

What we do, why we do
it (and for whom).

An examination of the three paradigms of HCI

What we do, why we do it (and for whom).

- Who are “we”?
- What is it we do?
- Why do we do it
- Who do we do it for?
- How is this related to “The Three paradigms of HCI”?
- We use HCI to illustrate an important way of thinking about design and interaction, and many other fields

Human-Computer Interaction

- An interdisciplinary field
- Roots in engineering research (human factors)
- Later in cognitive science
- Now concerned with “situated perspectives”
- HCI has traditionally been concerned with user-interface affordance and usability (Gasson, 2003)

What is a paradigm

- Kuhn's theory of the structure of scientific revolution (Kuhn, 1970)
- Science does not progress from accumulation of facts
- Overlapping waves that fundamentally re-frame ideas
- Fundamentally affect what we see as being true

What characterises a paradigm?

- A common understanding of:
 - what is being studied
 - the questions that are useful to ask about phenomena
 - How we structure our approach to answering the questions
 - how to interpret results
- Changes in paradigms can be seen by e.g. shifts in “paradigmatic examples” used to teach the subject
- Also by noticing attempts to bring in marginal issues to the centre of attention

Generative metaphors

- Comes from the work of Agre (1997)
- Says that technical fields are structured around metaphors
- They suggest the questions that are interesting to ask of the field
- They suggest the methods to be used
- They bring certain elements into the centre and marginalise others

Paradigms vs. metaphors

- Kuhn focuses on scientific enquiry
- Scientific inquiry presupposes an absolutist metric: one paradigm is right, one is wrong
- Agre focuses on the metaphor
- Metaphors can exist side-by-side, without having to reconcile the differences

- **HOWEVER:** even though we are actually dealing with metaphors, we still follow Harrison et al and use the term Paradigm (for convenience)

Human-Computer Interaction

- An interdisciplinary field
- Roots in engineering research
 - Human Factors for interaction
 - Originally a-theoretic and pragmatic
- Later in cognitive science
 - The 2nd wave
 - An amalgam of cognitive science ideas
 - Human information processing related to computer signal processing
 - Task of HCI is to enable machine-human communication
- Now, according to Harrison et al, concerned with “situated perspectives”

Three paradigms?

- Harrison et al work with the assumption that there are three different paradigms in existence in the field of HCI.
- They do not argue that there are exactly three paradigms (or that "paradigms" is the best term)
- Alternative constructions are possible
- Their main argument is that this is one way of conceptually unifying the many alternatives to the commonly identified paradigms of HCI

Right and wrong?

- Neither do they argue that the 3rd paradigm is right and the others are wrong
- Instead, paradigms highlight the different kinds of questions that are interesting and can be asked, and the methods for answering them
- Paradigms co-exist, and we can work within multiple paradigms
- However, we should recognise the differences between the paradigms that make them appropriate for different problems (and thereby different contexts)

Metaphors - what is marginalised?

- The dominance of the first two “paradigms” (Human factors and cognition) has meant that certain issues become marginalised within HCI (contentious claim!)
 - Participatory Design
 - Ethnomethodology
 - User-Experience design
 - Interaction analysis
 - Value-sensitive design
 - Critical design... etc.
- Harrison et al see these issues as elements of the 3rd paradigm

The metaphors in HCI

- Shifts occur when a new metaphor drives choices of what to research and how, and when new issues have moved to and from the centre
- At the centre of each paradigm is a metaphor of *interaction*
- The centres and margins drive choices about:
 - what phenomena describe qualities of interaction,
 - what questions we ask about interaction,
 - which methods are appropriate to study interaction,
 - how to validate knowledge claims about interaction.

Centres and margins

- First paradigm (engineering and human factors)
 - Metaphor: interaction as a form of man-machine coupling
 - Goal: to optimize the fit between humans and machines
 - Questions: identifying problems in coupling and developing pragmatic solutions to them
 - Centre: concrete problems in interaction that create disruption
 - Margin: phenomena that underlie interaction but do not cause noticeable problems

Centres and margins

- Second Paradigm (Cognitive)
 - Metaphor: mind and computer as a coupled information processor
 - Questions: about information-processing phenomena or issues in computing:
 - how does information get in, what are the transformations, how does it go out again, how can it be communicated efficiently?
 - Centre: causal phenomena that explain a central tendency
 - Margins: phenomena difficult to assimilate to information processing

What is moving to the centre?

- Strands of research suggest a need for new perspectives
 - Ubicomp: dynamic use context of computing into focus: approaches like ethnography, design and the arts. Based on the idea that the use context is unspecifiable, cannot be formalized and treated as an information flow between devices and the context
 - The social situation of interaction, found in workplace studies: moved to CSCW. The meaning of interaction is explained through the centrality of social interaction, and this is at odds with the information-theoretic view in the 2nd paradigm
 - The domain of non-task oriented computing, such as ambient computing and experience centred design. At odds with the 1st and 2nd paradigms, where methods need problems that are formalized and expressed in terms of goals, tasks and efficiency, which is what non-task oriented approaches are designed to address.
 - Etc.

Principles of the Third Paradigm

- There are a number of principles that drive the research questions, and methods for arriving at their answers, in ways that differ from the first two paradigms
 - Intellectual commitments
 - The underlying role of embodiment

Intellectual commitments

1. The construction of meaning
2. Putting users in their place
3. Putting interfaces in their place
4. Putting researchers in their place
5. Explicit focus on values in design
6. The necessity, but inadequacy, of theory

The underlying role of embodiment

- In the 3rd paradigm, embodied interaction is
 - A shared intellectual commitment
 - A cross-cutting perspective at the heart of other commitments
- “Embodiment is more than optional”
 - According to Dourish, embodied interaction does not involve a shift in what we build, but a shift in the way that we understand the nature of interaction
- Others go further than this
 - E.g. Klemmer, hartmann & Takayama (2006)

Radical implications

- This puts physical embodiment into a central and defining position
- It centres a linked viewpoint where all action, interaction and knowledge is seen as embodied in situated human actors.
- It rejects the view of the mind as an information processor, and centres a non-information processing viewpoint
- A shift to recognizing and accommodating a plurality of perspectives, rather than trying to reduce them to a single perspective.

The roots of a 3rd paradigm

- The embodied interaction perspective is not a different topic for standard HCI methods
- It is not another understanding of what is important for interaction
- Compared to 1st and 2nd paradigm HCI, it is grounded in altered epistemological commitments
- These lead to changed research questions, methodologies and forms of design and evaluation
- They lead to the 3rd Paradigm

The third paradigm

- The “situated” paradigm
 - Central metaphor: interaction as phenomenologically situated
 - Goal: interaction should support situated action and meaning making in specific questions
 - Questions: revolve around how to complement formalized computational representations and actions with the rich, complex, messy situation round them
 - Methods: no one single, correct set of methods. A variety of approaches “embedded in a similar epistemological substrate”

“Situated”

- Three widespread definitions
 - The interactionist:
 - An account of the range of resources that the actor has with which to convey the significance of their actions and interpret the actions of others. How society is produced by behaviour
 - The ecological
 - The situation is that part of the organisation of action that is taken care of by the environment, whether designed or pre-existing. Leads to questions of how we organise the world
 - The cultural
 - Emphasises the connection of cognitive and cultural artefacts, and how the individual acts in a way situated by the presence of others in the distributed system where the individual is operating

Why are the paradigms useful?

- They are useful in understanding what is happening in the field of HCI
- They allow us to look at the field as a whole in terms of the paradigms
- This lets us understand why differences arise between the different approaches that contribute to the area
- It allows us to adjudicate conflicts between different approaches

	Paradigm 1	Paradigm 2	Paradigm 3
Metaphor of interaction	Interaction as man-machine coupling	Interaction as information communication	Interaction as phenomenologically situated
Central goal for interaction	Optimize the fit between man and machine	Optimize accuracy and efficiency of information transfer	Support for situated action in the world
Typical questions of interest	- How can we fix specific problems that arise in interaction?	- What are the mismatches that occur in communication between people and computers? - How can we accurately model what people do? - How to improve the efficiency of computer use?	- Which existing situated activities in the world should we support? - How do users appropriate technology and how can we support these appropriations? - How can we support interaction without constraining it too strongly by what a computer can do or understand? - What are the politics and values at the site of interaction, and how can we support those in design?

Ways of knowing

- Uniting the different aspects of the paradigms (metaphors, phenomena of interest, questions, goals) are differing conceptions of what it means to know something is true – they have contrasting epistemological commitments.
 - Objective vs. subjective knowledge
 - Generalized vs. situated knowledge
 - Information vs. interpretation
 - “clean” vs. “messy” formalisms

The role of design

- The relationship of the paradigms to design depends on the view we have of design
 - The common usage in HCI, simply the process of creating systems
 - A broader view, the specialized discipline of design arising from product and industrial design
- In HCI practice, analysis and design have been separate paradigms: although the traditions differ, HCI encompasses both, and the balance between analysis and design is characteristic of all paradigms
- However, the paradigms have differing goals with respect to design

Design and the 1st paradigm

- Values usability, using the idea of variance reduction from engineering.
- Designs are constituted as problems and solutions
- Initial designs are solutions to problems found in earlier designs
- Since “critical issues” are often failures during use, new design is often created in use or in use-like testing

Design and the 2nd paradigm

- Design is principled
- Still relies on heuristics and conventions for basic knowledge (as in 1st paradigm), but differs in when, how and why evaluation takes place.
- User testing to lead to process improvement, to validate without full deployment
- Evaluation is coupled to creation – design as hypothesis testing rather than problem solving

Design and the 3rd paradigm

- Design is an element of enquiry
- Interaction is an element of the situated world
- The understanding or construction of the situation is the core of the design
- The intellectual questions that form the analytic frame are elements of the design process
- Problems, hypotheses, and solutions are not the primary construction of design moves

Design as a discipline

- Design as a discipline, as taught in art schools, is in some ways a natural fit to the 3rd paradigm
- It values and addresses the complexity of the design situation
- The idea of design as a science, found in the 2nd paradigm, does not fit well in the 3rd.
- Different concepts of design are differently suited to different paradigms

To make the connection...

- We use some of the discussion from Gasson, about the differences between UCD and HCD, and the ways in which this can be connected to the different paradigms

Gasson, S., Human-Centred vs. User-Centred Approaches to Information System Design, *Journal of Information Technology Theory and Application (JITTA)*, 5:2, 2003, 29-46

The user-centred approach

- A focus on technology and how humans interact with technology, rather than how and why technology can support human work
- This issue continues to constrain new “user-centred” approaches to IS design
- The constraints fit poorly with an ambition to design systems that support emerging processes, and result in systems that do not support organisational work

Human-centredness

- “A new technological tradition that places human need, skill, creativity and potential at the centre of the activities of the technological systems”
- The HCD approach arose as a reaction to the idea that approaches to technology design de-skill technology users and impoverish the quality of working life

The human-centred approach

- Takes the design “problem” from work-participants
- This design problem is embedded in local, organisational practice
- This is instead of seeking a technical solution to a context-free information-processing problem

Tenets of HCD

- The design of flexible systems that permit the people who work with them to shape and manage their work
- Technology is shaped by, and shapes, social expectations. The form of the technology derives from the effect of social expectations on the design process. HCD advocates design that questions the normative expectation of technology
- Opposed to the traditional technology-oriented approach that prioritises computer-based information processing and technology-mediated communications over humans and their communicative collaboration

The difference...

- The IS perspective can reduce human-centredness to the considerations needed to model individual interactions with a computer system
- It avoids issues of emancipation, autonomy and the role of IT configuration in enabling or constraining organisational work
- The difference in focus is in the way in which technology is designed
- UCD does not promote human interests because of a focus on the closure of pre-determined technical problems

Returning to the paradigms...

- A case:
- Someone works in 3 locations, using 2 or 3 network platforms
- She uses personal hotmail to transfer documents between sites and platforms
- This is the only resource she knows that can be accessed from all platforms, and that can transport all the documents across platforms

Other areas...

- I have used the "metaphors" of the three paradigms to look at the myriad of definitions of User Experience
- There are many definitions of UX
- To understand (and make use of) the concept of UX, you must look at the underlying paradigm where the definition is created

What is user experience?

According to Cooper et al:

- There is only one user experience
 - The combination of the physical form and the interactive behaviour of the product
 - The two must be designed in concert
 - Form should follow function (*is this necessarily true?*)
 - The demands of interaction must guide the industrial design (*is this necessarily true?*)
 - Concerns about fabrication and cost will affect the possibilities available to interaction design

(Cooper et al, *About Face 3.0*, p. 140)

Tjänstedesign - utmärkande drag och konsekvenser för innovation

Tjänster är ...	Karakteriseras av ...	Konsekvenser för innovation
Immateriella	tjänster är grundade på erfarenhet	Ökat fokus på design och hantering av förväntningar och upplevelser
tidsbaserad	en dialog mellan tjänsteproducenter och kunder	vikten av sammstämmighet baserad på 'löfte' om ett varumärke
leveranser överskrider flera beröringspunkter	leverans via flera kanaler	holistisk ansats är av vikt i service design - organisationsgränser överskrids många gånger
simultant	producerad och konsumerad samtidigt	förmåga att designa skräddarsydd individuell upplevelse

Clatworthy 2008, sid. 2, min översättning

User Experience

- Hard to know what this is...
 - How a product behaves and is used by people in the real world
 - “Every product that is used by someone has a user experience”
 - “How people feel about a product and their pleasure and satisfaction when using it, looking at it, holding it, and opening or closing it”
 - “One cannot design a user experience, only design for a user experience. In particular, one cannot design a sensual experience, but only create the design features that can evoke it”

Rogers, Sharp & Preece

User Experience (UX)

- Law et al (2008) suggested several reasons why it is hard to formulate a universal definition of UX:
 - UX is associated with a broad range of fuzzy and dynamic concepts: emotional, affective, experiential, hedonic, and aesthetic variables. Typical examples of attributes of UX like fun, pleasure, pride, joy, surprise, and intimacy are but a subset of a growing list of human values. Inclusion and exclusion of particular values or attributes seem arbitrary, depending on the author's background and interest.
 - The unit of analysis for UX is too malleable, from a single aspect of an individual end-user's interaction with a standalone application to all aspects of multiple end-users' interactions with the company and the merging of the services of multiple disciplines.
 - The landscape of UX research is fragmented and complicated by diverse theoretical models with different foci such as emotion, affect, experience, value, pleasure, beauty, etc.

From UX to PD

- There is no distinct boundary between technology design and use
- Designers, to design systems with any integrity, must develop them in relation to specific settings of use.
- To make useful technologies, practitioners of other forms of work must take up the work of design.

Suchman, Practice-based Design, 2002

New methodologies and practices

- *Pointers towards PD*
 - *“Incorporating the user as input, and respecting its impact on the process and its outcome, creates fundamentally new constraints in Service design that we believe is going to require new methodologies and practices” (Pinhanez, 2009, p. 9).*
- Två olika sätt att använda PD
 - 1) rättfram användning – oavsett om förgrunds- eller bakgrundsscen är i fokus
 - 2) PD principer tänkbara
 - både tjänsteproducenter och mottagare/kunder involveras i samskapande av mervärde respekterar varandras expertis, alla kan påverka
 - (Blomberg 2009)

References

- Bødker, S. (2006) When second wave HCI meets third wave challenges. Proceedings of the 4th Nordic conference on Human-computer interaction: changing roles, pp. 1-8
- Gasson, S., Human-Centred vs. User-Centred Approaches to Information System Design, *Journal of Information Technology Theory and Application (JITTA)*, 5:2, 2003, 29-46
- Harrison, S., D. Tatar, Sengers, P. (2007). The Three Paradigms of HCI. *alt.chi. Proceedings of CHI '07*, ACM Press, NY.
- Law, Effie, et al. "Towards a shared definition of user experience." *CHI'08 extended abstracts on Human factors in computing systems*. ACM, 2008.
- Rittel, Horst WJ, and Melvin M. Webber. "Dilemmas in a general theory of planning." *Policy sciences* 4.2 (1973): 155-169. **(Wicked problems)**
- Rogers, Yvonne, Helen Sharp, and Jenny Preece. *Interaction design: beyond human-computer interaction*. John Wiley & Sons, 2011.
- Suchman, Lucy A. "Practice-based design of information systems: Notes from the hyperdeveloped world." *The Information Society* 18.2 (2002): 139-144.