User Centred Approach

Department of Computer Science | Software Analysis &Design
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Overview of this lecture

- User Centred Approach
- What Do IT professionals do?

- Reading material:
  - ID chapter 2

User Centred Approach

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What is a user-centered approach?

User-centered approach is based on:

- *Early focus on users and tasks:*
  - directly studying cognitive, behavioral, anthropomorphic, and attitudinal characteristics
- *Empirical measurement:*
  - users' reactions and performance to scenarios, manuals, simulations, and prototypes are observed, recorded, and analyzed
- *Iterative design:*
  - when problems are found in user testing, fix them and carry out more tests
- Gould and Lewis (1985)

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Basic activities of User Centred Approach

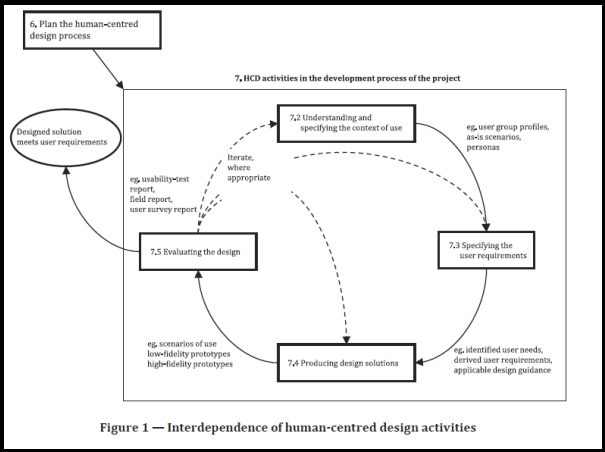


Figure 1 — Interdependence of human-centred design activities

Reference: ISO 9241-210:2019

Importance of involving users

Expectation management

- Realistic expectations
- No surprises, no disappointments
- Timely training
- Communication, but no hype

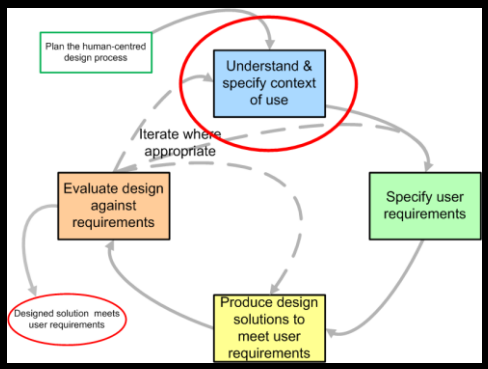
Ownership

- Make the users active stakeholders
- More likely to forgive or accept problems
- Can make a big difference in acceptance and success of product

Degrees of user involvement

- Face-to-face group or individual activities
  - Most frequently used to involve users
- Member of the design team
  - Full time: constant input, but lose touch with users
  - Part time: patchy input, and very stressful
  - Short term: inconsistent across project life
  - Long term: consistent, but lose touch with users
- Online contributions from thousands of users
  - Online Feedback Exchange (OFE) systems
  - Crowdsourcing design ideas
  - Citizen science
- User involvement after product release

Understanding Context of Use



The Context of Use

- Where will the software be used by this user group?
  - The actual space where the software is used
  - At one place vs. everywhere
    - At a hospital vs. In the nature vs. All over
  - Desktop computing vs mobile computing



Definition from ISO 9241-210:2019

- The Context of Use
  - Combination of users, goals and tasks, resources and environment
  - Note 1: The „environment“ in a context of use includes the technical, physical, social, cultural and organizational environments

Methods: Understand the Context of Use

Interviews

Meetings

Field study

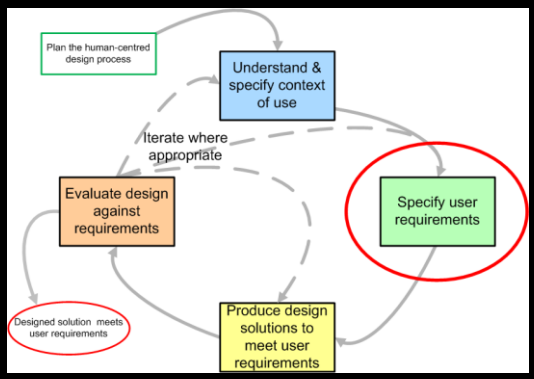
Workshops

Context of Use Described in User Groups

	Students in Iceland	Students Abroad	Graduated Student
WHO	**Age:** 19 - 99 **Gender:** All genders **Education:** Graduated from high school **Abilities/Disabilities:** nothing special **Computer skills:** Very good **Number:** ca. 4.000	**Age:** 19 - 99 **Gender:** All genders **Education:** Graduated from high school **Abilities/Disabilities:** nothing special **Computer skills:** Very good **Number:** ca. 2.000	**Age:** 20 - 99 **Gender:** All genders **Education:** Graduated from university **Abilities/Disabilities:** nothing special **Computer skills:** Various, depends on the age **Number:** ca. 30.000
WHY	Apply for loans and grants, look up the status of the laons and get information	Apply for loans and grants, look up the status of the laons and get information	Get information on the loans and payments
WHAT	The technical environment varies, but ususally they have good equipment and internet connection	The technical environment varies, because the students can be all over the world, but most of them have good equipment and internet connection	The technical environment varies, but ususally they have good equipment and internet connection

	Students in Iceland	Students Abroad	Graduated Student
WHERE	The physical environment is usually good both at home and at the university	The physical environment is usually good both at home and at the university	The physical environment is usually good
WHEN	**How often:** Mostly used in start and the end of the semester, less inbetween **For how long each time:** The system is used for ca. 30 mins - 1 hour each time **Skills:** Users will never get skilled in using the system, since they use it so infrequently	**How often:** Mostly used in start and the end of the semester, less inbetween **For how long each time:** The system is used for ca. 30 mins - 1 hour each time **Skills:** Users will never get skilled in using the system, since they use it so infrequently	**How often:** Mostly used twice a year, when paying the payments **For how long each time:** The system is used for ca. 15 mins each time **Skills:** Users will never get skilled in using the system, since they use it so infrequently
HOW	MOST IMPORTANT + Students Abroad	MOST IMPORTANT + Students in Iceland	Second most important user group

Specify User Requirements



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Some practical issues

- Who are the users?
- What are the users' needs?
- How to generate alternative designs?
- How to choose among alternatives?
- How to integrate interaction design activities with other lifecycle models?

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Who are the users/stakeholders?

Not obvious

- 382 distinct types of users for smartphone apps (Sha Zhao et al, 2016)
- Many products are intended for use by large sections of the population, so user is “everybody”
- More targeted products are associated with specific roles

Stakeholders

- Larger than the group of direct users
- Identifying stakeholders helps identify groups to include in interaction design activities

What are the users’ needs?

- Users rarely know what is possible
- Instead:
  - Explore the problem space
  - Investigate who are the users
  - Investigate user activities to see what can be improved
  - Try out ideas with potential users
- Focus on peoples’ goals, usability, and user experience goals
  - rather than expect stakeholders to articulate requirements

Methods: Specify User Requirements

User Stories

Mr. and Mrs. Macomb are retired schoolteachers who are now in their 70's. Their Social Security checks are an important part of their income. They've just sold their big house and moved to a small apartment. They know that one of the many chores they need to do now is to tell the Social Security Administration that they have moved. They don't know where the nearest Social Security office is and it's getting harder for them to do a lot of walking or driving, so they would like to do this on the computer if it is easy and safe enough. However, they are somewhat nervous about doing a task like this by computer. They never used computers in their jobs; but their son, Steve, gave them a computer last year, set it up for them, and showed them how to use email and how to go to Web sites. They have never been to the Social Security Administration's Web site, so they don't know how it is organized. Also, they are reluctant to give out personal information on Web sites, so they want to know how safe it is to tell the agency about their new address this way.

Scenarios

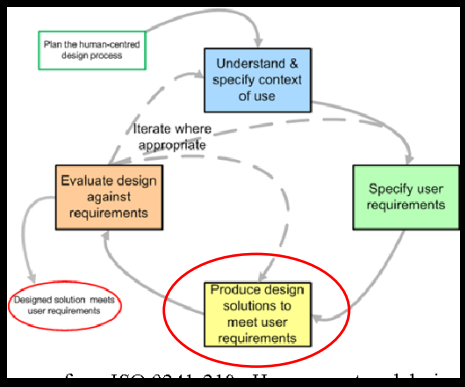
Name	Buy Product
Number	1
Description	The customer searches for a product, finds it, and buys it.
Priority	High
Author	Skúli Arnlaugsson
Source	1 (in requirements)
Actors	Online customer, warehouse
Precondition	The customer has a user in the system, product is in warehouse stock
Postcondition	An order is ready to be handled by the warehouse, and the purchase has been credited to the customer's credit card.

Use Cases

1. 90% of students can find information about how to apply for funding (effectiveness)
2. It takes each student less than 2 minutes to apply for funding (efficiency)
3. Students grade their overall satisfaction above 4 on average on a 1- 5 scale (Satisfaction)

Usability Goals

Produce Design Solutions



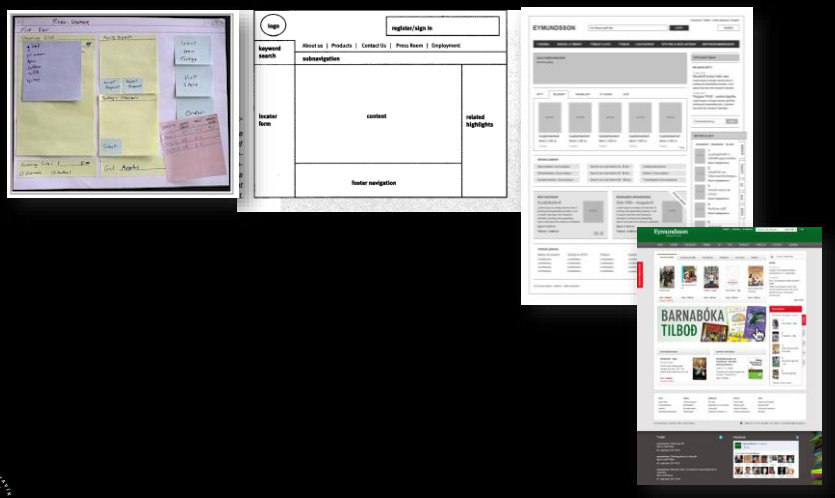
How to generate alternatives

- Humans tend to stick with something that works
- Considering alternatives helps identify better designs
- Where do alternative designs come from?
  - 'Flair and creativity' : research and synthesis
  - Cross-fertilization of ideas from different perspectives
  - Users can generate different designs
  - Product evolution based on changing use
  - Seek inspiration: similar products and domain, or different products and domain
- Balancing constraints and trade-offs

How to choose among alternatives

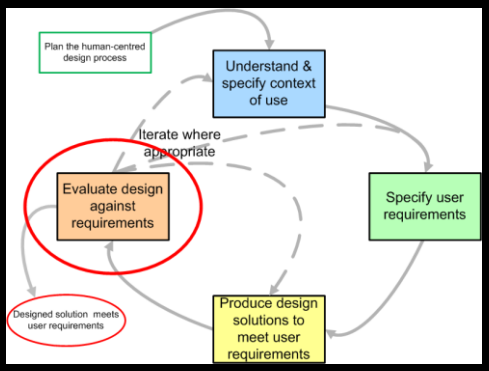
- Interaction design focuses on externally-visible and measurable behavior
- Technical feasibility
- Evaluation with users or peers
  - Prototypes not static documentation because behavior is key
- A/B Testing
  - Online method to inform choice between alternatives
  - Nontrivial to set appropriate metrics and choose user group sets
- Quality thresholds
  - Different stakeholder groups have different quality thresholds
  - Usability and user experience goals lead to relevant criteria

Methods: Produce Design Solutions



Definition of Prototype – ISO 9214-210:2019

- Representation of all or part of an interactive system, that, although limited in some way, can be used for analysis, design and evaluation



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Methods: Evaluations

Expert evaluation

Remote testing

Formal evaluation

Informal evaluation

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Researching User Involvement in Software Projects

- IT professionals in Sweden, Danmark and Iceland in many studies
  - In various roles: Developers, UX specialists, UX consultants, Business Analysts, Scrum Masters, Product Owners, Software Architects
- Many collaborators – Academics and research students

Asked These Questions

- What are the most freqently used UCD methods?
- What are the highest rated UCD methods?
- When are the methods used?
- What matters for succeeding?
- When are users involved?

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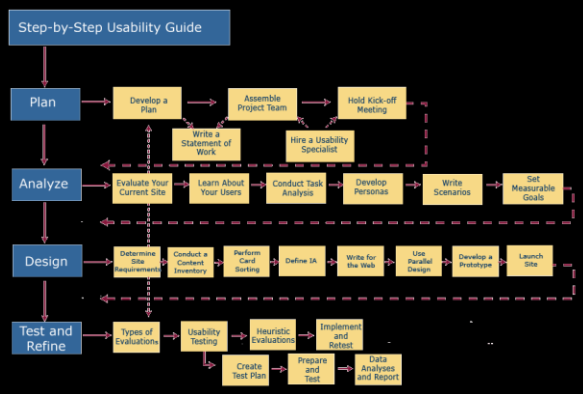
What UCD Methods Are Used?



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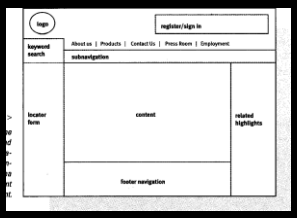
More than 50% of Participants Used

Interviews

Meetings



Low-fi prototyping /wireframes

Workshops

The Frequency of Using Usability Techniques

Table 2. The Frequency of Using the Usability Techniques

Usability techniques	Once a week or more	2 -3 times a month	7 – 12 times a year	2 – 6 times a year	Once a year or less	N*
Interviews	9%	13%	22%	44%	13%	25
Questionnaires	0%	0%	0%	25%	75%	9
Workshops	7%	7%	25%	50%	11%	30
Meetings with users	15%	10%	30%	35%	15%	21
Field studies	0%	0%	7%	53%	40%	17
Usability goals	21%	7%	29%	29%	14%	15
Scenarios	24%	24%	18%	24%	12%	17
Personas	6%	19%	13%	25%	38%	15
Digital prototyping	24%	12%	6%	35%	24%	17
Lo-fi prototyping	40%	20%	15%	20%	5%	20
Formal usability evaluation**	0%	0%	18%	82%	0%	11
Informal usability evaluation**	25%	25%	13%	50%	13%	8
Heuristic evaluation	0%	25%	0%	50%	25%	4

* N represents the number of respondents who had used the technique in their projects.
** With users participating.

The Highest Rated of UCD Techniques

Table 3. The Rating of the Usability Techniques

Usability techniques	Very good	Fairly good	Neither good or bad	Fairly bad	Very bad	N*
Interviews	28%	60%	8%	4%	0%	25
Questionnaires	0%	33%	56%	11%	0%	9
Workshops	38%	62%	0%	0%	0%	30
Meetings with users	38%	57%	5%	0%	0%	21
Field studies	59%	29%	12%	0%	0%	17
Usability goals	53%	20%	27%	0%	0%	15
Scenarios	35%	59%	0%	6%	0%	17
Personas	40%	40%	13%	7%	0%	15
Digital prototyping	59%	30%	12%	0%	0%	17
Lo-fi prototyping	50%	25%	20%	5%	0%	20
Formal usability evaluation**	73%	18%	9%	0%	0%	11
Informal usability evaluation**	25%	75%	0%	0%	0%	8
Heuristic evaluation	25%	50%	0%	25%	0%	4

* N represents the number of respondents who had used the technique in their projects.
** With users participating.

The Highest Rated Methods

Informal evaluation

Workshops

Formal evaluation

Highest rated

Rarely used??

WHY do Some Succeed?

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The Male UX Specialist

- PhD in HCI
- 46 years old
- 13 years of experience in different consultant companies
- Has integrated UX in several Scrum projects

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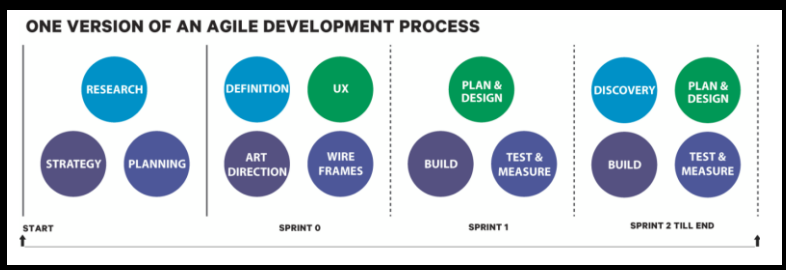
His Focus and Opinions

- The strategic vision and the UX goals are necessary to define
  - before the actual project starts
- The big picture of UX is missing in Scrum
  - Scrum is feature oriented
- Most user involvement should be done before production starts
  - and then every now and then
- Close collaboration with the PO is important

His Way of Integrating UCD and Scrum



REFERENCE:
http://adsubculture.com/traffic-project-management/2015/1/21/the-difference-between

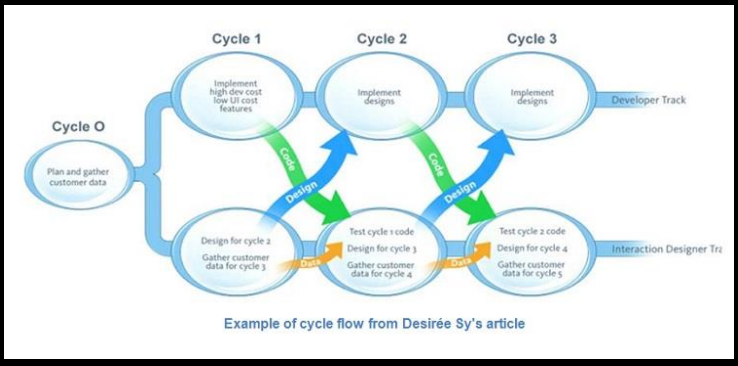
The Female UX Specialist

- Master of Media Technology Science
- 35 years old
- 4 years of experience from working in industry
- UX specialist
- Very successful in her work so far

Her Focus and Opinions

- She was the owner of the design
  - The team was collaborating on developing that
  - Collaborated with informal leaders of the teams
- Being a part of the whole project is needed
  - Small talk essential
- Her company started to sell UX
  - rather than features
- Hard to find good timing for UX evaluation in Scrum
- She often designs one sprint ahead

Her Approach as Suggested by Sy



Example of cycle flow from Desirée Sy's article

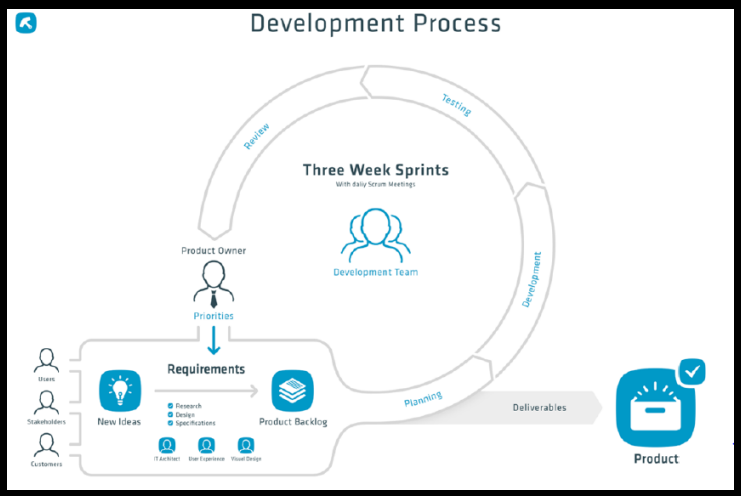
Desirée Sy. 2007. Adapting usability investigations for agile user-centered design. *J. Usability Studies* 2, 3 (May 2007), 112-132.

WHEN are Users Involved?

Infinit Project in Danmark

- Interview study – 10 people
  - Manager,
  - Project leader,
  - 3 Developers,
  - Software Architect,
  - 4 UX consultants
- We asked all of them to draw the process the have for including UX

Their Process – How they Describe it Formally



UX Consultants Activities and Deliverables

UX Method/Techniques	Activities	Deliverables
Kick-off workshop	1) Success criteria, KPI's and vision 2) User journey - creating a holistic overview of the solution 3) Scoping the task - we prioritize which areas to conceptualize	1) Alignment between stakeholders 2) Definition of scope
User Stories	1) Insights in user behaviour, needs and motivation 2) Creating user profiles e.g. persona, scenarios and more	1) Ensuring a user centri mindset so that the solution supports common user goals, needs and workflows
Concept Development	1) Creating a visual artefact to align stakeholders and validate features e.g. skteches or more detailed wireframes	1) A validated concept aligned with both users and business objectives
UI Design	1) Defining the visual appreance 2) Creating specifications e.g. design guides and styles sheets	1) Consitency throughout the solution in regards to business identity and values 2) Ready to implementation

Integrating UCD activities within other models

- Integrating UCD activities in lifecycle models from other disciplines requires careful planning
- Software development lifecycle models are prominent
- Integrating with agile software development is promising because:
  - It incorporates tight iterations
  - It champions early and regular feedback
  - It handles emergent requirements
  - It aims to strike a balance between flexibility and structure

Some key points

Four basic activities in user centred approach

- Discovering requirements
- Designing alternatives
- Prototyping
- Evaluating

User-centered approach rests on three principles

- Early focus on users and tasks
- Empirical measurement using quantifiable and measurable usability criteria
- Iterative design

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