Human-Computer Interaction

Week 5 Lecture 5B

HCI Design Approaches

COMP 3900 & COMP 6390

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HCI Design Approaches

Technology-focused design

User-Centred Design

User Experience Design (UX)

Participatory Design

Action Research

HCI Design Approaches

These five approaches represent different ways of thinking about HCI design.

Each has a different purpose. Which one you choose to follow will depend on the type of project and on the type of users or project partners that you work with.

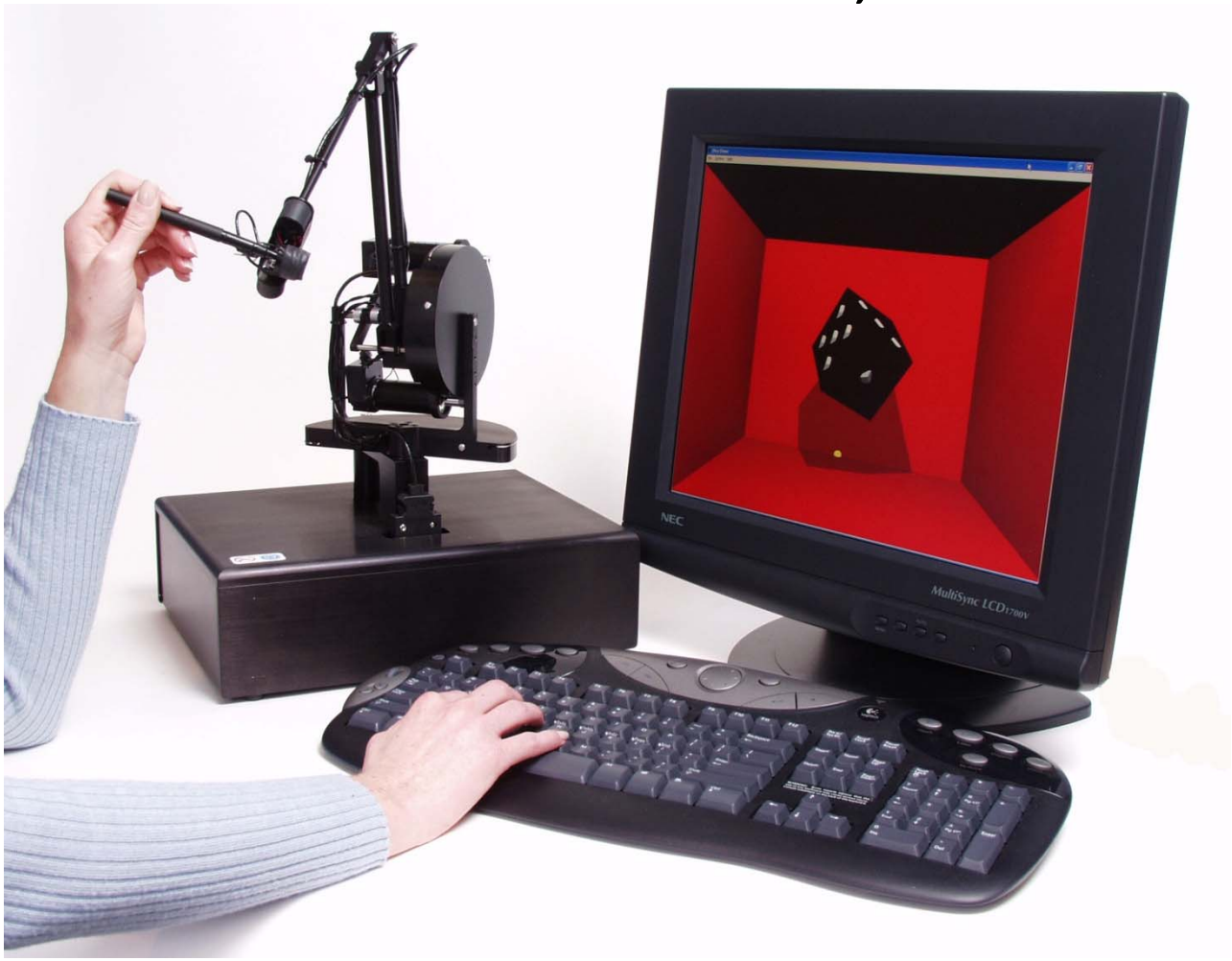
Technology-focused design

Your focus is on building a new interaction technology or on taking a new interaction technology and finding applications for it.

Consider when haptic interaction technology was new:

"We can touch virtual objects, so let's look for areas of HCI where touch might be useful"

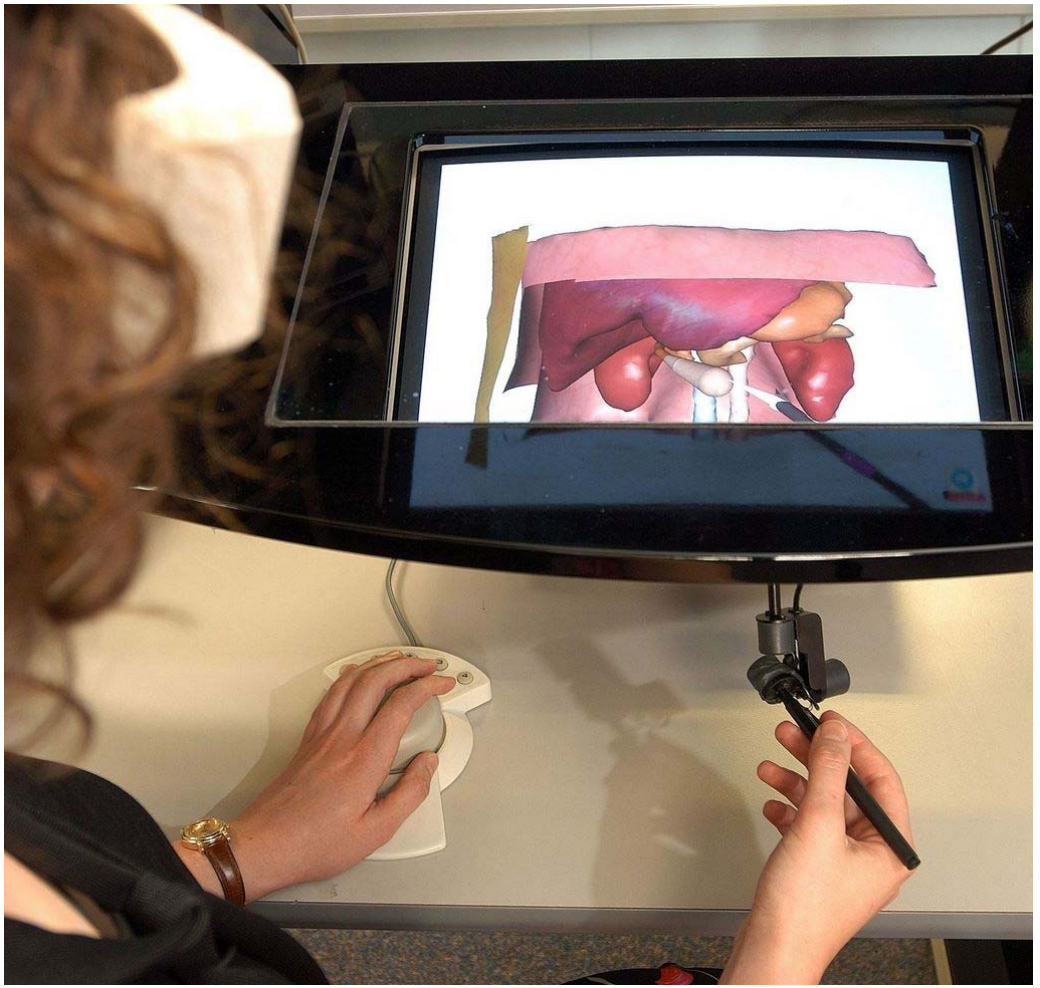
The Phantom device, 1994



Inventing a new technology: The Phantom haptic device was a novelty device sitting on the bench beside the monitor, much like a 3D mouse.

Placing the Phantom in 3D virtual reality

- What can the technology do?
- Adding 3D virtual reality and using stereo 3D vision to put the user's hand in the virtual reality scene created a powerful illusion of the presence of the objects in the scene.



Technology-centred HCI

Application: simulator-based training - prototype

Technology-centred HCI

Application: simulator-based training – early product

Technology-centred HCI

Target application – training for surgery

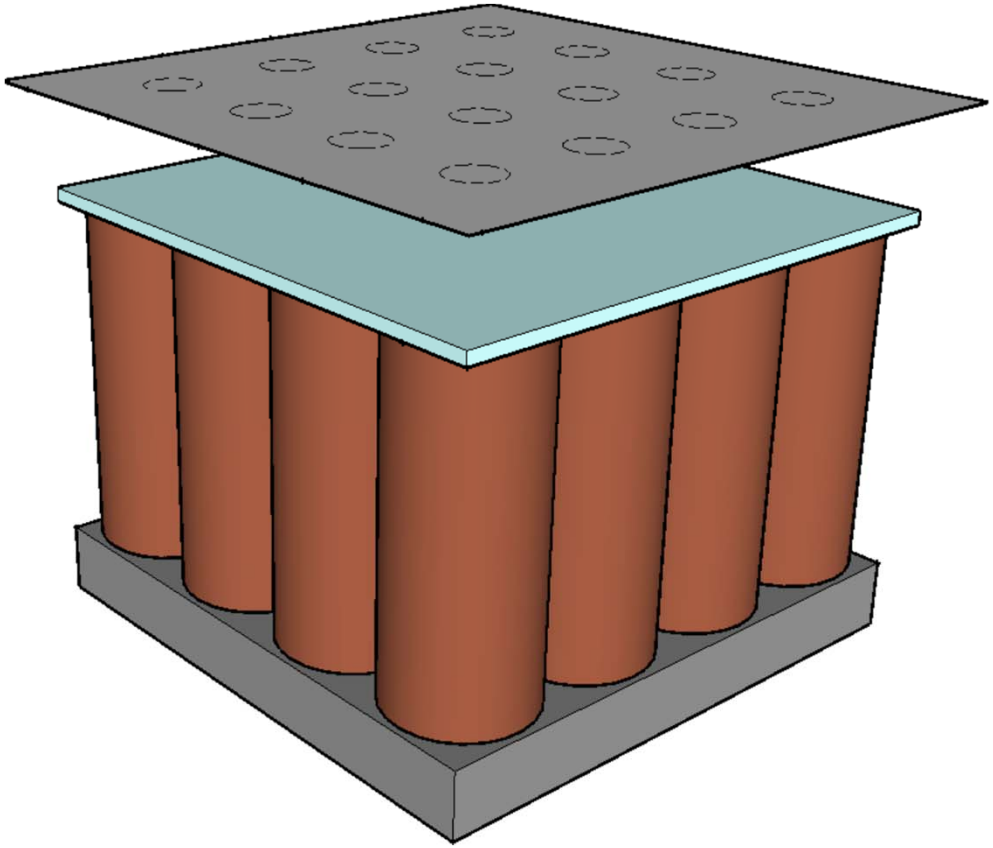
This might involve:

Technology push: we have this haptic technology and we are going to show it to you

Focus on the users and their tasks: what are the users doing where virtual touch might be important?

What the users experience: haptic interaction is an extraordinarily powerful experience that will transform what might be a fairly boring computer interaction

Another example: “Forceform”



(a) surface
(b) buffer

(c) electromagnets

(d) baseplate

Tsimeris, J., Stevenson, D., Gedeon, T., & Adcock, M. (2013) Using ForceForm, a Dynamically Deformable Interactive Surface, for Palpation Simulation in Medical Scenarios. Second Workshop on Smart Material Interfaces. In *Proc ICMI 2013*

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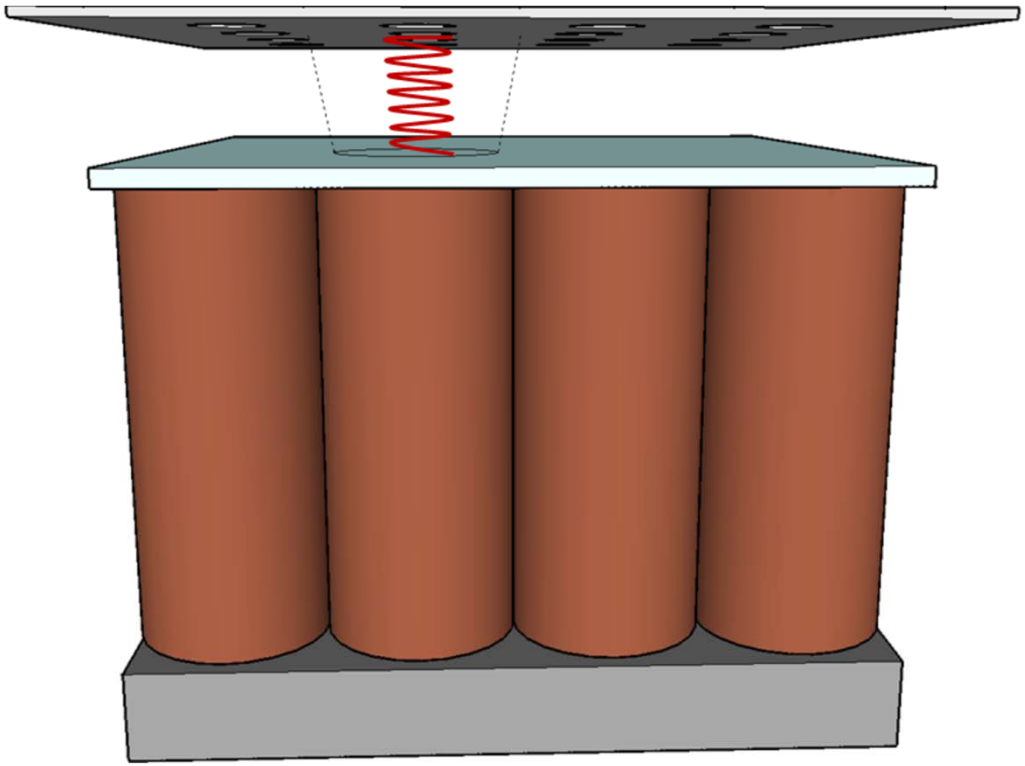

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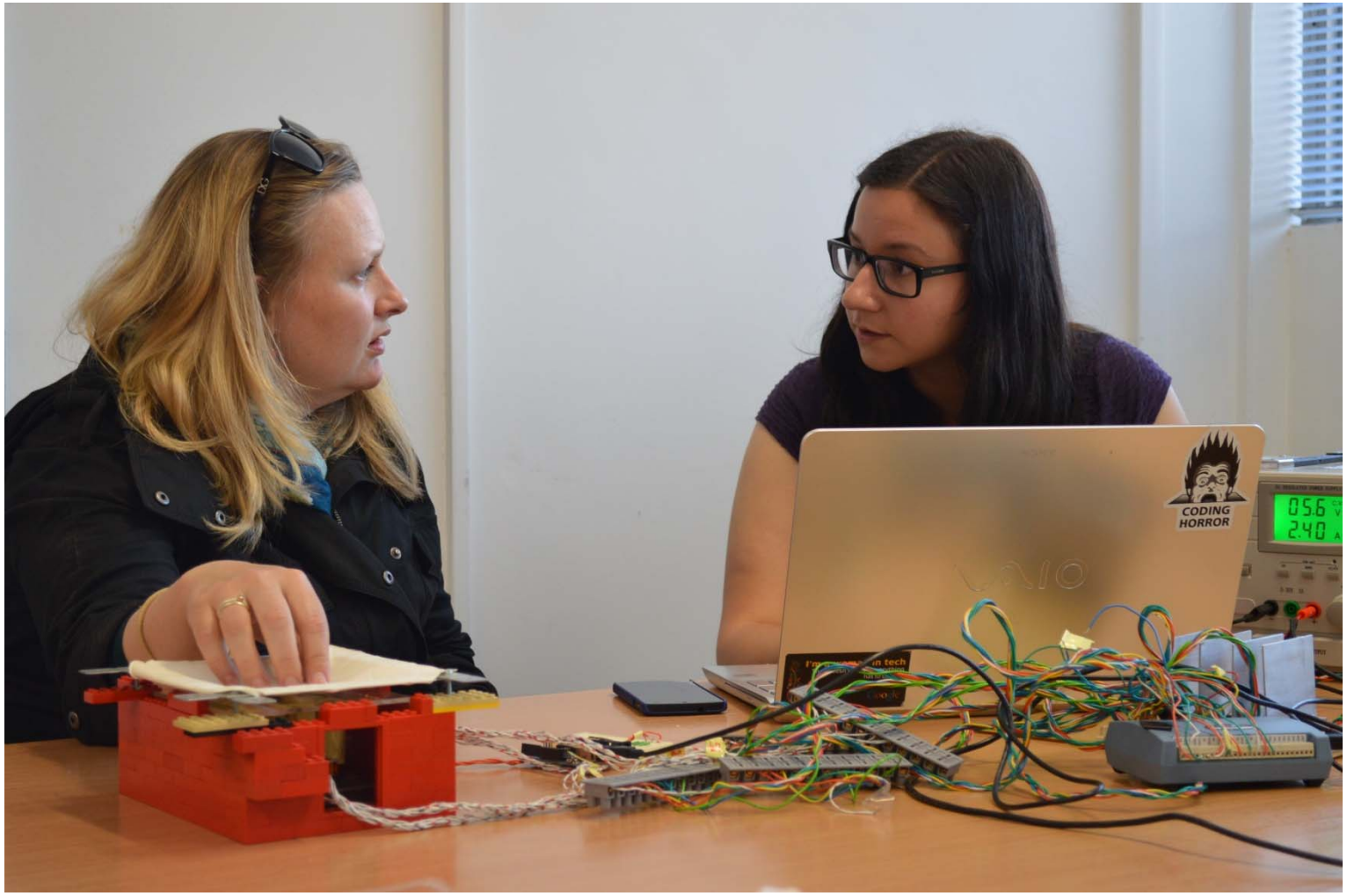

User-Centred Design (UCD)

The design and implementation focus on the intended users, their working context and the way they think about their tasks.

It follows the design principles that we studied earlier in the semester.

User-Centred Design

The ISO Standard 9241-210, 2010 “Human-centred design for interactive systems” as summarised on Wikipedia:

Six key principles:

1. The design is based upon an explicit understanding of users, tasks and environments.
2. Users are involved throughout design and development.
3. The design is driven and refined by user-centred evaluation.
4. The process is iterative.
5. The design addresses the whole user experience.
6. The design team includes multidisciplinary skills and perspectives.

Combining technology design and user-centred design

"Envisioning Mobile Information Services: Combining User- and Technology-Centred Design"

Kjeldskov, J. and Howard, S., 2004, June. Envisioning mobile information services: Combining user-and technology-centered design. In *Asia-Pacific Conference on Computer Human Interaction* (pp. 180-190). Springer Berlin Heidelberg.

See Figure 1 in this paper.

User Experience (UX) design

There are several descriptions of “user experience” relating to interactive system design:

- UX relates to all aspects of a user’s interaction with a product (Norman, 1999)
- UX is covered by adjectives like satisfying, enjoyable, entertaining, aesthetically pleasing (ibid.)

Norman, D (1999) The Invisible Computer: why good products can fail, the personal computer is so complex and information appliances are the solution, MIT Press

Norman & Nielsen

http://www.nngroup.com/articles/definition-user-experience/

And

UX Without User Research Is Not UX

by Hoa Loranger on August 10, 2014

http://www.nngroup.com/articles/ux-without-user-research/?utm_source=Alertbox&utm_campaign=1995c8da79-Related_Content_10_06_2014&utm_medium=email&utm_term=0_7f29a2b335-1995c8da79-24067789

User Experience design

Example book: “”Killer UX Design”, Jodie Moule, Sitepoint 2012

Chapter headings:

1. Your are not your user
2. Understand the business problem
3. Understand the user context
4. Making sense of what you’ve found
5. Sketching to explore the design concept
6. Prototype the solution
7. Test, learn, tweak, iterate
8. Launch to learn about behaviour

User Experience design

Example book: “”Killer UX Design”, Jodie Moule, Sitepoint 2012

In the “Final Word: the rules of UX” (p256) she says:

- Think hard about who you involve
- Be user-centered
- Prototype your design work
- Look to extreme users
- Think stories as well as concepts
- Seek direct user feedback rather than completely relying on data

UX example

Applying for an
Australian passport

Example (continued)

Three years ago it took a lot of effort and time to apply for an Australian passport.

The Department of Immigration ran a user study, following people who were applying for passports, so that they could improve the user's experience.

The elapsed time dropped from around 2 months to a few days.

[Keynote talk at the World Usability Day symposium held at the Department of Immigration and Border Control, November 14, 2014, Canberra]

Participatory Design

"Participatory design (originally co-operative design, now often co-design) is an approach to design attempting to actively involve all stakeholders (e.g. employees, partners, customers, citizens, end users) in the design process to help ensure the result meets their needs and is usable."

Wikipedia entry for Participatory Design, en.wikipedia.org/wiki/Participatory_design (accessed 5 August 2016)

Action Research

Action Research is a way of doing research that brings researchers and the communities who are the focus of that research together as (equal) partners in the research.

Three characteristics of Action Research:

- The participants (researchers and members of the community in which the research problem is found) work together on the problem
- The research aims to find a local solution to the research problem which takes into account the specific characteristics of the particular situation
- The research delivers a tangible benefit or outcome to that community

Reference: "Action Research, Third Edition", Ernest T Stringer, Sage Publications [Chifley Library, call number HV11 .S835 2007]

Action Research

Example: The telehealth project with the surgeons at the Royal Children's Hospital, Melbourne:

- Stakeholders included the surgeons, the Director of Surgery, the CEO and members of the hospital's Board
- The problem (investigating delivering outpatient consultations over the internet in a telehealth mode) was described in terms that were specific to that hospital
- The surgeons were involved in the design and early evaluation, and then deeply involved in the pilot trial in the hospital
- The local solution addressed the particular needs of these surgeons at this hospital
- The deliverable to the hospital was the research outcome of the trial which showed that these outpatient consultations could be delivered in a telehealth mode and also showed what would be required to implement this as an actual service for the hospital and its regional feeder hospitals

Papers that you might read

"Envisioning Mobile Information Services: Combining User- and Technology-Centered Design", Jesper Kjeldskov and Steve Howard, Lecture Notes in Computer Science, Volume 3101 (2004), Springer.

- Shows an approach that combines user-centred design (exploring what users of a particular service might want and how they might use it) and technology-centred design (exploring the functionality of mobile devices at the time [2004] to see what facilities were available to support the particular service.

“The Relationship of Action Research to Human-Computer Interaction”, GILLIAN R. HAYES, University of California, Irvine, Transactions on HCI 18(3), article 15, July 2011