

What is it all about ... Fons J. Verbeek LIACS, Imagery & Media

Content

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- What is HCI
- Historical context
- What are the scientific disciplines involved
- Interaction & Interactive Systems
- 1st Key concept: Usability
- Systems
- Examples
- Why are we teaching this course ...

September 1, 2014

LECTURE 1 INTRODUCTION TO HCI PRINCIPLES & KEY CONCEPTS

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Human Computer Interaction

- As a Science
 - Methods
 - Formalisms
 - Relations and Overlap diciplines
 - Measurement
- As a Product
 - Recipes
 - Design
 - Technology
 - Measurement
- Strategies for Development

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Beginnings – Computing in 1945

















Machine Personal Relations

- Robots get more human
 - Android
 - Geminoid
 - Ubiquitous phenomena
- Interaction will be more human
 - Emotive respons
 - Personal relations (e.g. Mariage ...)
 - "If the alternative is that you are lonely and sad and miserable, is it not better to find a robot that claims to love you and acts like it loves you?"

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Design: Interdisciplinary Field HCI combines knowledge and methods associated with professionals including: Computer Scientists Psychologists Experimental, Educational, Social and Industrial Designers Instructional and Graphical Technical Writers Human Factors and Ergonomics Experts Anthropologists and Sociologists









User Friendly

- What is User Friendly ?
- Can we measure it ?
- Criteria adhering to some standard ?
- Prototyping, Prototyping styles
- Usability, Usability criteria
- Evaluations, Evaluation techniques
- All are based in getting the User involved!

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Definitions of HCI

• A workable definition is:

"a set of processes, dialogues and actions through which a human employs and interacts with a computer" (comment: visa versa ?)

• A focus on the research themes:

"a discipline concerned with the design, evaluation, and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them"

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Dissect HCI definition

• Human,

- Users, single, group working together, sequence
- User(s) tries to complete a task.

• Computer,

- Technology, not just Desktop computer
- Systems:
- Large-scale computers,
- Process control,
- Embedded systems.

Interaction,

- Communication, direct/indirect
- Dialogue + feedback/batch
- Task oriented

Design (1)

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• 'What is design?

It's where you stand with a foot in two worlds – the world of technology and the world of people and human purposes – and you try to bring the two together'. *Mitch Kapor* (1996)

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Design (2)

- The term 'design' refers to: both to the creative process of specifying something new and to the representations that are produced during the process.
- In Design:

both problem and solution need to evolve during the design process; rarely complete specification before some design work has been done. Ergo: it is an interactive process.

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Design and Interactive Systems (1)

• Interactive system:

- Term used to describe the technologies that interactive system designers work with.
- Term intends to cover components, devices, products and software systems that are primarily concerned with processing information.
- Things that deal with the transmission, display, storage or transformation of information that people can perceive.
- Devices and systems that respond dynamically to people's actions.

People and Technologies

• People and interactive systems are different: this entails the fundamental challenge for interactive systems designers is to deal with.

View	People are	Machines are
Machine-centred	Vague	Precise
	Disorganised	Orderly
	Distractible	Undistractible
	Emotional	Unemotional
	Illogical	Logical
People-centred	Creative	Dumb
	Compliant	Rigid
	Attentive to change	Insensitive to change
	Resourceful	Unimaginative
	Able to make flexible decisions based on content	Constrained to make consistent decisions
urce: Adapted from Ne	orman (1993), p. 224	



HCI: disaster stories

1988 :

Iran Air Flight 655 shot down by USS Vincennes

- F-14?? 290 casualties
- Conclusion: 'Aegis had provided accurate data. The crew had misinterpreted it.'
- Different radar screens displayed different aspects of airplane

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- Correlating information was difficult
- Vital data cluttered by trivial data



Poor interface design

- 1. Increased mistakes in
 - data entry
 - system operation
- 2. Inaccessible functionality
- 3. User frustration
 - low productivity and/or
 - under-utilisation
- 4. System failure because of user rejection

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Usability Components

- Learnability
 - Ease of learning the system, i.e. the basic tasks
 - Skills retained over time (also Memorability)
- Throughput (also Efficiency)
 - Speed of task performance
 - Low user error rate
- Flexibility
 - Suitability for intended user expertise
 - Can system be customised?
- Attitude (also Satisfaction)
 - User subjective satisfaction with system

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Definition of Usability (Nielsen 2003)

- Usability is a quality attribute that assesses how easy user interfaces are to use.
- The word 'usability' also refers to methods for improving ease-of-use during the design process.
- Consequently, usability testing requires interaction with representative users!

Usability & Goals

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Usability goals (criteria = objective)

effectiveness, efficiency, learnability, safety, etc.

User experience goals (quality = subjective)

fun, motivating, aesthetically pleasing, supportive of creativity, rewarding, helpful, satisfying, etc.

Sometimes there are conflicts

"10 minute rule?"
optimize what the user already knows...(Nelson 1980)
use the innate knowledge of the user (group) to learn the software (study workflow)
not for complex systems





Problems with ATMs

- Older people make much less use of ATMs
 - 24 years : average 7 visits to an ATM per month
 - Use drops off among those over 45
 65+ years : two-thirds NEVER use an ATM
- Senior citizens often put off by ATMs they find the machines
- complicated, inconvenient and intimidating.
- Buttons that did not line up with commands
- Dimly lit screens hard to read in the glare of daylight
- Sometimes confusing menu choices

Source: http://cnn.com/TECH/9712/04/t_t/atms.seniors/index.html Reporting on research by W. Rogers and A. Fisk, Georgia Institute of Technology



Problems with ATM's (Continued)

- Researchers + banks expected ATMs to be intuitively easy to use
- Testing among senior citizens found only 20 percent correct operation
- Usability suggestions:
 - Simpler on-screen instructions
 - More "undo" buttons
 - Banks should provide training for any customers who need it
- remark a "large percentage" of people surveyed said they would use ATMs if trained

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Importance of Usability				
Research machines	1950s	Mathematicians Scientists	Machine reliability users do programming	
Mainframes	1960s & 1970s	Data-processing professionals	Users of output (business managers) grow disenchanted with delays, costs and lack of flexibility	
Minicomputers	1970s	Engineering and other non-computer professionals	Users must still do must programming; usability becomes a problem	
Microcomputers	1980s	Almost anyone	Usability is the major problem	
Internet (WWW)	2000s	Almost anyone	Usability is big business Shackte, 1991	
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Improvements with new Technology



HCI has economic value (\$, €, £)

Think about, strong competition on:

- Operating Systems
- Phones / Tablet Systems / Portable Devices
- Internet Browsers
- Word Processors
- Web-editing systems
- Photo-editing systems

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Aim – Approach for this Course Learn the major principles of HCI /Interaction

- Cognetics
- Affordance/Visability
- Usability
- Learn how people think, react, acquire
 - Perception
 - Cognetics
- Learn how to evaluate a system
 - Development track
 - Envisioning, Prototyping, Evaluating
 - Research Based Approach Empirical !



Next Lectures

- Thursday September 4th 11.15-13.00 Huygens building, Room 106/107 1st floor
- Monday September 8th , No Lecture
- Thursday September 11th 11.15-13.00 Huygens building, Room 106/107 1st floor
- Monday September 16th 11.15-13.00 Huygens building, Room 106/107 1st floor

See schedule hci.liacs.nl

human car