

Interaktionsdesign E2008

Lektion 14 Tangible Computing

Lektion 14 læringsmål

- Forstå interaktionsmodaliteter i digitale artefakter og ...
- relatere disse til Dourish' begreb om embodied interaction
- Særlig fokus på
 - Tangible computing
 - Mobile computing
 - Synkinesthetic computing
- Skabe forudsætninger for undersøgelse af modalitet / interaktionsformer for eget interaktionsdesign-projekt

Indhold lektion 14

- Interfaces / Modaliteter: kinestik, tangible interfaces ... (= embodied interaction – Dourish)
- Synkinestetisk interaktion
- Teori og baggrund
- Tangible Computing
- Embodiment
- Eksempler / Projektinspiration
- **Pause**
- Projekt: deadlines og delrapport
- Evaluering

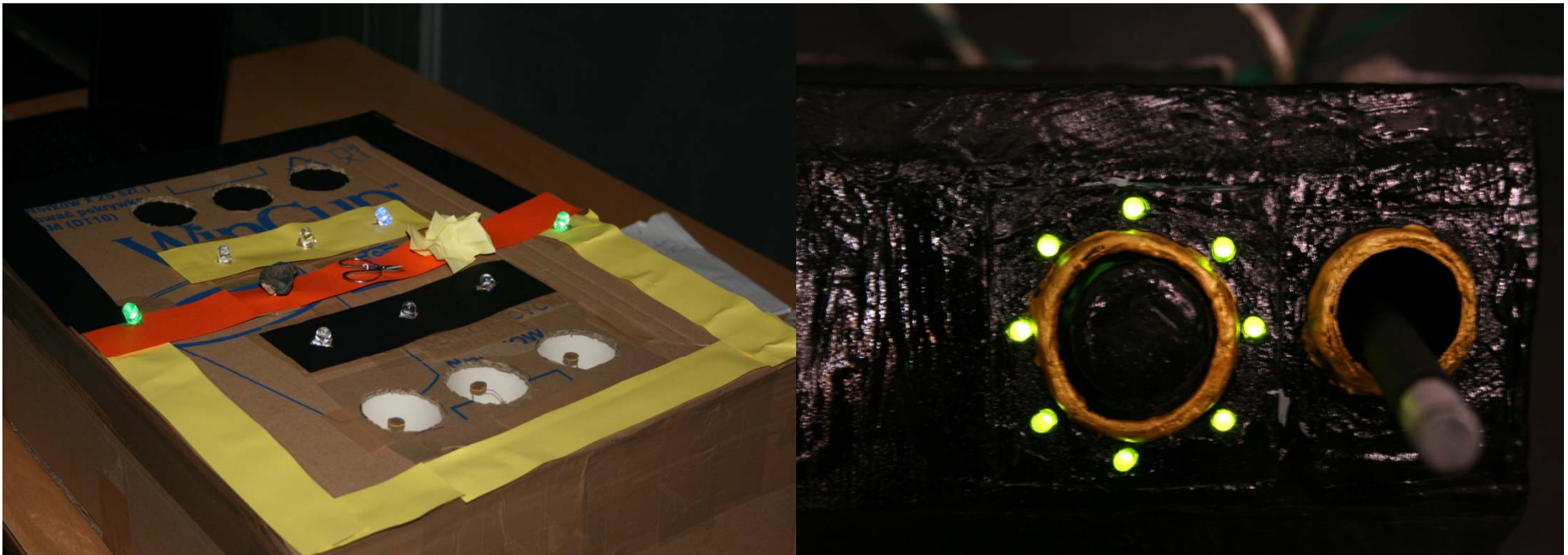
Modaliteter / interaktionsformer?

Input / output?



Interaktionsformer i workshopperioden?

- Sanser
 - Output
 - Input
- Dele af kroppen
 - Output
 - Input



Interface types

1980s interfaces

Command

WIMP (Windows, Icons, Menus and Pointer) / GUI

1990s interfaces

Advanced graphical (multimedia, virtual reality, information visualization)

Web

Speech (voice)

Pen, gesture, and touch

Appliance

2000s interfaces

Mobile

Multimodal

Shareable

Tangible

Augmented and mixed reality

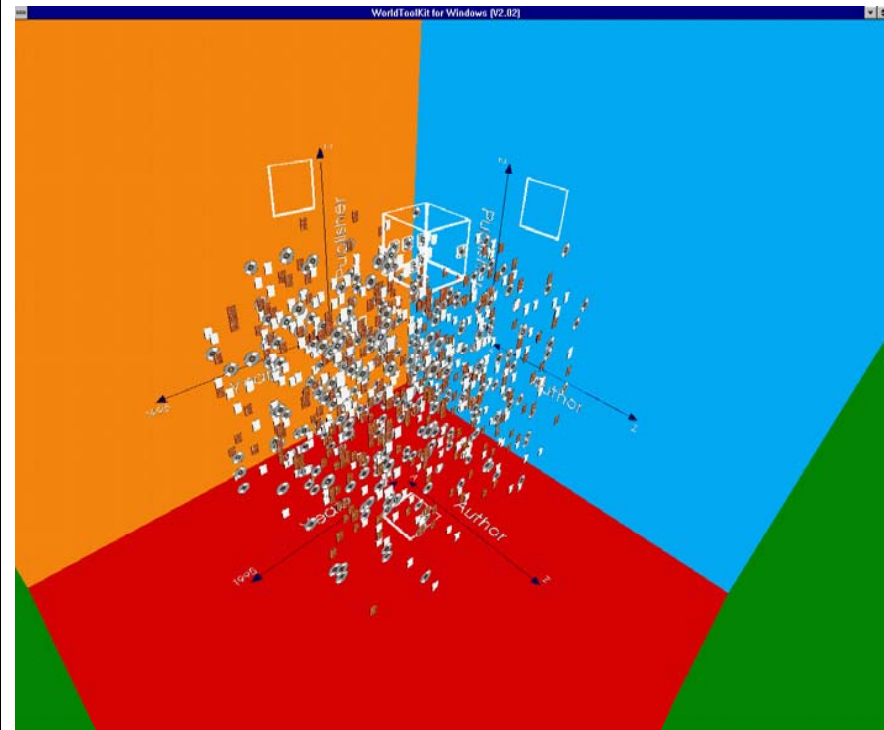
Wearable

Robotic

Det virtuelle bibliotek



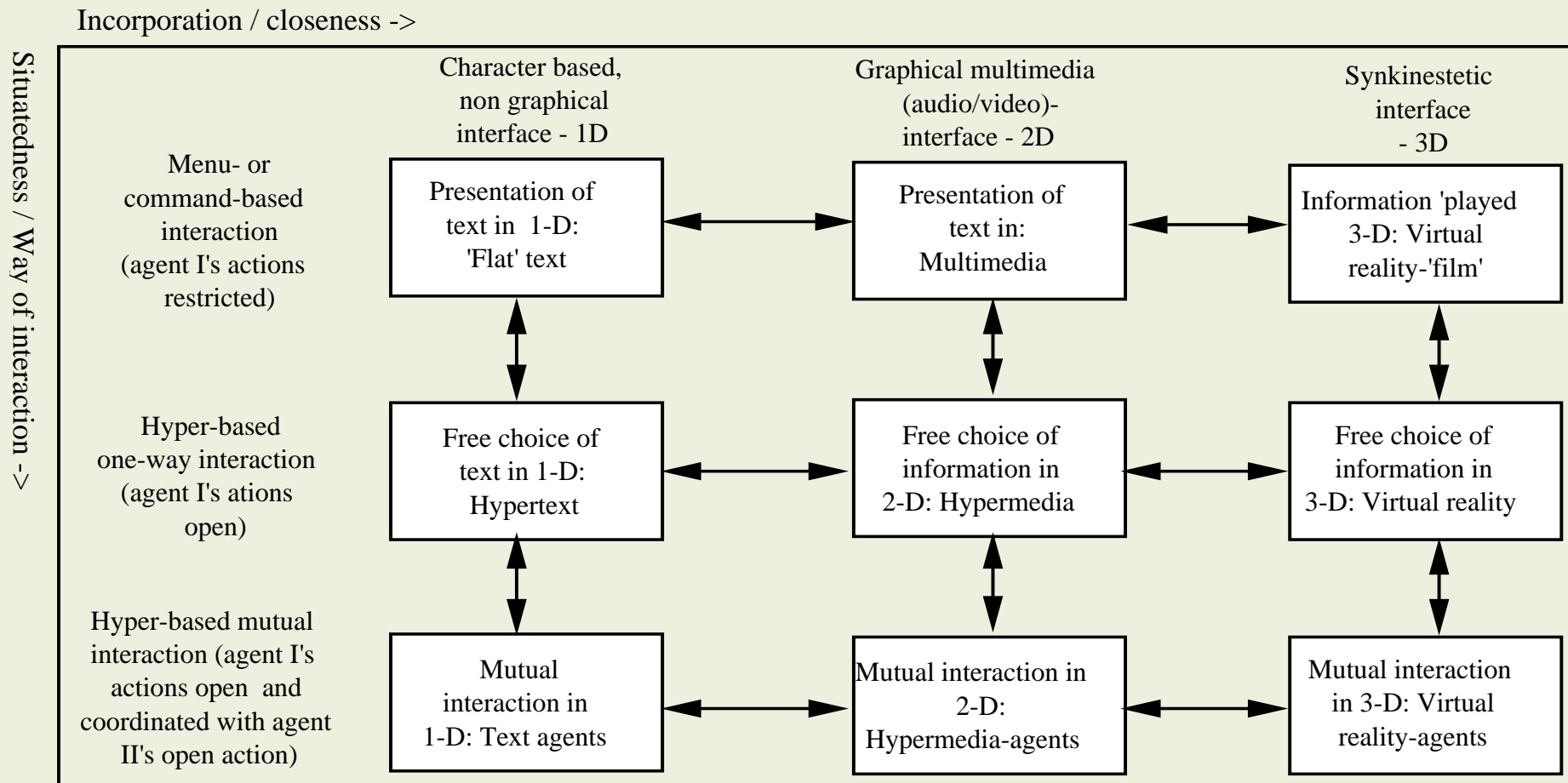
HMD fra Virtual Research: 3000\$, opløsning på 479 x 234 pixels. 3D-mus og tracker.



Et eksempel på swarm-mode i Det virtuelle Bibliotek

Synkinesthetic interaction [*embodiment*]

O. F. Kirkeby & L. Malmborg: Imaginization as an approach to interactive multimedia. First International Conference on Cognitive Technology, 24-27 August 1995, Hong Kong. Published in: Barbara Gorayska (ed.): Cognitive Technology, Human Factors in Information Technology Series, North Holland/Elsevier, 1996.



Tangible computing

- paradigme

- Begrebsafklaring
 - Ubiquitous computing
 - Pervasive computing
 - Context-aware computing / location-based system
 - ...
 - Social computing

Theory and Foundations

- Paul Dourish: Where the Action is
- Kap 2: Getting in Touch
- *Embodied Interaction is interaction with computer systems that occupy our world, a world of **physical** and **social** reality, and that exploit this fact in how they interact with us*
- Embodiment denotes a form of participative status
- A history of HCI and interaction paradigms
 - electronic
 - symbolic
 - textual
 - graphical
 - ...
- A history of conceptual & theoretical models
 - incorporating new human skills and abilities
 - incorporating new ways of understanding their use

Two Recent Trends

- “Tangible computing”
 - physical interaction
 - augmented environments
 - computation as part of the physical world
 - ...”the way we experience the everyday world”
(phenomenological approach)
- “Social computing” (Nis 5/11)
 - using social understandings of interaction
 - enhancing interaction with computation

Tangible Computing

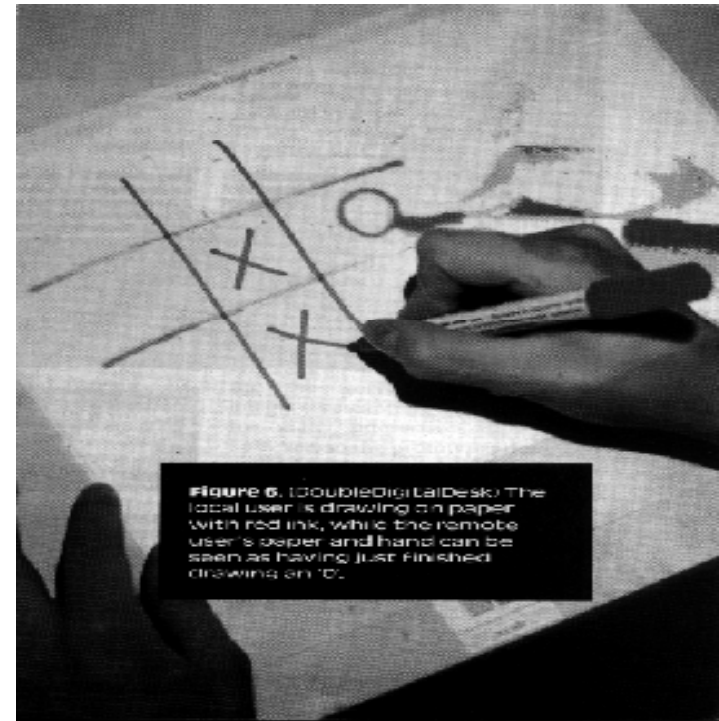
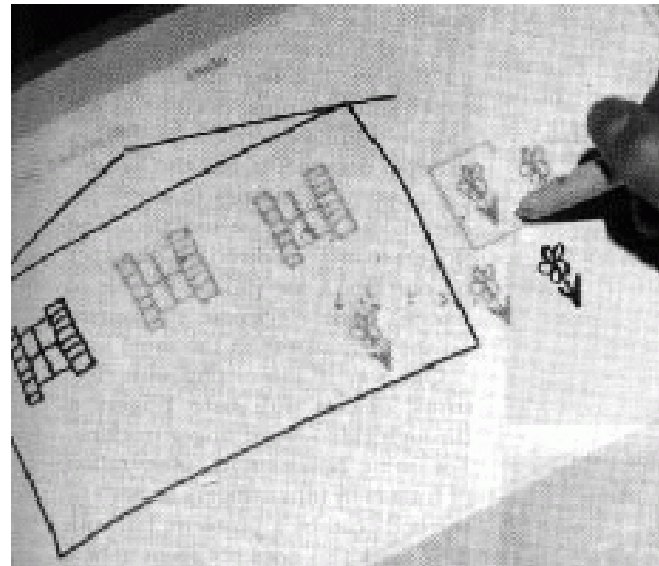
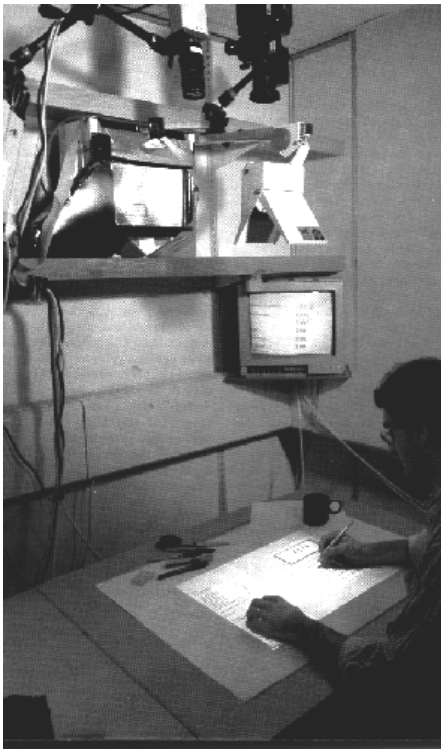
- Origins in Ubiquitous Computing
 - Mark Weiser: ...”the computer for the 21st century” (1991)
 - invisible computing (paradox), “the disappearing computer program”
 - computation moves into the environment
 - interface moves into the environment
 - new set of design concerns
 - managing attention
 - incorporating context
 - combining devices
 - new physical forms and affordances
 - new interactive styles
 - computation by the **inch** (electronic tags / computational “post-it”), **foot** (stylus-based interaction, digital paper) and **yard** (wall-sized devices, Liveboard) -> **Augmented paper, LBS, CAS**
 - examples of tangible designs?

Tangible Computing

- A 'historical' view ...
- Wellner's Digital Desk (1993)
- Jeremijenko's Live Wire (1994)
- Bishop's Marble Answering Machine (1995)

Tangible Computing

- Wellner's digital desk (1993)
 - interaction with paper and electronic documents



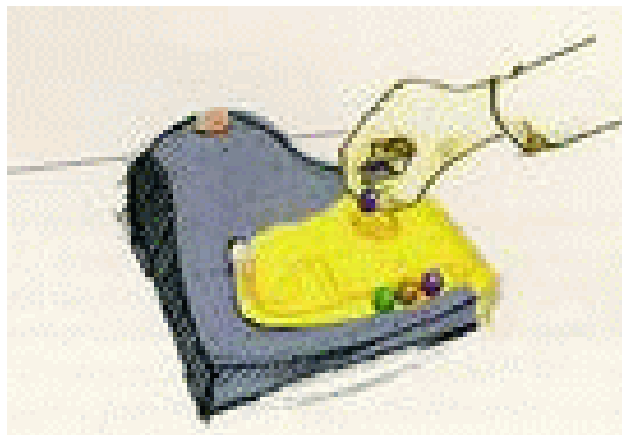
Tangible Computing

- Jeremijenko's "Live Wire" (1994)
 - bridging physical and virtual



Tangible Computing

- Bishop's Marble Answering Machine (1995)
 - physical interaction with digital information (coupling bits and atoms)



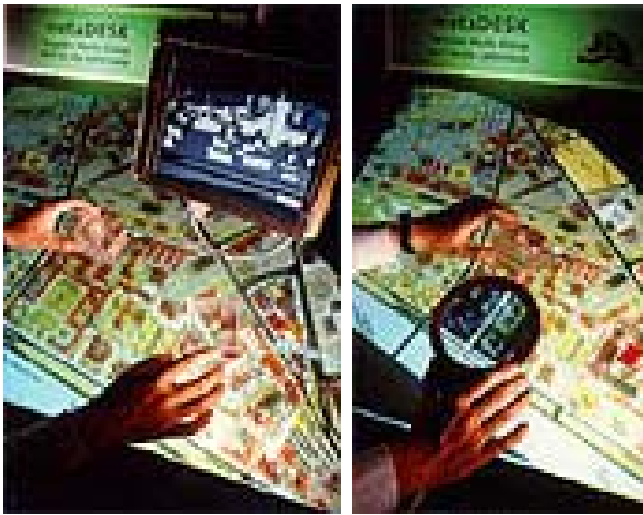
MIT tangible bits program

- Ullmer & Ishii: Tangible Bits (1997)
- Tangible bits -> tangible media
- [Examples / projects](#)

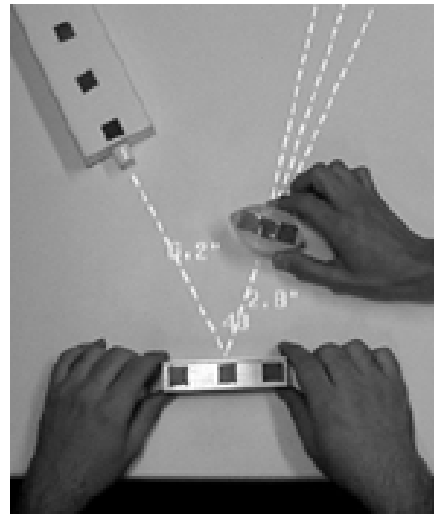
Tangible Computing

- Metadesk (Ullmer & Ishii 1997, TB, MIT)
- Illuminating Light (Underkoffler & Ishii 1998, TB, MIT)
- Urp (Underkoffler & Ishii 1999, TB, MIT)

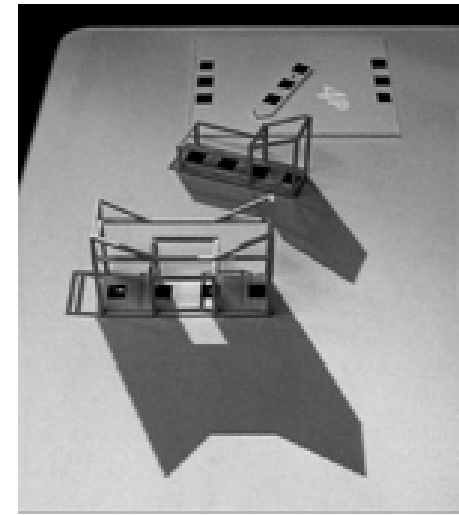
Tangible Computing



metaDESK



Illuminating
Light



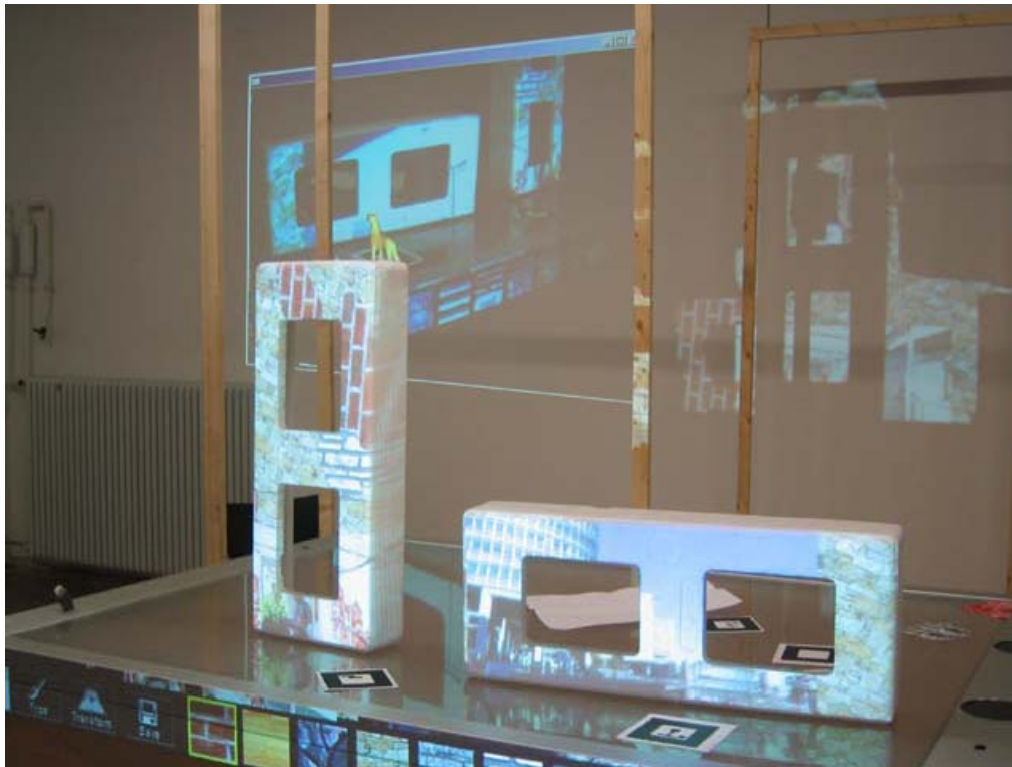
Urp (1999)

Own examples of tangible computing

- Atelier: tangible archive
- Psst! Tangible sound toys
- PaperWorks: augmenting pen and paper
- Mobility and learning environments: ubiquitous tangible language
- Students' work

- Your examples?

Atelier



The aim of the ATELIER project (Architecture and Technology for Inspirational Learning Environments) is to contribute to inspirational learning environments, which are grounded in an understanding of creative practices within design, architecture and art.

Co-wall / tangible archive
Texture painter

...

Psst!



The Programmable Soundscape Toy

Paperworks

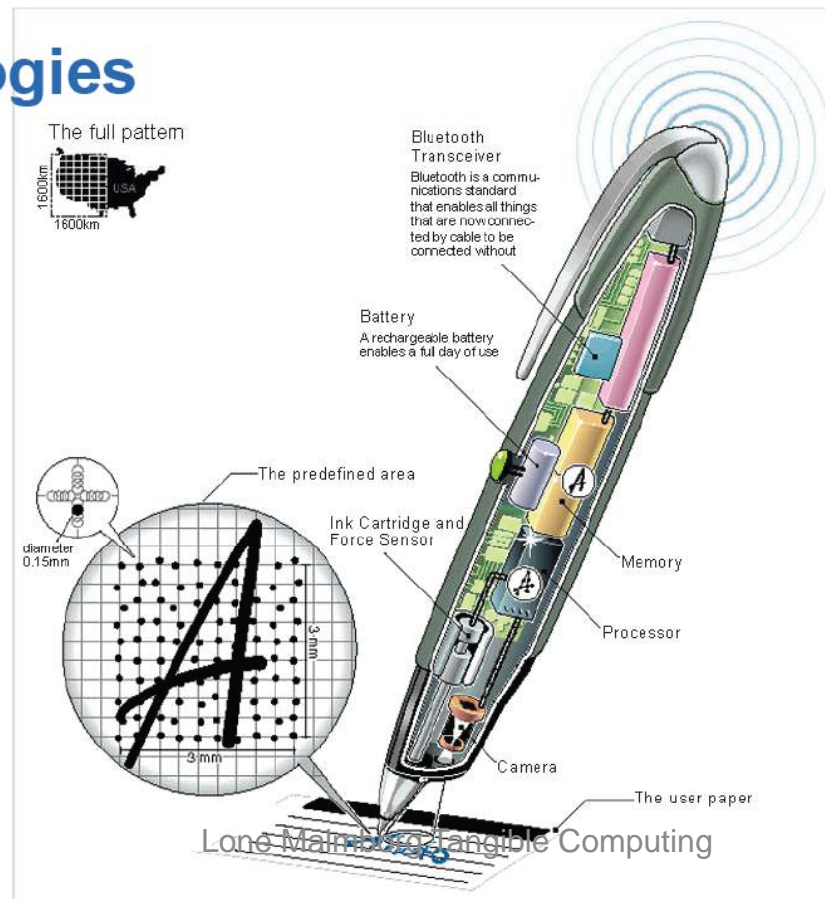
Augmenting pen and paper



Anoto Technologies

virtual paper space
of 60 million km²

Pen manufacturers
Sony Ericsson
Logitech
Nokia
Maxell



24. Oktober 2008

23

Situated probing

CHI2006, Montreal

Lone Malmborg

Bodil Jönsson

Arne Svensk

Mobility and Learning Environment
engaging people in design of their everyday environment

Mobility and Learning Environment

- from abstract to tangible living

- methodological problems of engaging users in design
 - ethnographic approaches + cultural probes
 - flexible learning situations that fit users' needs
 - *Tryckolera*: activity centre for people with reduced cognitive abilities
 - CP processes: surprising observations and important ideas for future design
 - access to our own and our co-designers' thoughts
- understand needs / wishes of people affected by decisions in design process
 - **inclusive design for mobile learning & communication**
 - two groups of people:
 - 1: limited verbal language abilities, need to convey experiences non-verbally
 - 2: students, need for access to different media in an open, flexible environment
 - establish a situated design process

Tryckolera – the environment

- 25-75 pictures pr day
- Movies every day
- Library contains 80.000 pictures + 100 movies
- Variety of inspirational environments to create illustration, interest and affection
- In-door, out-door, themes, planning, problem solving ...



Tryckolera – design aims

- From activity environment to learning environment
- Abstraction
- Reflection
- Self-confidence
- Continuity
- Contact with network
- Ubiquitous language



Concluding remarks

- transcend well-established practices and habits
- view very familiar situations and environments in a new way
- question established concepts of whom is capable of initiating and contributing to a design process
- CP elucidate who own the questions, issues and problems
- 'Non-verbal' methods like CP have a great potential in letting people with cognitive difficulties have an important role in the design process
- CP helped us to design the *ubiquitous language* for people with cognitive and language difficulties



Students' work

- *Kremlan (Livia Sunesson, 2001)*
- *Tabletop Wireless Tracking System (Nichlas Nilsson, 2002)*
- *FISH - a robot to help emotional development in autistic children (Tove Blomgren & Anders Tenggren, 2003)*

Kremlan



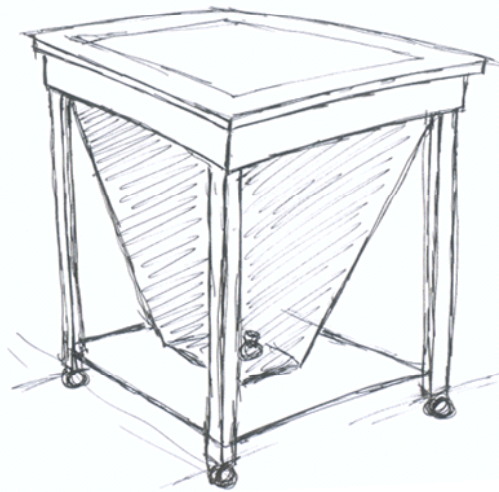
I studion

På Snoezelen



Livas website / portfolio:
<http://tallponies.net/livia/portfolio.html>

Tabletop Wireless Tracking System for composing / sampling music



FISH - a robot to help emotional development in autistic children

[Tove Blomgren](#) & Anders Tenggren, 2003

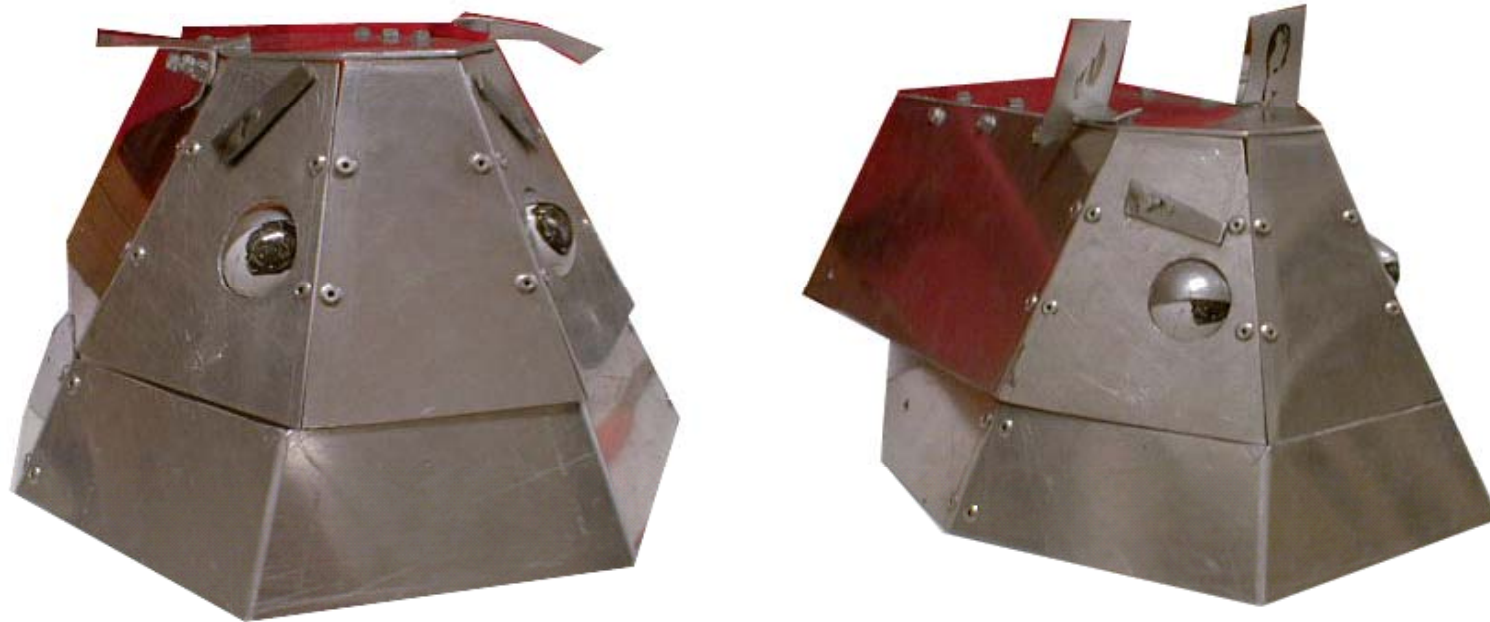


Fig 1. First prototype - without skin

Jeres eksempler ...

Features of Tangible Computing

- Physical mappings
 - physical objects rather than abstract entities
 - *specificity* and *specialisation* (focused and task-specific)
- Exploiting physical affordances
 - suggesting and guiding action
- Distributed interaction
 - interaction across a range of objects
 - interaction spread throughout a space
 - moving beyond enforced sequentiality

Embodiment

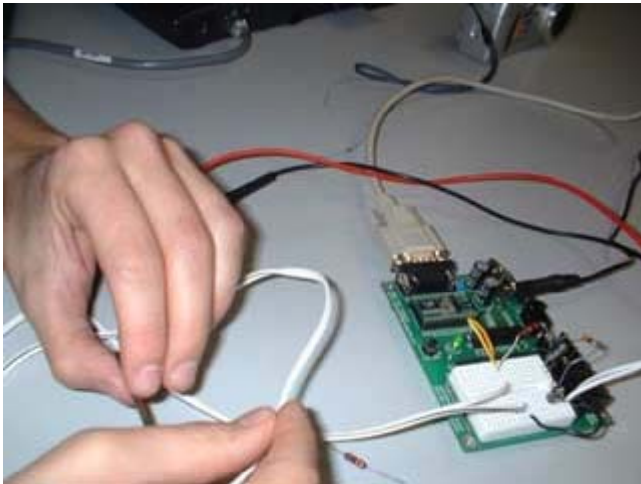
- Embodiment in physical computing
- Embodiment in social computing
- Embodiment is...
 - the nexus of presence and practice
 - a feature of engaged participation with the world
 - a pre-ontological apprehension of the world
(‘see and understand’ rather than ‘understand and see’)

Dourish conclusions

- Embodiment is a foundation for new HCI models
 - tangible and social computing
 - a common focus on participation and meaning
- Turning to phenomenology
 - a conceptual understanding of embodiment
 - ... det vender vi tilbage til 12. november

Inspiration

- et interaktionsdesign statement



Unsworn – Magnus Torstensson & Erik Sandelin

Although digital technology is becoming increasingly personal and intimate, electronic artefacts and systems are often conceived of as tools, designed to support goal-oriented tasks and activities as efficiently as possible. The Digital Peacock Tails project looks beyond this narrow point of view and employs digital technologies not only as efficient tools but also as beautifully challenging plumages



Digital Peacock Tails
Designing Post-Optimal Electronic Artföre

Projekt

- Deadlines etc:
- Delrapport: afleveres 31. okt
- Øvelser: 24. + 29. okt.:
 - Vejledning: om at skrive delrapport
- Prototypepræsentation: 7. nov, kl 10-12
 - i hjælpelærergrupperne; en halv time til hver gruppe inkl. spørgsmål og feedback. Eftermiddag: arbejde videre med prototypen / forberede posterpræsentation
- Invitation til posterpræsentation: 12. nov
- Website: 14. nov
- Poster: 19. nov

Evaluering

- Forelæsningerne
 - Supplement til den læste litteratur i stedet for gennemgang (især Sharp), dygtige formidlere, godt med eksempler, Sharp er demotiverende, øvrige tekster er gode, forvirrende med Sharp med en tilgang og lærere som har en anden tilgang, svært at forstå de enkelte tekster i en større kontekst,
- Øvelserne
 - Gode øvelser – konkretisering, mere fleksibilitet så det passer til gruppernes projektstatus, forventninger tilpasses gruppernes behov, færre øvelser som så går over flere øvelsesgange, evt hel dag med forelæsninger + hel dag med øvelser, bedre koordinering mellem lærere og hjælpelærere, ros til hjælpelærere,
- Workshops
 - Mulighed for at deltage på begge workshops, evt halvanden uge på hver workshop, etnografiworkshoppen var for lidt workshop og for meget forelæsning, hellere intensive workshops (hver dag i en uge), klarhed omkring forventet output, stor ros til hjælpelærere / undervisere på workshops,
- Bloggen
 - Supergodt, svært at finde rundt på bloggen ... Men godt den
- Generelt
 - God kobling mellem teori og praksis, dårlig planlægning, for kort varsling af deadlines, klarere udmelding af deadlines og arbejdsomfang, godt at arbejde med ældre, møde en gruppe som man ikke kender til, tydeliggøre forskel mellem invention / innovation, svært at kortlægge reelt behov hos ældre, 'luftige' behov, godt med høje ambitioner, kurset fylder mere end 15 ECTS, meget stof er nyt for mange, uklarhed om krav, svært at leve op til krav, positive og optimistiske lærere, meget med to gange om ugen -> hellere en gnag om ugen over to semestre, vigtigt at konkretisere hvilket stofområde vi befinder os i, klarere planlægning, mere tid til aktiviteter, godt at komme hurtigt i gang med projektet, koordinering mellem lærere, har lærerne for høje forventninger / ambitioner?, hele tiden under tidspres, vælge ud blandt opgaver / krav, supplementer / alternativer til Arduino, overblik over mulige 'byggeklodser' til sketching, godt med pilotprojekt, krav til website (og andet) ud i bedre tid, svært at få adgang til tekster når man ikke er på ITU hver dag,
- Andet