touching technology

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I work in Lancaster
and live in Cumbria
The Lake District

... but

although I live in England
and I speak English
I am not English
I am Welsh
rydw i’n Cymraeg

... and have sabbatical year so

mostly in Tiree
... when not elsewhere

today I am not talking about …

• intelligent internet interfaces
fuzzy personal ontologies and
structure from folksonomies

• situated displays, eCampus,
small device – large display interactions

• visualisation and DB interfaces

• fun and games, virtual crackers,
artistic performance, slow time

• modelling dreams and regret!!

... or even lots of lights

http://www.hcibook.com/alan/projects/firefly/
cognition connects with computation
cognition connects with computation
when bodies touch technology
when bodies touch technology

the physical world
the physical world
material artefacts and design
material artefacts and design
space and spatial arrangement
space and spatial arrangement

different ways to touch
different ways to touch
ubiquitous comp. = tech. entering the world
ubiquitous comp. = tech. entering the world
tangible UI = embodying computation	tangible UI = embodying computation
... plus mobile ... = when location matters
... plus mobile ... = when location matters

virtual reality = emulating the world
virtual reality = emulating the world
AR / MR = blending physical and digital worlds
AR / MR = blending physical and digital worlds
physiological comp. = the body is the interface
physiological comp. = the body is the interface
product design = physical devices with digital effect
product design = physical devices with digital effect

three rules to be broken
three rules to be broken
• directness of effort
• localiry of effect
• visibility of state

continuity in time and space
continuity in time and space
physicality and the body

bodily limitations – skin and bone

- ergonomics and health
  - keyboards and trackpads
  - car switches
- as a design resource
  - simultaneous switches in nuclear bunker
  - sweets on the high shelf

bodily limitations – grey matter

- fleeting thoughts – electrical
  - Miller's 7±2
- long-term memory – physical connections
  - some sums ...
- mood and medium term memory – chemical
  - coping with multiple chat windows

action in the world

- Gibson and affordances
- distributed cognition
- the embodied mind

physicality and design
levels of fidelity in design

from paper prototype to working mock-up

study the old to design the new

work with Masitah Ghazali & DEPh project

• look at ordinary consumer devices
  – washing machine, light switch, personal stereo
  • why?
  – we are used to using them ourselves
  – they have been ‘tested’ by the marketplace
  – they embody the experience of designers

half empty?

• not the first …
  – Norman – DOET/POET
  – Thimbleby – FSM for video, microwave
  • often used as HCI strawman
  – emphasise for design flaws
  • we are looking for the good lessons
  – how mundane devices exploit physicality

models of AR & tangibility

• Ullmer and Ishii – MCRpd
  – architectural interaction model
  • Benford et al. – sensible/sensable/desirable
  – exploring design space
  • Koleva et al. – TUI framework
  – ‘coherence’ between the physical and digital

multiple feedback loops

physical-logical mappings

model physical device states

the device ‘unplugged’

• the device ‘unplugged’
model logical system

light

OFF

ON

two states
of the system

physical–logical mapping

switch

user pushes
switch up
and down

light

OFF

ON

exposed state

mapping 1–1

switch

user pushes
switch up
and down

light

OFF

ON

controlled state

give it to designer

kettle switch

system state

system state visible through control

press up

press down

BOILING

Temp < 100

POWER

OFF

POWER

ON

(1) system state visible through control
(2) system and user have similar effects

compliant interaction

exposed state particularly easy to understand and use

but not always 1–1

compliant interaction

exposed state particularly easy to understand and use

but not always 1–1

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• 'real' world and 'virtual world' interactions are all physical .... but some are more physical than others
• understanding physicality is fascinating .... and helps us to design better
• watch for the book .... TouchIT