DESIGNING UBICOMP – MUTUAL INFLUENCES OF UBIQUITOUS COMPUTING AND DESIGN.

_A SHORT OUTLINE ON A PHD-PROJECT._

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EXPERIENCE & BACKGROUND

> industrial designer
> HCI: interaction- and interface-design, information architecture
> Ambiente-Group of Norbert Streitz / GMD – IPSI  
  » i-LAND framework: Roomware, BEACH, Passage  
  » hci, cscw, augmented/ mixed reality
> Hochschule für Gestaltung Offenbach  
  » website scientific communication / social sciences  
> MARS - Exploratory Media Lab, Fraunhofer IMK  
  » hci, knowledge visualization & information retrieval, tangible objects
> phd at University of Wuppertal, advised by Mihai Nadin
introduction to dissertation and aims

status quo

significance: design & ubiquitous computing

some notes on design theory
**why design and ubicomp?**

> what has design to do with ubicomp?
> what has ubicomp to do with design?

**claim 1:** design is relevant for ubicomp.
ubicomp is relevant for the discipline of design.

**phd’s aims**

> to investigate and identify roles of design in the field of ubiquitous computing
> to reflect the influences of nowadays digital culture and ubiquitous computing on design, its theory and methodology
> to enlarge the current knowledge body of design theory with aspects of other disciplines like HCI
splendid isolation of design

currently the role of design is reduced to the visual aspects, to mere screen-design

> lack of understanding what design provides
> missing exchange between design and IT-disciplines: lack of transdisciplinarity and crosscultural exchange

explanations

> design-internal problems
> no strong research tradition
> situation changes and design becomes a discipline ¹

¹ compare Bürdek 2001
> History: two separated branches – industrial design and graphic design
  » different origins: industrial production vs. arts
  » different schools // education: art vs. sciences

> US-Tradition?
  » design in the US traditionally covers ID and GD; styling...
  » origins and supremacy of computation/ IT/ HCI

_ what about computation & design?_

> computation is subject of design in terms of
  » using software-applications as tools: CAD, DTP
  » designing software: men-machine-interfaces

> influences of computation on design are currently barely considered beyond this level
claim 2: ubicomp changes paradigms in HCI

new requirements

> multiple computers per person
> mobility, on-air networking
> sensing
> new input and output devices beyond the screen
> omni-presence of integrated computers and networks
> further increasing complexity of software/ function overload

cognitive problems: eclecticism and invisibility

> the disappearing computer
  » physical invisible = integrated
  » cognitive & emotional invisible = imperceptable
> anything could be connected to everything
> a digital artefacts’ form is not determined by its function: anything goes
> result: the user cannot ”read” i.e interpret an artefact
current approaches

> new HCI concepts as information appliances
  » reducing cognitive overload and maintenance efforts
  » simplicity
> context awareness and perceptive computing
> ai, agents etc.

claim 3: ubicomp is a social concept.

> compare e.g. Weisers visions of "computers which vanish in the background" or of IT that is used the way we handle writing \(^1\)
> compare e.g. Normans vision of computation as "non-technology" \(^2\)
> technologies and social acceptance: two sides of the same coin
_Why design is relevant for ubicomp/ some reasons

> "Design is about artefacts, might it be hardware or software, service- or eventdesign. It has to with products, their handling, use, reception, interpretation and their contexts." ¹

> design deals with signs and communication processes, with psychological, social and technical aspects, with production and lifestyles, with man and machine.

_HCI ...

_trust

> one of the most crucial problems in ubicomp environments

> technical „hard“ side

> trust has to be created on the „soft“ side in terms of signs, of communication of acceptance and access.

> need of human-centered prespective instead tech-centered IT-focus (as critisized by Norman)
HCI beyond function?

- HCI: currently focussed on functionality, usage etc.
- relationship man-objects ≠ pure fullfillment of needs
- Secondary functions: beauty or joy
- market
- the yearning for a product is as important as the need itself \(^1\)

Other new tasks

- complexity
- internal communication as e.g. information-visualization

\(^1\) Nadin 1999
and why ubicomp is relevant for design/ some reasons

new requirements
  > ubicomp requires to joint the two historical branches of industrial design and graphic design
  > theoretical foundations have to be enlarged, concepts from other disciplines have to be taken into account.

social relevance of the field
  > computing as part of our everydays life
  > danger: losing contribution

rethinking the role of computing in design
  > impact on the work of the designer in terms of thinking and working
  > if You use a hammer, You start to see the world in nails...

upcoming economic relevance
Some notes on design theory

> "Design Theory can be clarified at the nexus between psychological symbol research and design-specific symbol interpretation." ¹

> mainly established in the field of industrial design
> 2 main roots: linguistics and psychology

> Semiotics as one fundamental part of design theory
  » Linguistic Turn as paradigm shift
  » focus on semiotics beside text: architecture, film, objects, art ...
  » People like Peirce, Mukarowsky, Barthes, Baudrillard, Eco etc.

> Freudian Psychology as the other root
  » symbolic interpretations
  » school of symbolism: Cassirer, Langer

> today: other approaches e.g. as constructivism, systems theories, or communication theories

¹ Bürdek and Gros 2000
Theory of Product Language

- user
- functions
- artefacts

practical functions

functions in terms of sensual functions

mediation

semantic functions

Formal Aesthetics

"Anzeichenfunktion"

"Symbolfunktion"

- indicating technical & practical functions; "semantic hints"
- symbolic functions:
  - individual
  - collective, cultural

Compare: Gros 1983, p.70; Steffen 2000
_website: www.designing-ubicomp.com

(currently only in German)

...thank you