TIE-41206 Human centered product development
Lecture 1 (10.1.2014):
Introduction, definitions, history, motivation
Contents of the first lecture

General view
- Goals of the course
- Content, schedule
- Requirements
- Practicalities
- Q & A

Overview of the field (mind map…)

Terminology
History
Motivation
A learning goal not necessarily achieved, but we’re aiming at it (not listed in official goals):

- After the course the student can:
  - Successfully take care of communicating human centered issues in product development organization
    - Ability to get experts and managers to understand usability and user experience largely enough
    - Ability to communicate usability goals of a project to all central stakeholders
    - Ability to communicate the means to achieve a good end result. Requires also listening to the stakeholders!
The nature of this course

- Frameworks – general view about how UX/usability should be visible in product development
  - We put lot of emphasis on software engineering, that’s where interactivity (and the problems) originates from
- Some views about methods, but there are other courses...
- Views from other fields and courses, e.g. software engineering, marketing, industrial economics, technology strategy, futurology, product development...
  - Looking things from the perspective of user centeredness
Contents of the lectures

Topics 1 & 2: Perspectives & Methods:

1. Intro + definitions + history (+ article)
2. Stakeholders
3. Segmentations, values (+article)
4. Working in multidisciplinary team (+ article)
5. Requirements, Goals, methods for understanding…
6. Trends, concepting, innovating, futurology
7. Services, products, coherence, business…. And explaining why
   UCD is economical (ROI) (+ article)
8. Context
9. Ideation techniques, prototyping, (industrial) design
10. User experience
11. Work related systems vs. consumer products

NOTE: The lectures, their order and content is subject to changes!
Contents of the lectures

**Topic 3: Bringing usability into the processes**

12. Software processes in relation to usability (+ article)
13. Integrating usability in product development, maturity
14. Software architecture and usability
15. Development processes and product lifecycles, case in machinery automation
16. Visiting lecture Kati Kuusinen (TUT): Agile UX
17. Visiting lecture Ville Nore (F-secure): User research in F-secure
18. Summary and discussion
Practices, Jari Laaksonen

1. Ideation techniques
2. Stakeholders
3. Product and the user
4. Reverse engineering (contains a homework)
5. Visionary concepting
6. Agile product development
7. Usability goals and measures
8. User experience
9. Use cases
10. SW architecture & Usability
11. Prototyping
12. Summary & Feedback
Practice assignment

- Group work in teams of 2-3
- Sign up in POP (opens at latest 14\textsuperscript{th} of Jan)
  - DL 24.1.2013
- Supervised by Jari Laaksonen

- Always use \texttt{katu@cs.tut.fi} when communicating to course personnel unless otherwise instructed
Requirements for passing the course

- Approved practice assignment and exam.
- Taking notes in one lecture and returning them to Jarmo within two days.

- Exam covers issues from the lectures and a package of six articles
  - Introduction to Agile Usability - User Experience Activities on Agile Development Projects: [Link](http://www.agilemodeling.com/essays/agileUsability.htm)

The list will be finalized later
Other practicalities

- WWW: http://www.cs.tut.fi/kurssit/IHTE-3100 and www.cs.tut.fi/~katu (both lead to same place)
- Email: katu@cs.tut.fi
- Attending 6 or more weekly practices (+ guest lectures and the last lecture) will give you 1-5 bonus points that will be added to an accepted exam.

Notice: practice assignment and exam need to part of the same course instance (3 exam trials)
Q & A

Course staff:

• Jarmo Palviainen, TC209
  Responsible for the course & lectures

• Jari Laaksonen, TC 213 (not there much, though)
  Main assistant and the only assistant 😊
  Weekly practices, assignment work,
Central terminology

Product
Interactive product  (vuorovaikutteinen tuote in Finnish)
Product development process
Usability  (käytettävyyys)
User experience  (käyttäjäkokemus)
User
Consumer
Customer
Stakeholder  (sidosryhmä!)
Context of use  (käyttökonteksti)
User/Human centered design (process)
Human centered product development
Life cycle: product, use and product development  (elinkaari)
"A product is anything that can be offered to satisfy a need or want. -- A product or offering can consist of as many as three components: physical good(s), service(s), and idea(s)."

## Product examples & attributes

<table>
<thead>
<tr>
<th></th>
<th>Screwdriver (Stanley)</th>
<th>Rollerblade (HP)</th>
<th>Laser printer (Chrysler)</th>
<th>Car (Chrysler)</th>
<th>Aeroplane (Boeing)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Annual production</strong></td>
<td>100 000</td>
<td>100 000</td>
<td>1,5 millions</td>
<td>250 000</td>
<td>50</td>
</tr>
<tr>
<td><strong>Life cycle (years)</strong></td>
<td>40</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>30</td>
</tr>
<tr>
<td><strong>Sales price ($)</strong></td>
<td>3</td>
<td>200</td>
<td>365</td>
<td>19 000</td>
<td>130 mil</td>
</tr>
<tr>
<td><strong>Number of components</strong></td>
<td>3</td>
<td>35</td>
<td>200</td>
<td>10 000</td>
<td>130 000</td>
</tr>
<tr>
<td><strong>Development time (years)</strong></td>
<td>1</td>
<td>2</td>
<td>1,5</td>
<td>3,5</td>
<td>4,5</td>
</tr>
<tr>
<td><strong>Size of the internal dev. Team in the company (persons)</strong></td>
<td>3</td>
<td>5</td>
<td>100</td>
<td>850</td>
<td>6 800</td>
</tr>
<tr>
<td><strong>Extended dev. team (persons)</strong></td>
<td>3</td>
<td>10</td>
<td>100</td>
<td>1400</td>
<td>10 000</td>
</tr>
<tr>
<td><strong>Dev. costs ($)</strong></td>
<td>150 000</td>
<td>750 000</td>
<td>50 mil</td>
<td>1 000 mil</td>
<td>3 000 mil</td>
</tr>
<tr>
<td><strong>Investments in production ($)</strong></td>
<td>150 000</td>
<td>1 mil</td>
<td>25 mil</td>
<td>600 mil</td>
<td>3 000 mil</td>
</tr>
<tr>
<td><strong>Dev. Costs % of the sales during the life cycle</strong></td>
<td>1,25</td>
<td>1,67</td>
<td>3,04</td>
<td>0,04</td>
<td>0,02</td>
</tr>
</tbody>
</table>

Different product types (1/2)

consumer products - used by end users
industrial products - used in the production of other goods
convenience goods - purchased frequently and with minimal effort
impulse goods - purchase stimulated by immediate sensory cues
emergency goods - goods required immediately
unsought goods - e.g., cemetery plots, insurance

Note! Partially overlapping, e.g. ”consumer” and ”impulse”
perishable goods - goods that will deteriorate quickly even without use

durable goods - goods that survive multiple use occasions

non-durable/consumption/consumable goods - goods that are used up in one use occasion

capital goods - installations, equipment, and buildings

parts and materials - goods that go into a finished product

commodities - undifferentiated goods (e.g., wheat, gold, sugar)
Course focus

- Products containing interactive technology
  - Information, communication, automation and machinery technology...

- Bringing the user into the development so that all stakeholders will be accounted for
Interactive product

**Human**
- Cognitive and physical abilities,
- Needs, tasks, motivation

**Product**
- Functionality,
- Technical properties,
- Form (design), I/O-devices

**Context of use**
Physical, social, technical, ...

⇒ UCD = User-Centered Design, HCD = Human Centered Design
Core benefits of a product

- Benefit from the use/functionality
- Psychological benefit (status, hope, self esteem etc.)
  - Central to understand in user experience
- Removing problems (safety, comfort)
Product development process

- Stepwise description of how to transform an idea into a ready product
- Names may vary:

- HCD is most central in the early stages
SW-engineering perspective

- Business, management
- Quality system
- Managing Programs (product level)
- Project management
- Specification
- Design
- Implementation
- Testing
- Introduction, Maintenance
- Managing Product
- Managing Quality
- Documentation
- Managing requirements

[Haikala & Märijärvi: Ohjelmistotuotanto, 2004]
Definition of usability
(ISO 9241-11, 1998)

• “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.”
  • FIN: ”Tarkoituksenmukaisuus, tehokkuus ja tyytyväisyys, jolla tuotteen määritellyt käyttäjät saavuttavat määritellyt tavoitteet tietyissä käyttöympäristöissä.”

• Effectiveness – reaching a goal
  • Fin: tarkoituksenmukaisuus

• Efficiency – used resources per task, e.g. time per task
  • Fin: tehokkuus

• Satisfaction – subjective rating
  • Fin: tyytyväisyys
User Experience (Käyttäjäkokemus)

- Describes holistic experience throughout the whole use lifecycle
- Emphasis on context of use
- Perspectives: psychological, social, emotional user

Diagram: Dan Saffer: Designing for Interaction, 2009
User, customer, consumer

- **User**
  - Interacts with the product

- **Customer**
  - Buys,
  - typically the target of the marketing,
  - often defines requirements

- **Consumer**
  - Buyer and user of a consumer product

Warning: Customer rarely represents user!
Stakeholder (Sidosryhmä)

- Parties, whom actions of an organization may affect, who can affect the actions of an organization or who are concerned by actions of an organization

- For us:
  - Those who affect or benefit from the product, inside and outside of an organization

- Next lecture
Product life-cycle

Introduction, growth, maturity, decline

[Kotler, Marketing Management, p. 304]


[Mike Volker
www.sfu.ca/~mvolker/biz/pushpull.htm]
“A brief history of usability and a few other things”
The role of psychology in usability field

- Cognitive models from the 50’s still important in modelling
- Empirical tradition of experimental psychology
- Social psychology still in minor role in usability – until very recently

Green, Rebecca et al. WADC/WADD History - 50 Years of Human Engineering - History and Cumulative Bibliography of the Fitts Human Engineering Division. 1995.
Human-Computer Interaction (HCI): 1980-

- Focus on the (user) interfaces between human and machines
- Different interaction techniques
- Applying psychology, sociology and pedagogy
Human/User-Centered Design, HCD/UCD: 1990-

- Wider perspective on engineering
- How to get user perspective in systems development or production process
- Multidisciplinary teams
Towards more holistic design: User Experience design: 2000-

- Context and earlier experiences
- Multimodal interaction
- Social interaction, emotions

[Follizzi & Battarbee, 2004]
Why user centered design is necessary?
Why

Airbus A320, accident
20.01.1992
Airbus buttons

Modes in the panel

Speed/angle of landing

Mode switches

Speed/angle handling

3300 ft/minute (1000m/min), should have been 3.3 angle/min, now it was 60 angles
The coders way?
Reading related to the lecture 1
(we will discuss this briefly in the next lecture):


http://proquest.umi.com/pqdlink?vinst=PROD&fmt=6&startpage=-
1&ver=1&vname=PQD&RQT=309&did=477180641&exp=03-01-2015&scaling=FULL&vtype=PQD&rqt=309&cfc=1&TS=1267521826&clientId=23383