – improve the usability
- Real users
  - do the real task(s)
- Observation
- Analysis

ISO 9241-10
Standart Usability Lab Layout

Observer Room
- Screen-Capture Software
- Audio
- Live-Video (3 Cameras)
- Space for Attendees

User Room
- Screen(s) for Testing Prototypes
- Microphones (2)
- Pleasant Atmosphere
Lab Usability testing

Specifically constructed testing room
...instrumented with data collection devices

Separate observation room
...usually connected to the testing room by one-way mirror and audio system / data recording and analysis

Test users perform prepared scenarios
...and use the “Think aloud” technique

Problem
...very artificial setting
→ bias in test results
Usability Inspection Methods Overview

Inspection methods: need to be carried out by cognitive expert.
They are good in finding problems

- **Heuristic evaluation**: better predictor
- **Cognitive walkthrough**: finding end-user problems towards ease-of-use

(The cognitive walkthrough method is a usability inspection method used to identify usability issues in interactive systems, focusing on how easy it is for new users to accomplish tasks with the system)

Actual user testing is still **very important** (Triangulation)
User testing and inspection methods do not have a high degree of overlapping findings

source: [6]
Usability Test Plan I

• What kind of knowledge do they need to have before they can carry out the usability tests of the product?

• Where and how can you get the knowledge?

• Do you need any skill training as well? You need to specify the discussion as detailed as possible.

• What kind of team members do you like to have when you are asked to organise the usability tests?

• Would you prefer to carry the test in the lab, or in the field, or both? Why?
Usability Test Plan II

• What kind of preparations do you need to do before you can design the tests?

• What can be the best schedule?

• **Who shall be your tests subjects?** How many of them in each group? How can you find them?

• **How many tests you plan to carry out?** How would you design your testing scenarios? What kinds of design features and functions you are planning to test?
Usability Test Plan III

• **Prepare your testing tools.** What kind of tools will you need? How shall they look? What do you plan to measure?

• **Data analysis.** Based on your study plan, test your plan of measurements: How will you analyse the results? What kind of conclusions are you expecting from the data analysis?

• **Preparing your usability testing report.** Structure how your usability testing report shall look.

source: [6]
Usability II and Approaches to UX/Interaction Design

• Usability II

• The Purpose of Different Approaches

• Four Main Approaches
  • User Centred Design (UCD)
  • Activity Centred Design
  • Systems Design
  • Genius Design
Design is a funny word. Some people think design means how it looks. But of course, if you dig deeper, it's really how it works.

Steve Jobs
Usability II and Approaches to UX/Interaction Design

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Four Main Approaches

- User Centred Design (UCD)
- Activity Centred Design
- Systems Design
- Genius Design
• can be used in many different situations to create vastly different products and services,
• e.g. Web sites, consumer electronics or nondigital services.

source: [5]
• move between approaches, applying the best approach to the right context
• sometimes applying multiple approaches even within a single project.
• problematic situations can be improved by developing at least one of these approaches
## Four Approaches to Design

<table>
<thead>
<tr>
<th>Approach</th>
<th>Overview</th>
<th>Users</th>
<th>Designer</th>
</tr>
</thead>
<tbody>
<tr>
<td>User-Centered Design</td>
<td>Focuses on user needs and goals</td>
<td>Guide the design</td>
<td>Translates user needs and goals</td>
</tr>
<tr>
<td>Activity-Centered Design</td>
<td>Focuses on the tasks and activities that need to be accomplished</td>
<td>Perform the activities</td>
<td>Creates tools for actions</td>
</tr>
<tr>
<td>Systems Design</td>
<td>Focuses on the components of a system</td>
<td>Set the goals of the system</td>
<td>Makes sure all the parts of the system are in place</td>
</tr>
<tr>
<td>Genius Design</td>
<td>Relies on the skill and wisdom of designers used to make products</td>
<td>Source of validation</td>
<td>Is the source of inspiration</td>
</tr>
</tbody>
</table>

source: [5]
Expert Mindset
“users” seen as subjects (reactive informers)

Design-Led

Participatory Mindset
“users” seen as partners (active co-creators)

Research-Led

- design-led with expert mindset
- research-led with expert mindset

- design-led with participatory mindset
- research-led with participatory mindset

source: [6+7]
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Case Study:

Paul Bradly

- designed the “Microsoft Mouse”
- followed an established “User Centred Design Process” (UCD)
- helps Interaction Designers at IDEO developing their prototypes

http://www.designinginteractions.com/interviews/PaulBradly
UCD Design Process Model
Double Diamond

source: [2]
User Centred Design (UCD)

Philosophy: Users know best

People who will be using a product or service know what their needs, goals and preferences are

**Designers aren’t the users.**

Participation from users at every stage of the design process.

Roots in industrial design and ergonomics: Industrial designer Henry Dreyfuss (Bell) popularised the method with his 1955 book “Designing for People”.

Software designers were long time unaware of the method

source: [5]
Why a user centred approach?

- With increased memory and processor powers and color monitors different forms of interfaces were now possible
- In the early 1980’s a movement began focusing on the users not on computers.

source: [5]
What is a user centred approach?

- User centred approach is based on:

  **Early focus on users and tasks**: directly studying cognitive, behavioural, anthropomorphic & attitudinal characteristics

  **Empirical measurement**: users’ reactions and performance to scenarios, manuals, simulations & prototypes are observed, recorded and analysed

  **Iterative design**: when problems are found in user testing, fix them and carry out more tests
Four basic activities

- Identifying needs and establishing requirements
- Developing alternative designs
- Building interactive versions of the designs
- Evaluating designs

source: [4]
Summary:

- Goals are important in UCD -> interaction designer focus on what the user ultimately wants to accomplish.
- Interaction designer determines the user's task and means necessary to achieve those goals -> always with the users needs and preferences in mind
- Interaction designers involve users at every stage of the process
- Users are consulted of the very beginning of a new project
- Interaction designers conduct extensive research (Chapter 4) up front to determine what the users goals are in the current situation
- Interaction Designers test and try prototypes of a system with users
- User data is a determining factor throughout the project when making decisions

source: [5]
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Case Study:

Jeff Hawkins

-worked with the team that developed the first laptop, the Compass by GRID
-developed the first tablet PC, the GRIDpad
-started PALM computing

http://www.designinginteractions.com/interviews/JeffHawkins

source: [3]
Activity Centred Design

- Philosophy: Activities as the main design focus
- Activities are a cluster of actions and decisions that are done for a purpose (tasks)
- The purpose of an activity is not necessarily a goal
- Purposes are more focused and tangible than goals

source: [5]
Summary:

• The difference between a task and an activity can be fairly minor.

• Some tasks have enough parts to be considered as sub activities themselves.

• Like UCD, activity centred design relies on research as the basis for its insights, albeit not as heavily.

• Interaction designers catalog users’ activities and tasks which leads to a specific design solution to help users accomplish the task, not to achieve a goal per se.

• The activity, not the people doing the activity guides the design process.
A danger in activity centred design is that designers might not look for solutions for the problem as a “whole” (Not see the forest for the trees)

source: [5]
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Systems Design

• Analytical method of approaching design problems

• A set of entities that act upon each other is center of the design process

• Systems can range from simple (heating system in a house) to the enormously complex (power-plant)

• Systems design is a structured, rigorous design methodology

• Excellent for tackling complex problems

• Holistic design approach (focus on the context of use)

• Systems design outlines the components that systems should have: A goal, a sensor, a comparator and an actuator (these parts are shaped by the interaction designer)

• Compared to other approaches systems design provides a clear roadmap for designers to follow

source: [5]
705 ALMA ST.

ALL SYSTEMS NORMAL
01:53P Wed 09/04/02
The Goal states the **ideal relationship** between the system and the environment it lives in.
Systems Design

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source: [5]
Flow Diagram

Represent a series of events, actions or processes of different actors. Usually have a beginning and an end point.
Systems Design

• What is the environment?

• What goal does the system have in relation to its environment?

• What is the feedback loop by which the system corrects its actions?

• How does the system measure whether it has achieved its goal?

• Who defines the system, environment, goals and monitors it?

• What resources does the system have for maintaining the relationship it desires?

• Are the resources sufficient to meet the system's purpose?
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Genius Design

• Philosophy: Design relies almost solely on the wisdom and experience of the interaction designer making the design decisions.

• Probably best practiced by experienced designers who have encountered several types of problems and can draw solutions from previous design issues
"Great design is as much about prospecting in the past as it is about inventing the future."

Bill Buxton
Beau Brownie Camera 1930

iPod Shuffle 2004

source: [8]
"A mobile device with a touch interface and only one physical button?"
References (Books):


References (Papers):


Articles: