History of user centered design in HCI
July 2 - July 5

Academic HCI
July 8 - July 12

Special topics in HCI
July 15 - July 17

Course Review
July 19 - July 22

Presentation 2
July 24 - July 26

Last class
July 29

User Centered Design Process
May 6 - June 28
Stages in the development of a technology
(by David Liddle)

Enthusiast stage

Professional stage

Consumer stage

http://www.candstech.com

https://www.falmouth.ac.uk/

https://www slashgear.com/
“The need for the future is not so much computer oriented people as for people oriented computers” (Nickerson, 1969)
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Concept of Digital Natives and Digital Immigrants, Marc Prensky, 2001
User Centered Design in Computer Systems

History

- Waterfall Model
- GUI and WIMP
- Agile Development

User Centered Design in Computer Systems

- HFE and Ergonomics
- Socio-Technical Systems Design
- Cognitive Psychology
- Cooperative Design
- Interaction Design
1880-90s - Frederick Taylor - "scientific management" method

Goals of occupational health and safety and productivity

Maximizing the safety and healthiness of work environments and work practices

Gained popularity in 1940s

Concept of ergonomic fit: “fitting the man to the job and the job to the man” (Alec Rodger)

http://www.computerhistory.org/timeline/1951/
User Centered Design in Computer Systems

History

Waterfall Model

User Centered Design

HFE and Ergonomics

Socio-Technical Systems Design

Term was coined by Fred Emery and Eric Trist (1950s)

Describes systems that involve a complex interaction between humans, machines, and the environmental aspects of the work system

STSD guiding principles:
- Meaningfulness of tasks
- Whole task and minimal critical specification
- Responsible autonomy
- Adaptability
“Digital Equipment Corporation (DEC) had a family of expert systems that were developed using STSD to support the configuration and location of DEC VAX computers”

Cognitive modeling - approximation of human reasoning
Developed as a method in late 50s - early 60s
Computational process as a metaphor for human reasoning:
- Input
- Memory and storage
- Information manipulation
- Output

Early models focused on separate stages, then
Unified theories of cognition by Allen Newell, 1990
How people reason and problem solve when using complex interfaces?
Originated in Scandinavia in 1970s from an action research approach. In North America, referred to as participatory design / co-design approach.

Focused on process, not style.

<table>
<thead>
<tr>
<th>Degrees of participation:</th>
<th>Weak participation</th>
<th>Strong Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interaction</td>
<td>Indirect</td>
<td>Direct</td>
</tr>
<tr>
<td>Length</td>
<td>Short</td>
<td>Long</td>
</tr>
<tr>
<td>Scope</td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>Control</td>
<td>Very limited</td>
<td>Very broad</td>
</tr>
</tbody>
</table>

Baek, Eun-Ok, et al. "User-centered design and development."
Term was coined by **Bill Moggridge** and **Bill Verplank**, mid-1980s

The design of the interaction between users and products

First design programs:
- the Visible Language Workshop, Muriel Cooper, MIT, 1975
- the Interactive Telecommunications Program, Martin Elton, NYU, 1979

The first academic program:
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Interaction Design
The first mentioning:
Herbert D. Benington,
Symposium on advanced programming methods for digital computers, 1956

The first formal description:
Winston W. Royce,
"Managing the Development of Large Software Systems", 1970
History

The first formal description:
History

Waterfall Model

The first formal description:

Additional requirements:
1. Program design comes first
2. Document the Design
3. Do it twice
4. Plan, Control and Monitor testing
5. Involve the Customer
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NLS - oN-Line System - developed by Douglas Engelbart and his colleagues at the Augmentation Research Center, SRI

First demonstrated December 19, 1968 at the Fall Joint Computer Conference, San Francisco.
Was called “The mother of all demos”

“We were not just building a tool, we were designing an entire system for working with knowledge.” Douglas Engelbart
Doug Engelbart at an NLS workstation

Bill English with several ergonomic setups for the oNLine System (NLS); late 1960s
Hypertext Editing System (HES) console, 1969

DATAR Trackball, 1952

Doug Engelbart’s mouse prototype, 1968

Hypertext Editing System (HES) console, 1969

PARC 5-key Chord Keyboard
Dynabook by Alan Kay, "A personal computer for children of all ages", 1972

Concept of a portable educational device. Target audience was children.

“If the computer is to be truly ‘personal’, adult and child users must be able to get it to perform useful activities without resorting to the services of an expert. Simple tasks must be simple, and complex ones must be possible.” Alan Kay
PARC’s Alto computer, 1973

Developed at Xerox PARC, inspired by NLS and Dynabook

First computer to support operating system using GUI, used bitmap display, first to use an early version of the desktop metaphor

“If our theories about the utility of cheap, powerful personal computers are correct, we should be able to demonstrate them convincingly on Alto,” Butler Lampson
**History**

**Bravo** - the first WYSIWYG document preparation program, 1974

**Gypsy** - the first document preparation program to use mouse as a point-and-click interface tool, 1975

**Tim Mott and Larry Tesler**

Tim Mott’s sketch of a desktop on a bar napkin, From: Bill Moggridge and Bill Atkinson. Designing interactions.
PARC’s Alto computer, 1973

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Xerox Alto GUI
History

*Apple Lisa (1983)*

*Apple Macintosh (1984)*
History

Texas Instruments Silent 700, 1973

Osborne 1 computer, 1981
History

GRiD Compass 1101, 1982

Designed by Bill Moggridge and John Ellenby

First laptop computer, clamshell design, easy-to-read screen, allowing full 80x24 text, used graphical GRID-OS, no mouse
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Agile Development

The Manifesto for Agile Software Development, 2001

- Focus on Individuals and Interactions
- Presenting Working Software
- Continues process of Customer Collaboration
- Responsiveness to Changes and Continuous Development
Agile Development Principles

- Customer satisfaction by early and continuous delivery of valuable software
- Welcome changing requirements, even in late development
- Working software is delivered frequently (weeks rather than months)
- Close, daily cooperation between business people and developers
- Projects are built around motivated individuals, who should be trusted
- Face-to-face conversation is the best form of communication (co-location)

- Working software is the principal measure of progress
- Sustainable development, able to maintain a constant pace
- Continuous attention to technical excellence and good design
- Simplicity—the art of maximizing the amount of work not done—is essential
- Best architectures, requirements, and designs emerge from self-organizing teams
- Regularly, the team reflects on how to become more effective, and adjusts accordingly