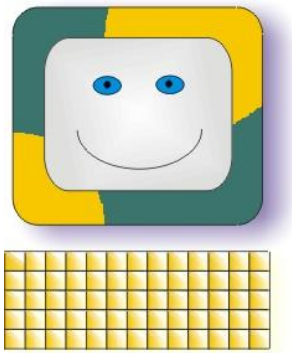
Human Computer Interaction (HCI)

Designing Interactive systems
Lecture 1

dr Kristina Lapin





Objectives

- The variety of interactive systems
- Evolution
- Concerns of interactive system design
- Course requirements
- Learning resources

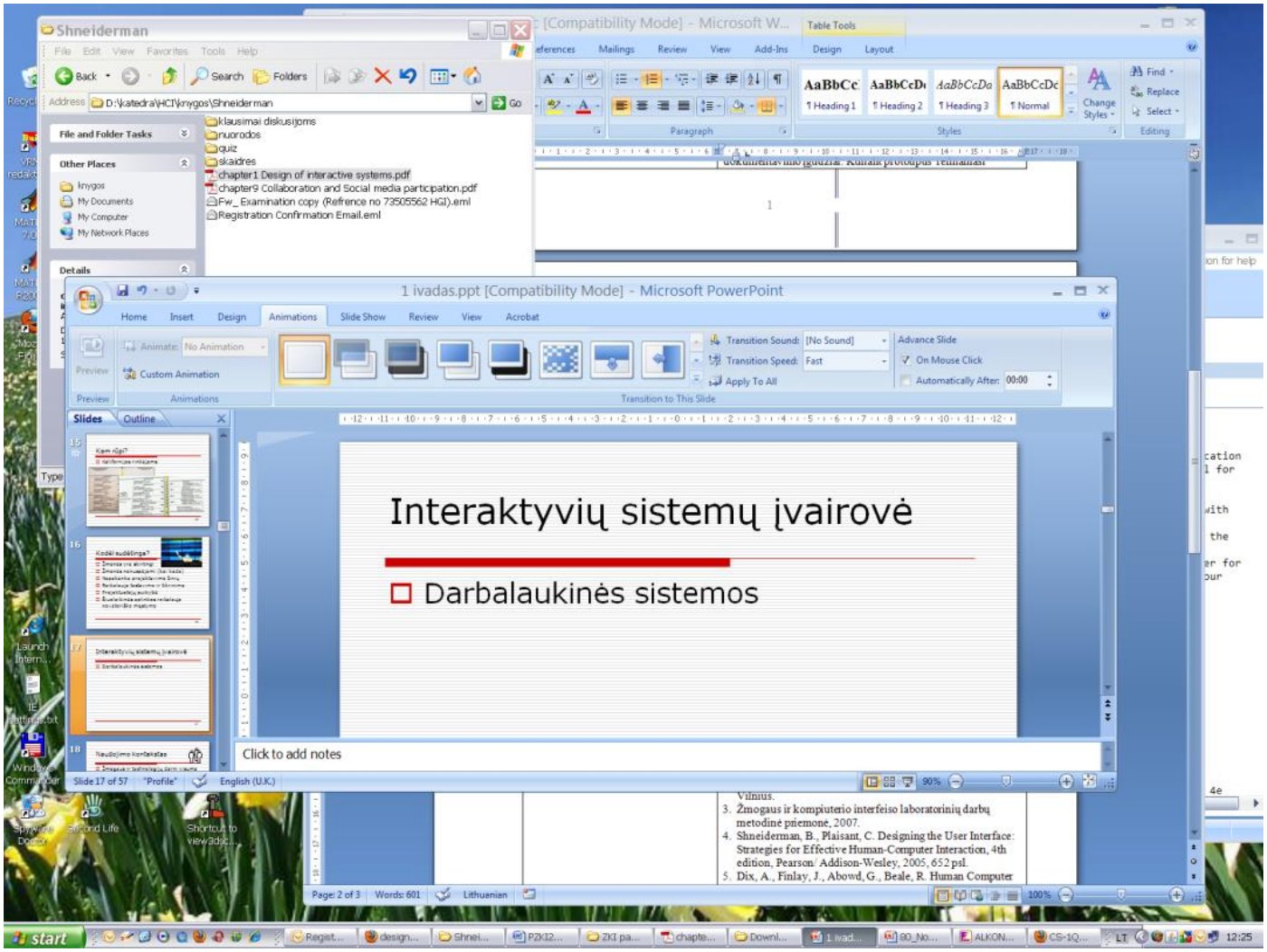
Aims

- The variety of interactive systems
- The concerns of interactive systems
- Evolution
- Being digital
- The skills of interactive systems designed
- Importance of human computer interaction

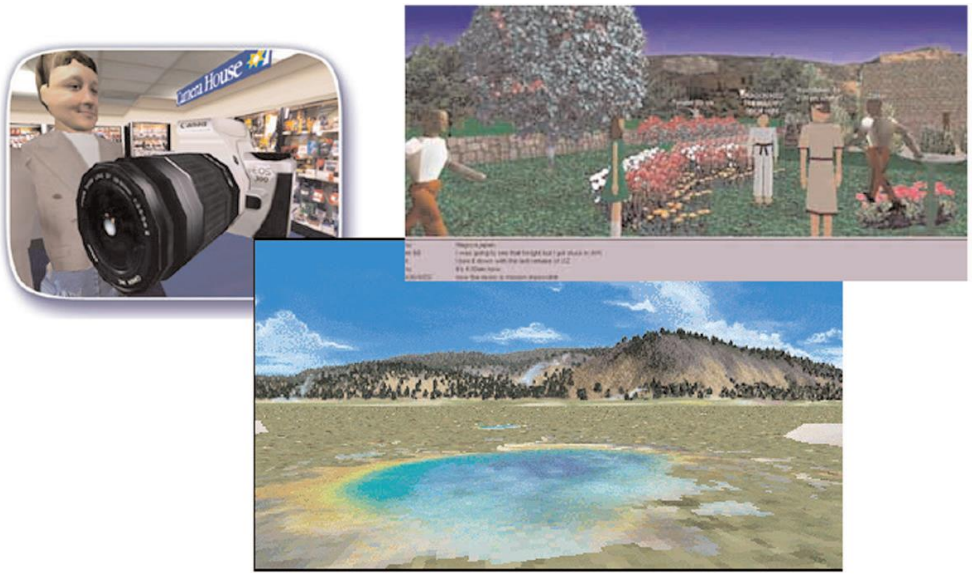
Smart phones

- 2007: iPhone
  - Touch screen
  - Multi-touch input
  - New ways of interaction
    - Pinching for zooming
    - Sensors how phone is held
      - Portrait, landscape styles
  - iTunes delivery service

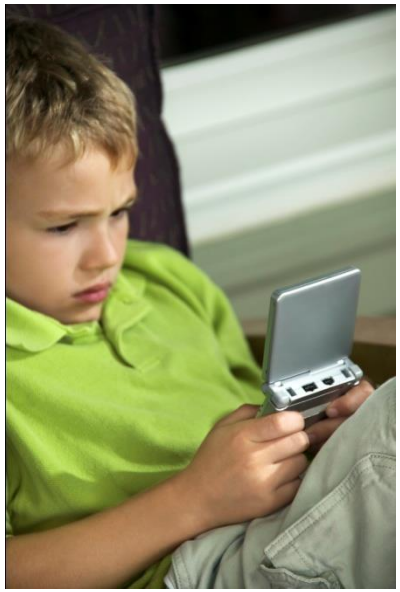
Desktop systems



Virtual reality



Immersive technologies



Virtual worlds

Second life is a huge on-line community populated by animated virtual people (avatars). Consists of simulated islands with parks, buildings, etc. People create the avatars to represent themselves.

http://www.thefuntheory.com/

Ambient technologies

http://www.youtube.com/watch?v=2lXh2n0aPyw&feature=player_embedded#!

Domestic toy robot i Robo Q

- moves freely around the house
- reacts to voice commands,
- monitors its surroundings with a surveillance camera and takes pictures
- teaches children languages,
- plays games,
- provides the weather forecast, news and recipes.

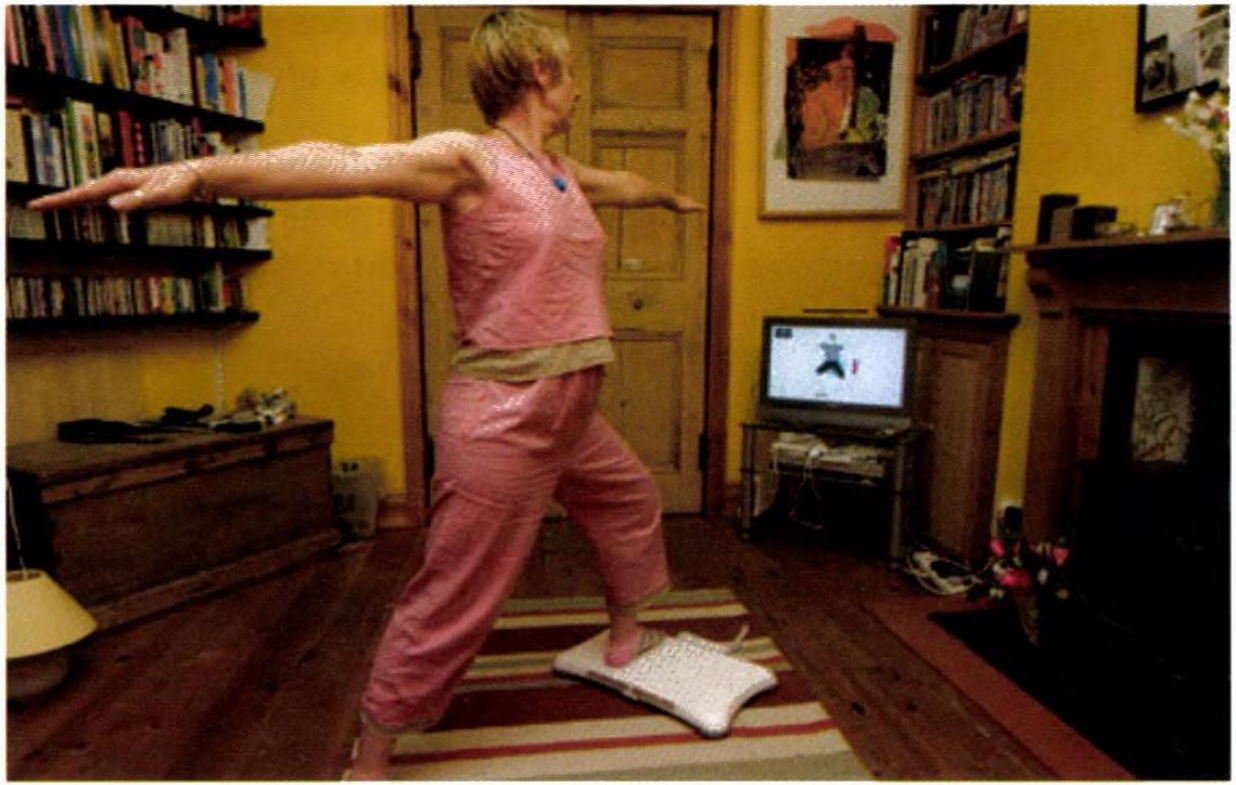
Photographed at a robot exhibition in Seoul, South Korea.

Social networks

Various user interfaces

What do the interfaces consist of?

Gesture interaction: Nintendo Wii

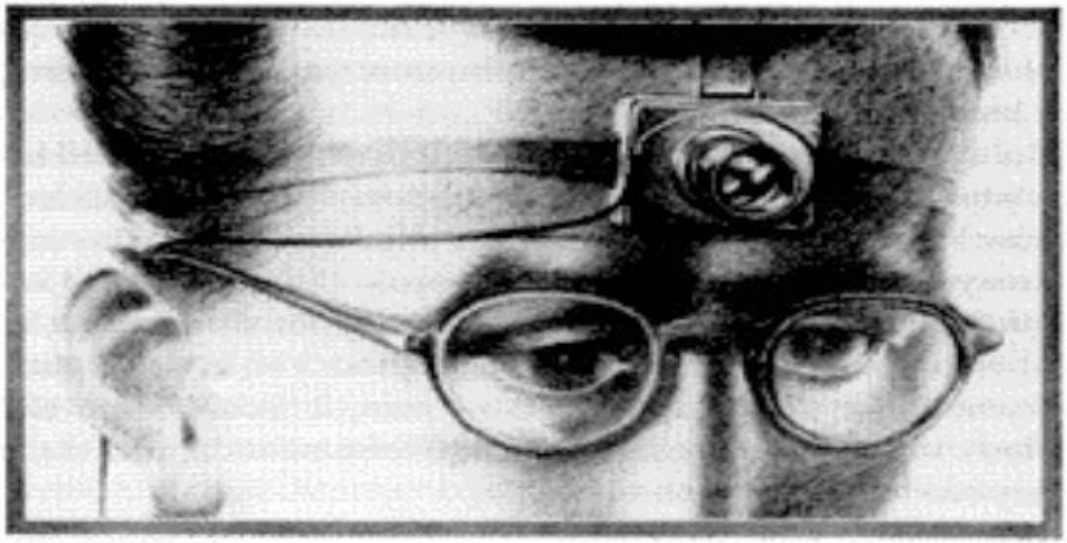


EVOLUTION OF HCI

Vannevar Bush “As We May Think”

1890 – 1974

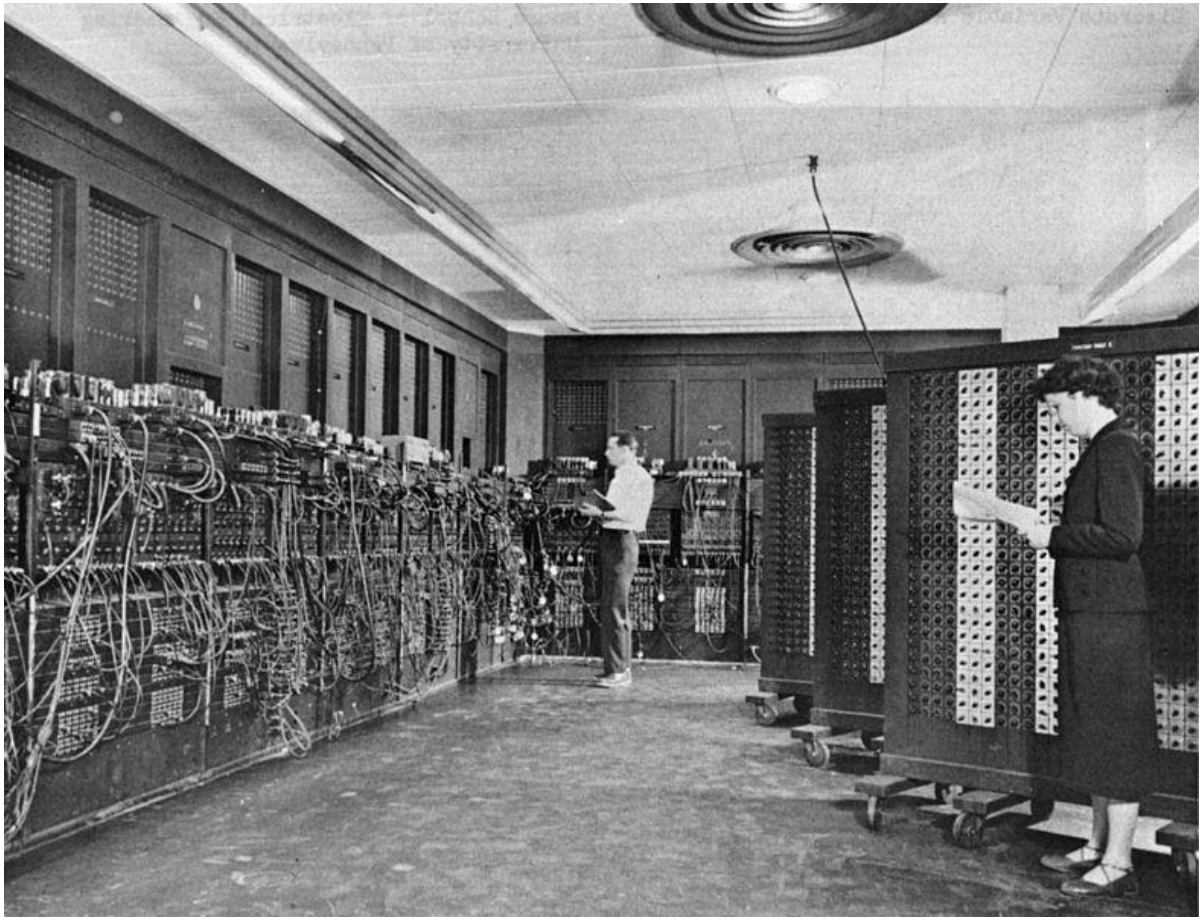
- The Atlantic Monthly, 1945.
- Memex: analog hypertext



A scientist of the future records experiments with a tiny camera fitted with universal-focus lens. The small square in the eyeglass at the left sights the object (*LIFE* 19(11), p. 112).

ENIAC, 1946

Electronic Numerical Integrator And Computer



http://en.wikipedia.org/wiki/File:Eniac.jpg

Grace Hopper – the inventor of compiler

- Compiler improved usability
- A-0: Arithmetic Language version 0; 1951-1952
- COBOL, 1959

First interactive screens

1960-ties: data stored in paper tape or cards with holes punched in them. Cards were sent to computer centre, data was processed, results printed.

- Joseph C.R. Licklider

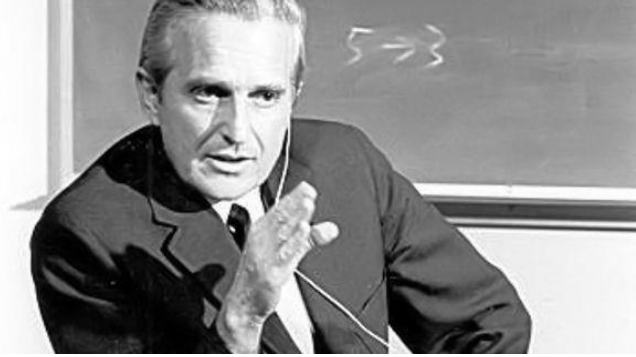
  the first screens and cathode ray tubes (CRT)

Direct interaction with computer

- Ivan Sutherland (MIT),
- Sketchpad, 1962
  - It could draw both horizontal and vertical lines and combine them into figures and shapes. Figures could be copied, moved, rotated, or resized, retaining their basic properties.
- Input: light pen
- Output: cathode ray tube

http://www.youtube.com/watch?v=USyoT_Ha_bA

Computer mouse



- Douglas Engelbart, 1968
- Demonstrated the interaction using the mouse at The Mother of All Demos

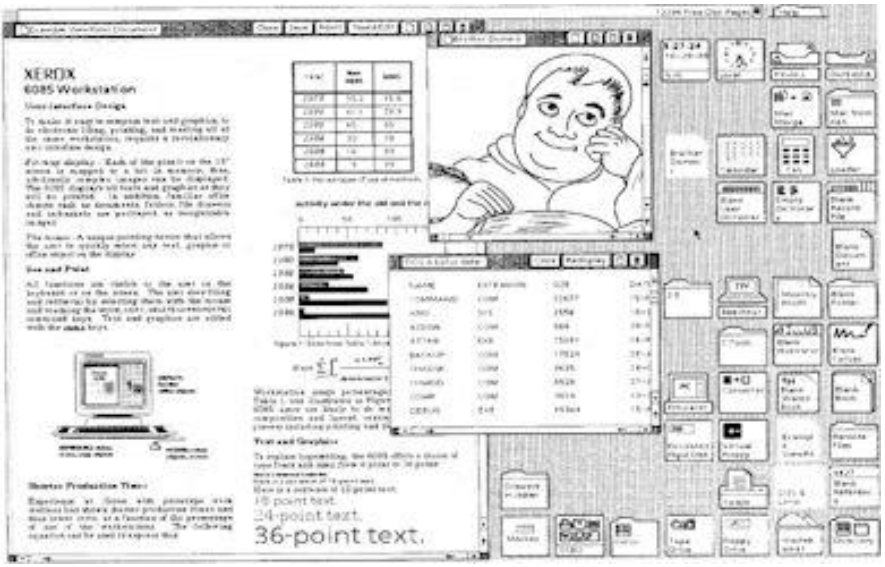
http://sloan.stanford.edu/mousesite/1968Demo.html#complete,clip 12

1970-ties: people at the center

Alan Kay holds the mockup of Dynabook

- Technology at the focus of design
  - batch interaction, command line interface
- Alan Kay
  - Dynabook: concept of laptop
  - Object-oriented programming, SmallTalk
  - People at the center of design

Graphical user interface



- XEROX STAR, 1981
- Office metaphor
  - windows, icons, folders
  - Ethernet network,
  - file server,
  - print server,
  - email
- microcomputers

http://www.youtube.com/watch?v=Cn4vC80Pv6Q

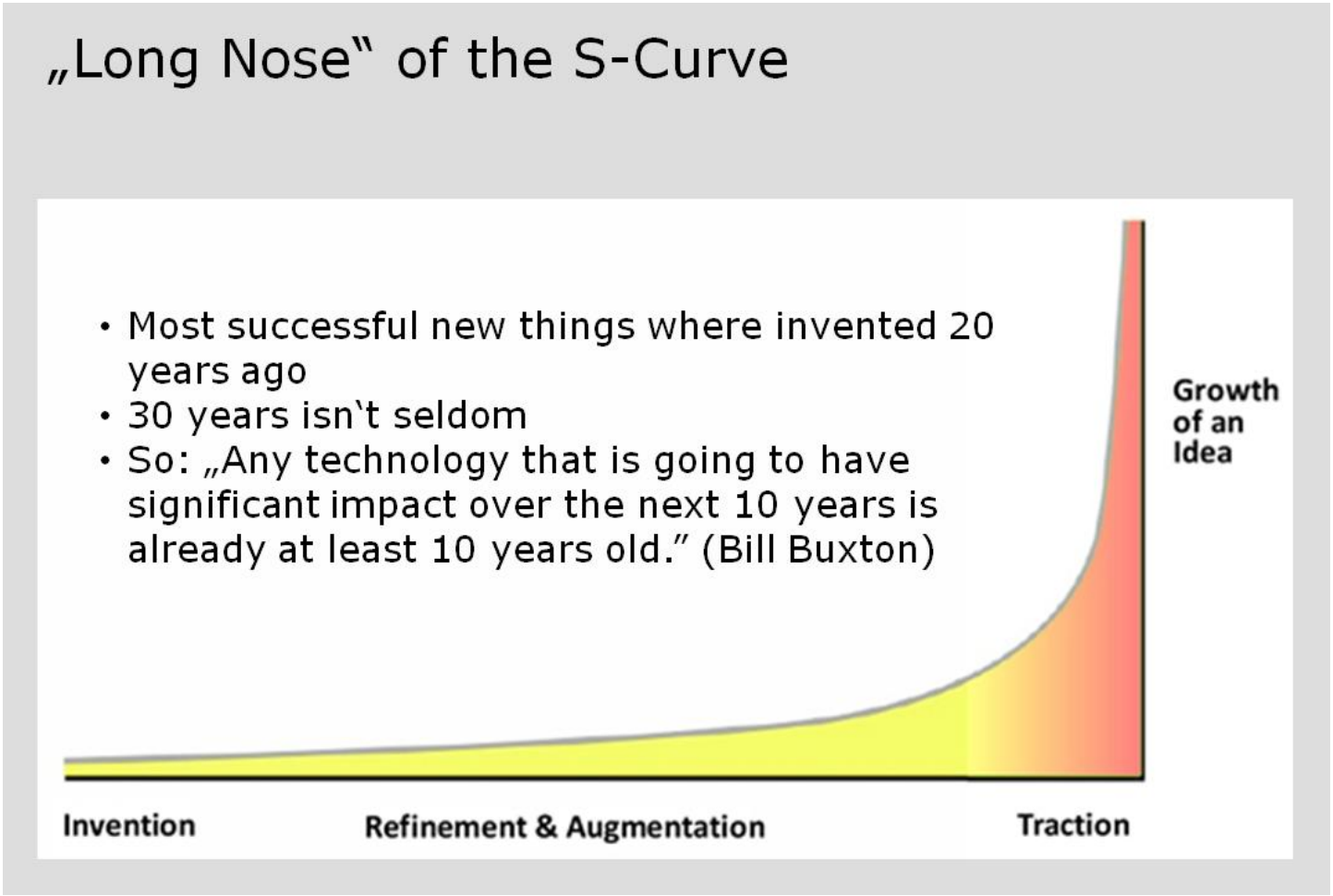
1990 ties: multimedia

- 1993: hypertext
- World Wide Web revolutionized the process of transmitting and sharing files.
  - Pictures, movies, music, text and even live video links were available to everyone
- 1993: Mark Weizer, ubiquitous computing
  - Mobile devices and available Internet

Evolution of HCI

- 40–ties – vision, Vannevar Bush
- 50-ties – compilers, Grace Hoper
- 60-ties – Sketchpad, Ivan Sutherland
- 70-ties – Dynaburg, Alan Kay
- 80-ties – XEROX Star, microcomputers
- 90-ties – multimedia
- 2000-ties – mobiles
- 2010-ties - ?

Long nose of innovation, Bill Buxton



Long nose of innovation

- New products and ideas come from observing history and the evolution of the ecosystem.
- ipod took aesthetical inspiration from Dieter Rams' Braun T3 radio, produced in 1958.

Design

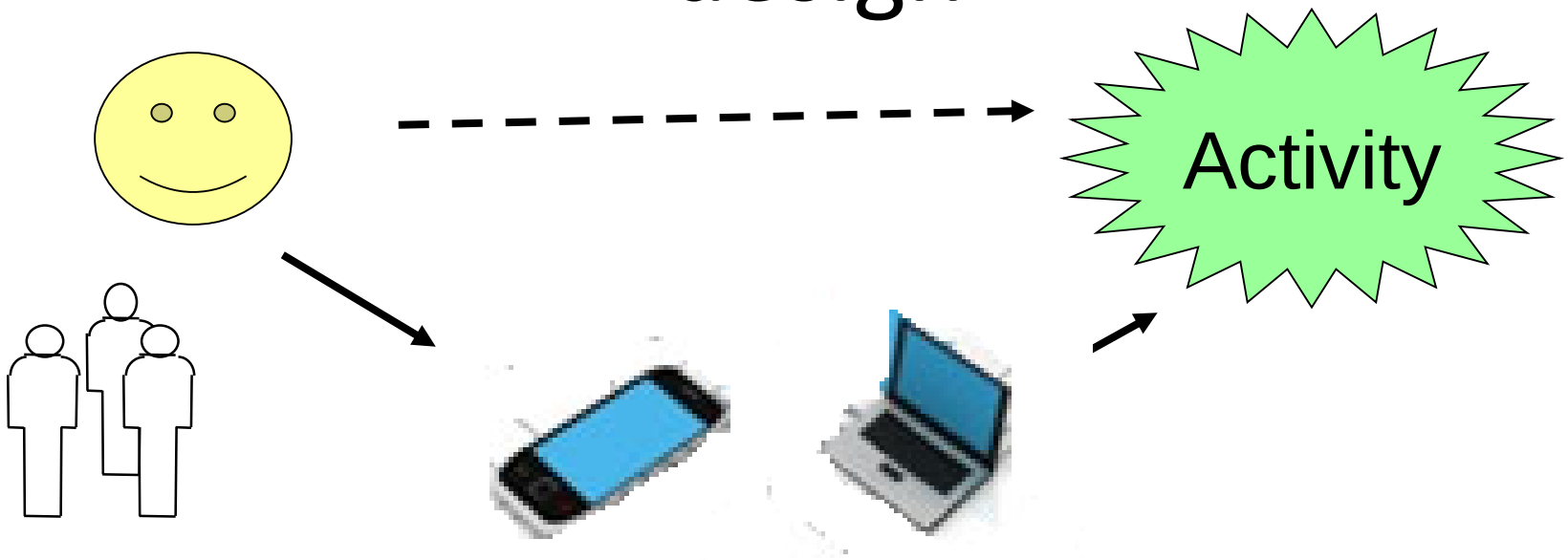
Technologies

People

Activities and contexts

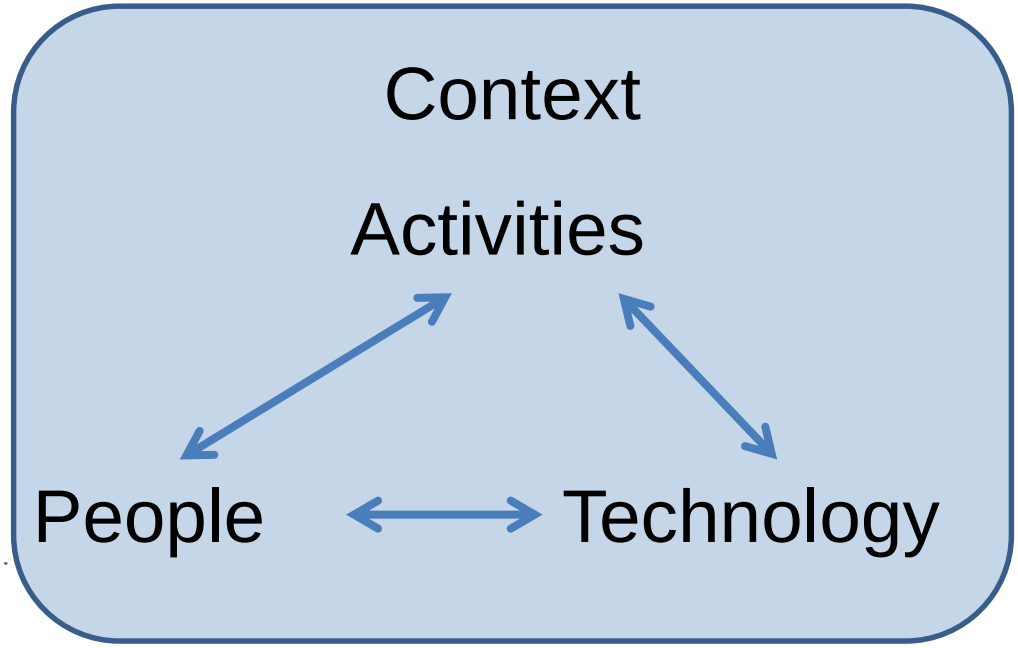
CONCERNS OF THE INTERACTIVE SYSTEMS DESIGN

Concerns of interactive systems design

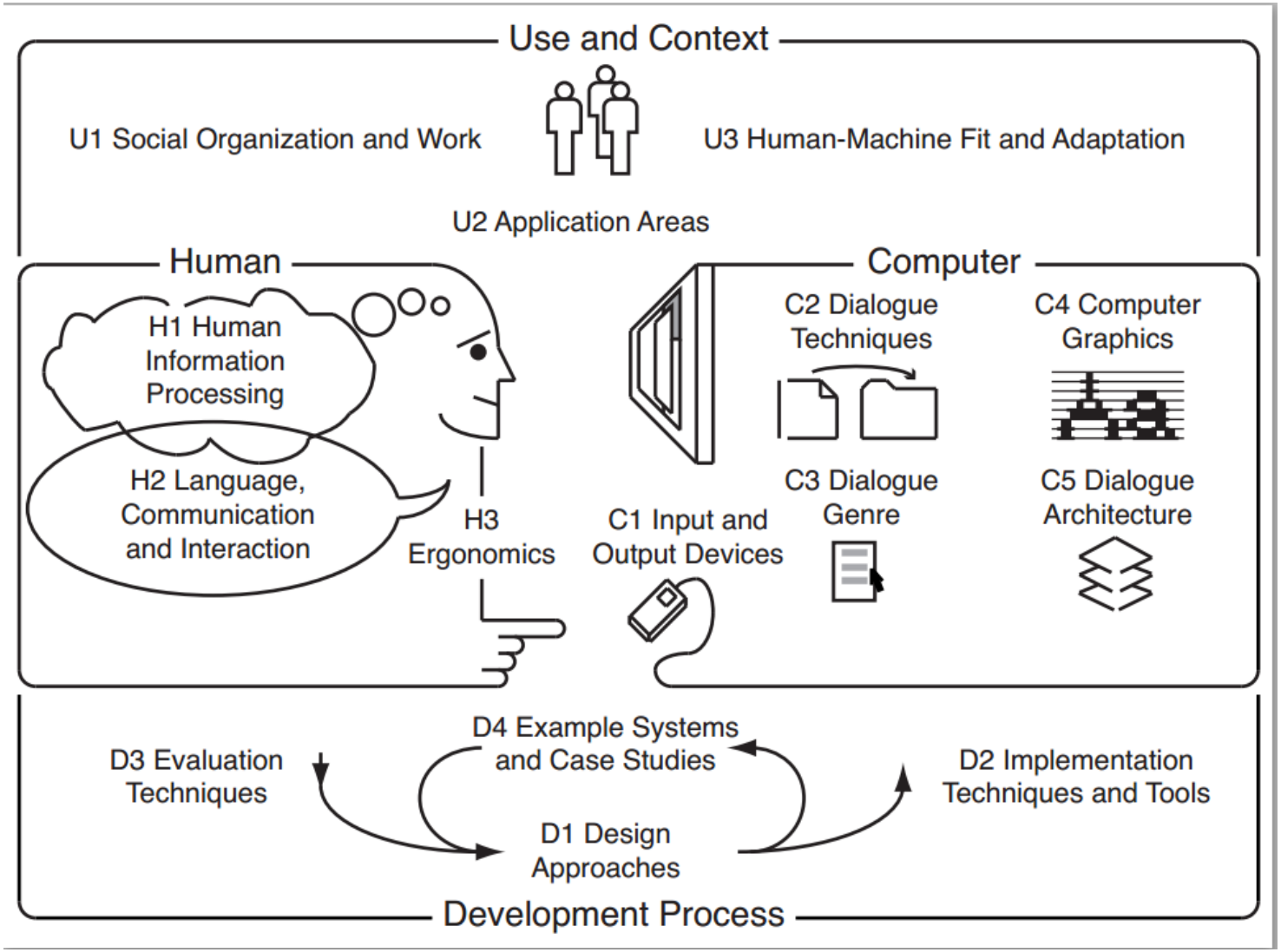


- developing high quality interactive systems, products and services that
  - fit with people and their ways of living

The ergonomic model of HCI



ACM model of HCI



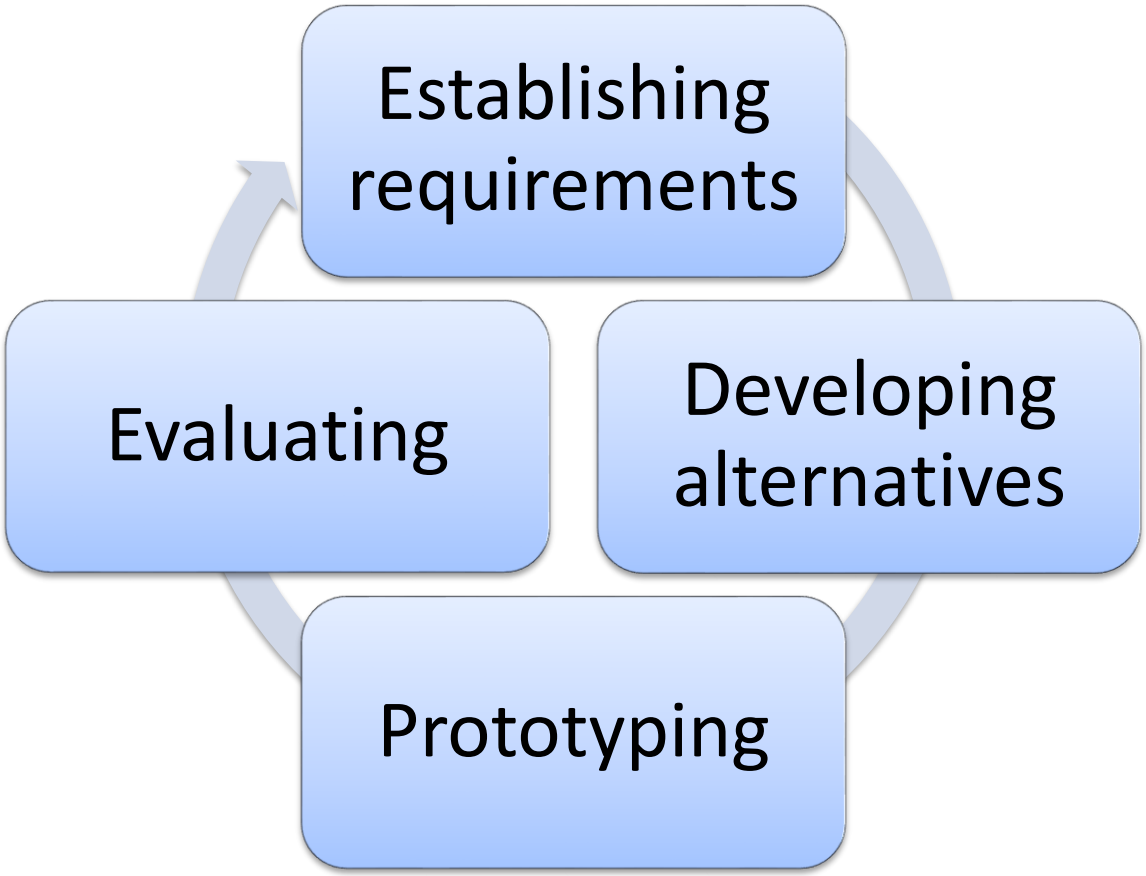
People and technologies

- *Interactive system* - the technologies that cover components, devices, products and software systems
  - that are primarily concerned with processing information.
- Interactive systems are things that deal with the transmission, display, storage or transformation of information that people can perceive.
  - They are devices and systems that respond dynamically to people's actions.

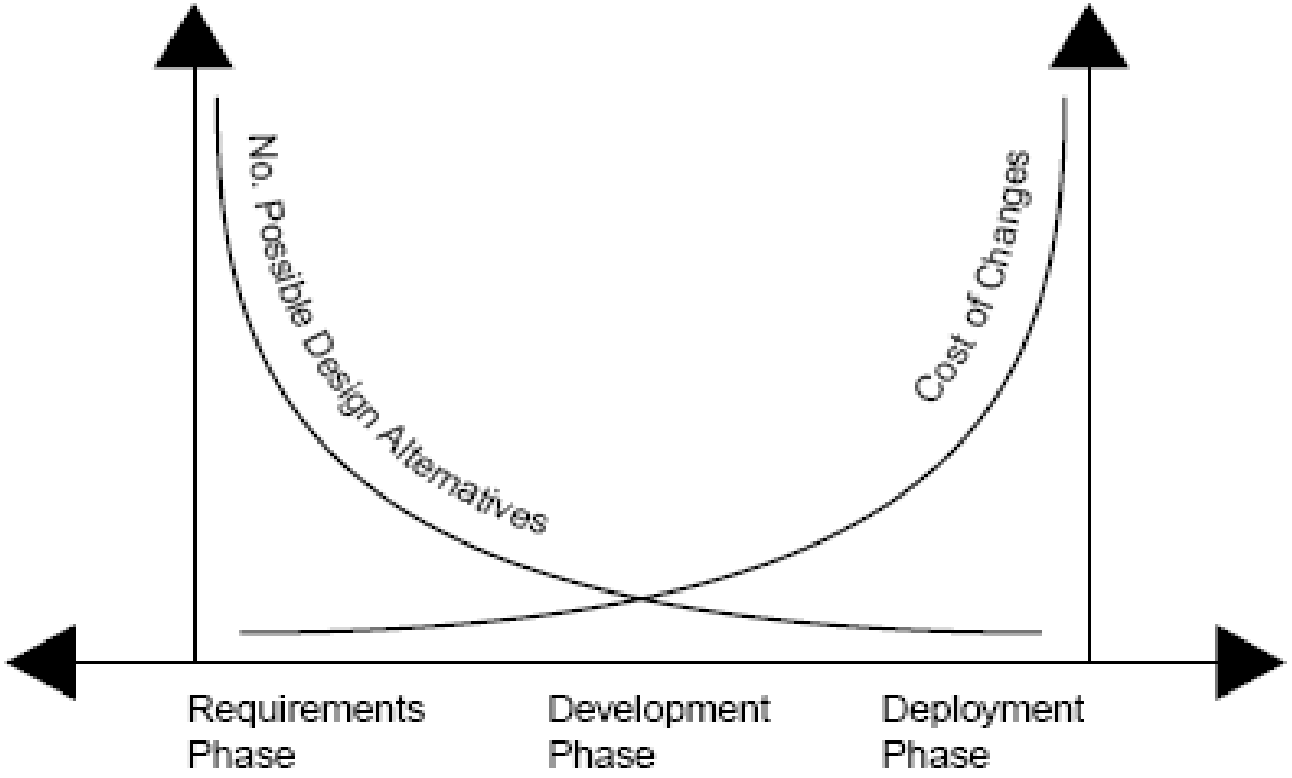
Being human-centred

- Thinking about what people want to do rather than what the technology can do
- Designing new ways to connect people with people
- Involving people in the design process
- Designing for diversity

The process of interaction design



Save development costs



The number of possible designs decreases as the cost to make changes increases (Erhlich and Rohn, 1994, p. 80).

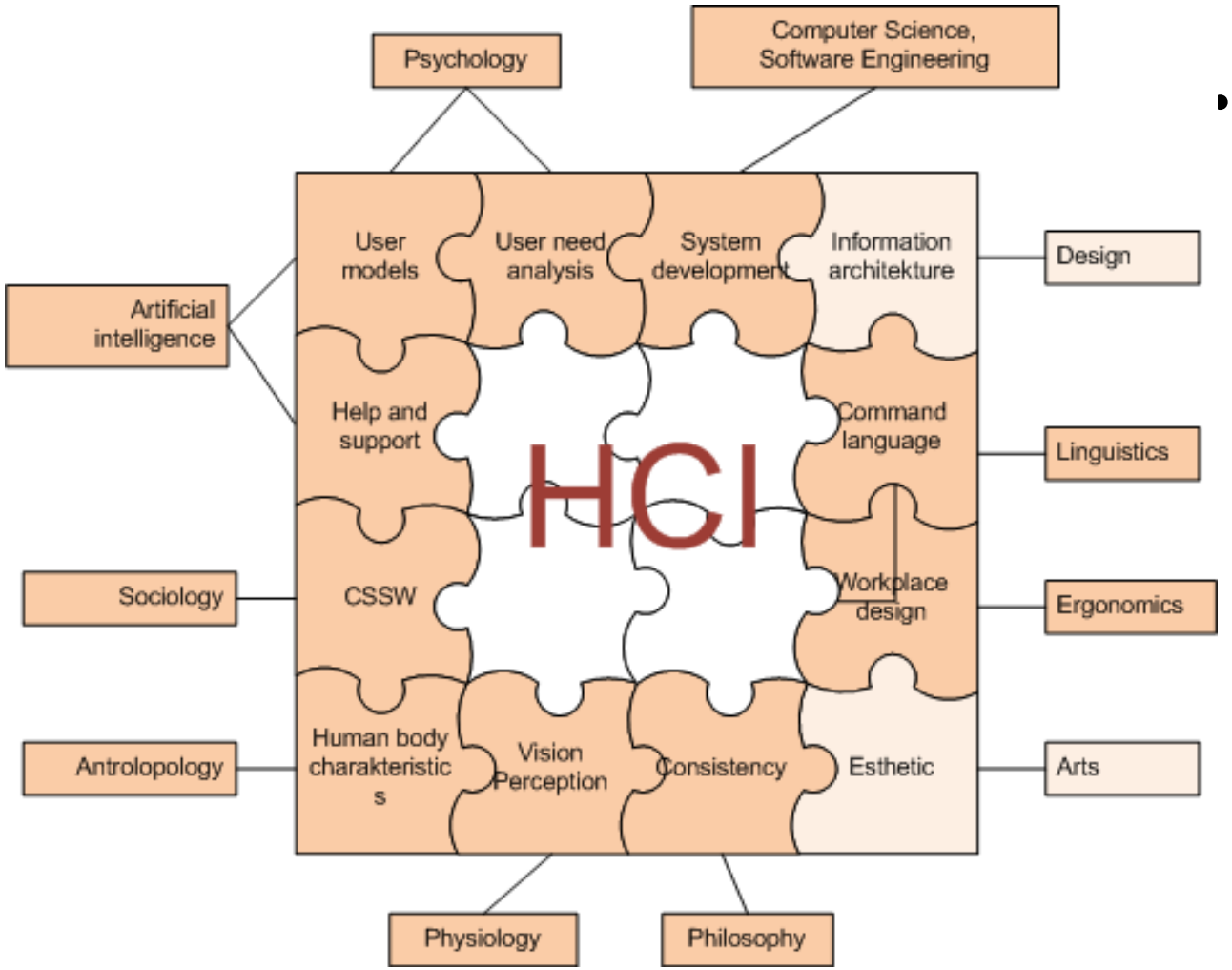
Bias, Randolph G., Mayhew, Deborah J. Cost-justifying usability: an update for the internet age. Morgan Kaufman Publishers, 2005.

COURSE REQUIREMENTS

Human-**c**omputer **I**nteraction

- a discipline concerned with
  - the study,
  - design and
  - implementation of
- human-centric interactive computer systems.

Interaction design: fusion of skills



- Main contributors
  - Ergonomics
  - Psychology
  - Computer science
  - Sociology

Skills of interactive systems designer

- Study and understand the activities and aspirations of people and the contexts
  - within which some technology is useful
  - and generate requirements for technologies
- Know the possibilities offered by technologies
- Research and design technological solutions
  - that fit in with people, the activities they want to undertake and the contexts in which those activities occur
- Evaluate alternative designs and iterate
  - (do more research and more design) until a solution is arrived at.

Course grade structure

- Assignments – 50%
  1. User needs
  2. Alternative mockups
  3. Analytical evaluations
  4. High-fidelity prototype
  5. Usability testing
- Exam – 40%
- Minitests and peer reviews – 10%

Learning objectives

- understand how to design interactive products that fit with what people want, need and may desire
- appreciate that one size does not fit all

  e.g., teenagers are very different to grown-ups
- identify any incorrect assumptions they may have about particular user groups

  e.g., not all old people want or need big fonts
- be aware of both people's sensitivities and their capabilities

Learning resources

- Course website:
  - **web.vu.lt/mif/k.lapin**
- Books at the MIF library

MIF library

David Benyon, Phil Turner, Susan Turner

Designing Interactive Systems: People, Activities, Contexts, Technologies,

Addison Wesley,

2005, 2010, 2014

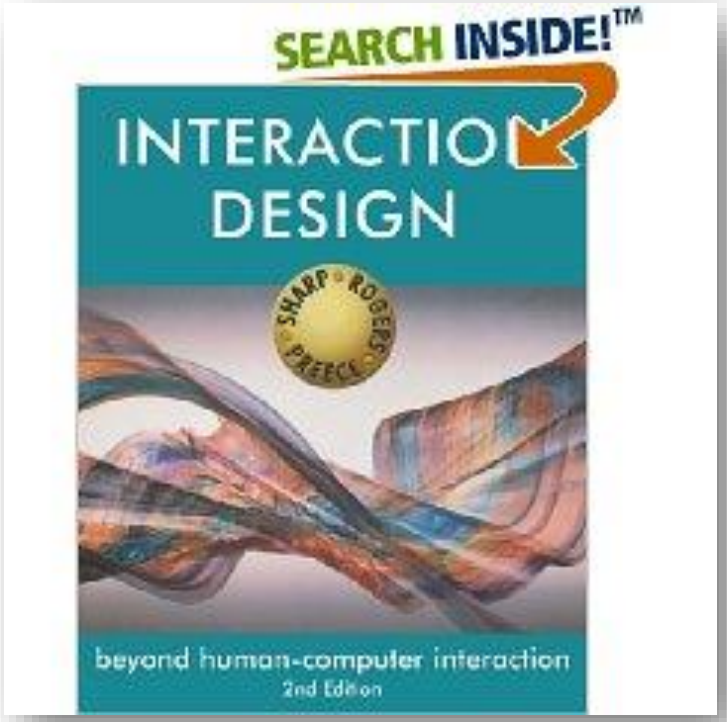
MIF library

- Helen Sharp, Yvonne Rogers, Jenny Preece

  Interaction Design: Beyond Human-Computer Interaction

  John Wiley & Sons, 2002 (20 egz.)

  2007, 2011.

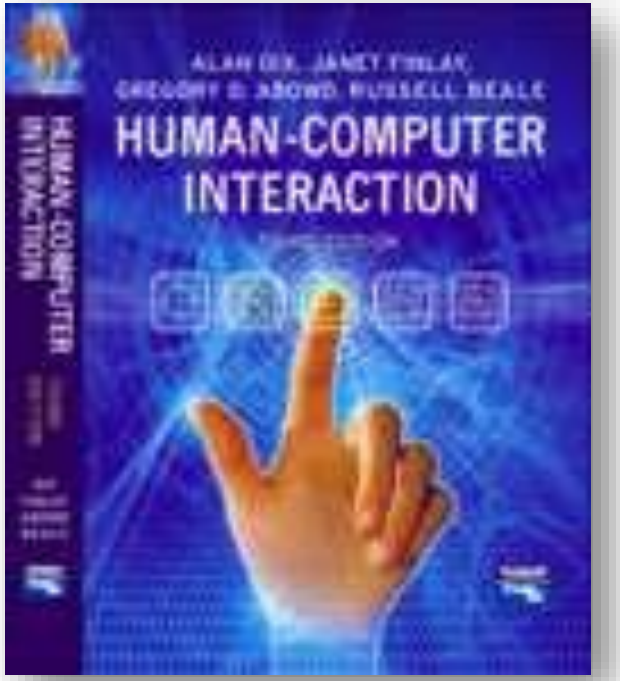


MIF library

- Donald A. Norman. **The Design of Everyday Things**. Basic Books;
  Reprint edition (September 17, 2002), 272 pages
  - Puikus ŽKS įvadas

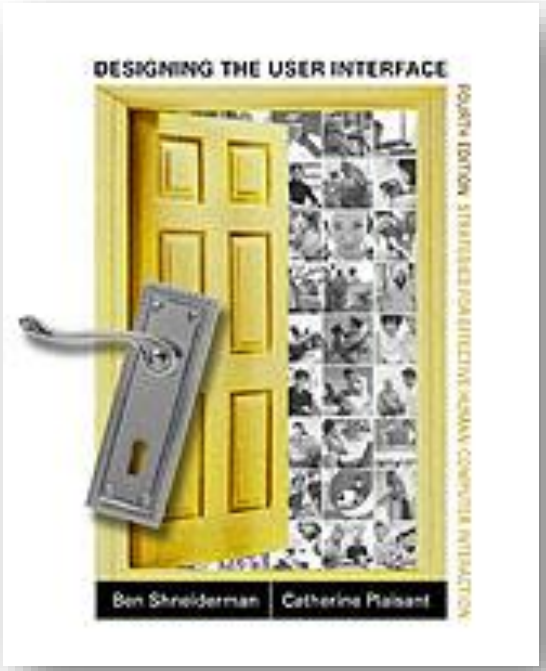
MIF library

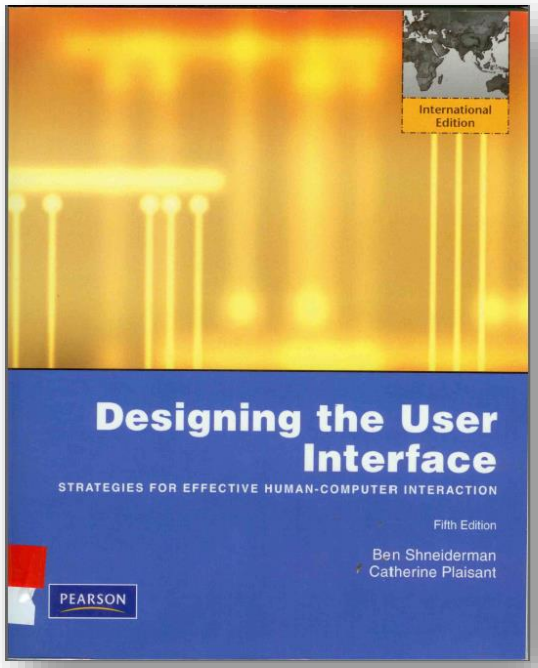
- Dix, A., J. Finlay, G. Abowd, R. Beale. **Human-Computer Interaction**, 2nd Edition, Prentice Hall, 2003, 638 p.



MIF library

- Schneiderman, B., Plaisant C. **Designing the user interface**. Addison-Wesley.
  2004, 2010





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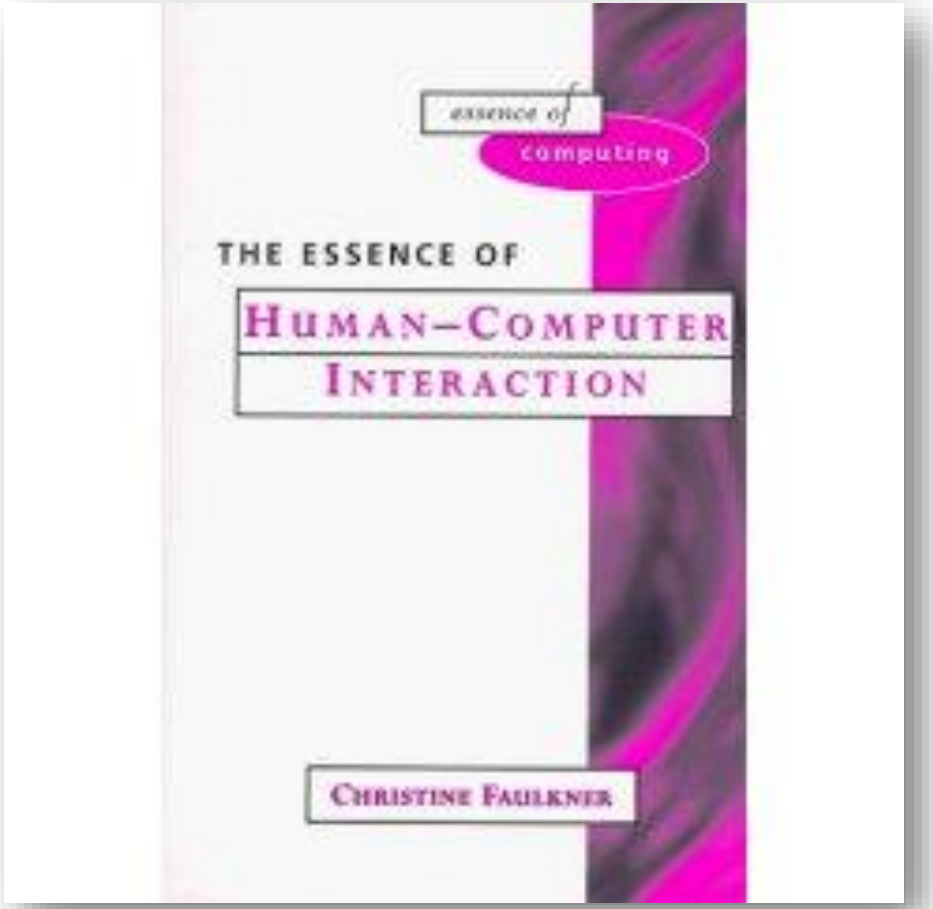
- Faulkner, Ch. **The Essence of Human-Computer Interaction**, Pearson Prentice Hall,1996.



MIF library

- **The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies, and Emerging Applications**.
  Julie A. Jacko (ed.) and Andrew Sears (ed.)
  Lawrence Erlbaum Associates. 2003

Other resources

- User Experience Professionals Association
- AIGA, the professional association for design
- ACM Special Interest Group CHI
- Usability Net
- Nielsen Norman Group

Human computer interaction

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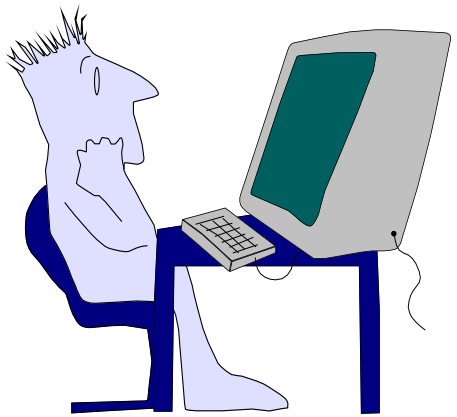
web.vu.lt/mif/k.lapin/



References

- David Benyon. Designing Interactive Systems: A comprehensive quide to HCI and interaction design, Addison Wesley, 2005, 2010, 2014.
  - 1 chapter: Designing interactive systems: a fusion of skills
- Jennifer Preece, Yvonne Rogers, Helen Sharp (2002, 2007, 2011). Interaction design: beyond human – computer interaction. John Wiley & Sons www.id-book.com
  - 1 chapter: What is Interaction Design?