

# Engineering Human Computer Interaction

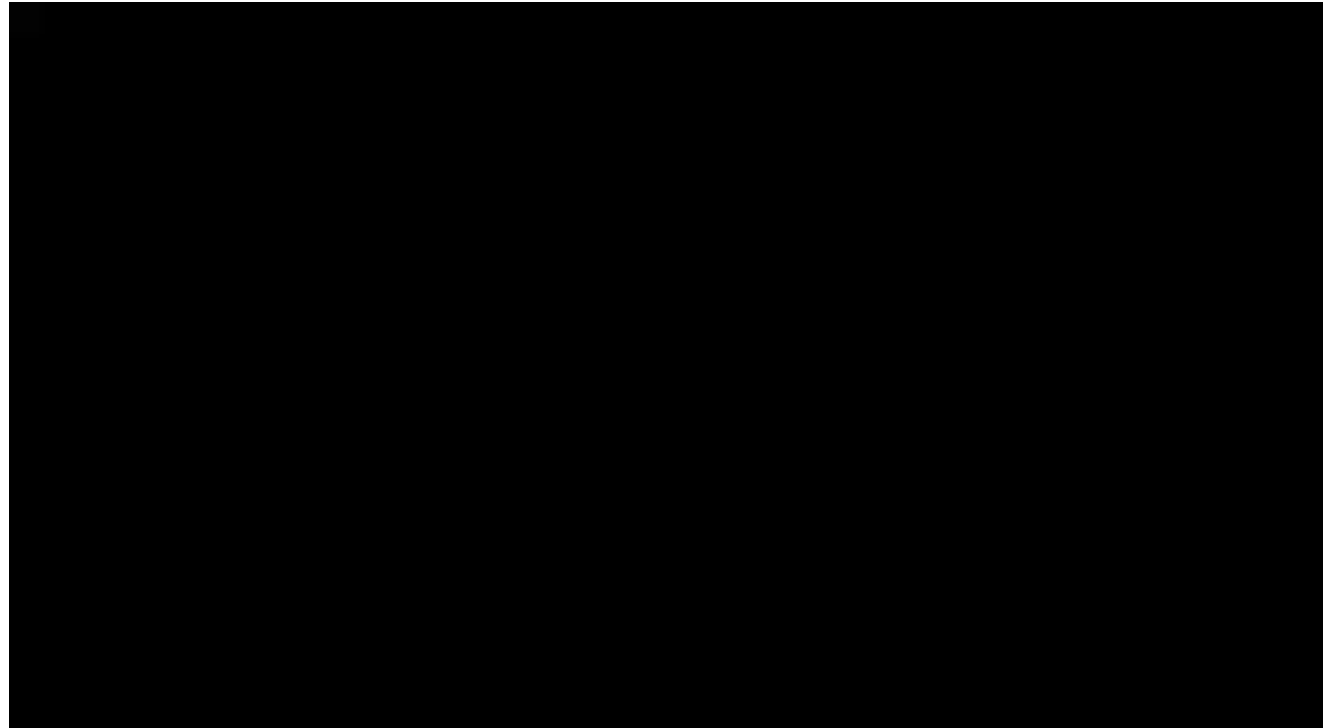
Gaëlle Calvary  
Fatoumata Camara  
Sophie Dupuy  
Yann Laurillau

[First.Name@imag.fr](mailto:First.Name@imag.fr)

Laboratoire d'Informatique de Grenoble

**Why?**

# Counter-example from daily life



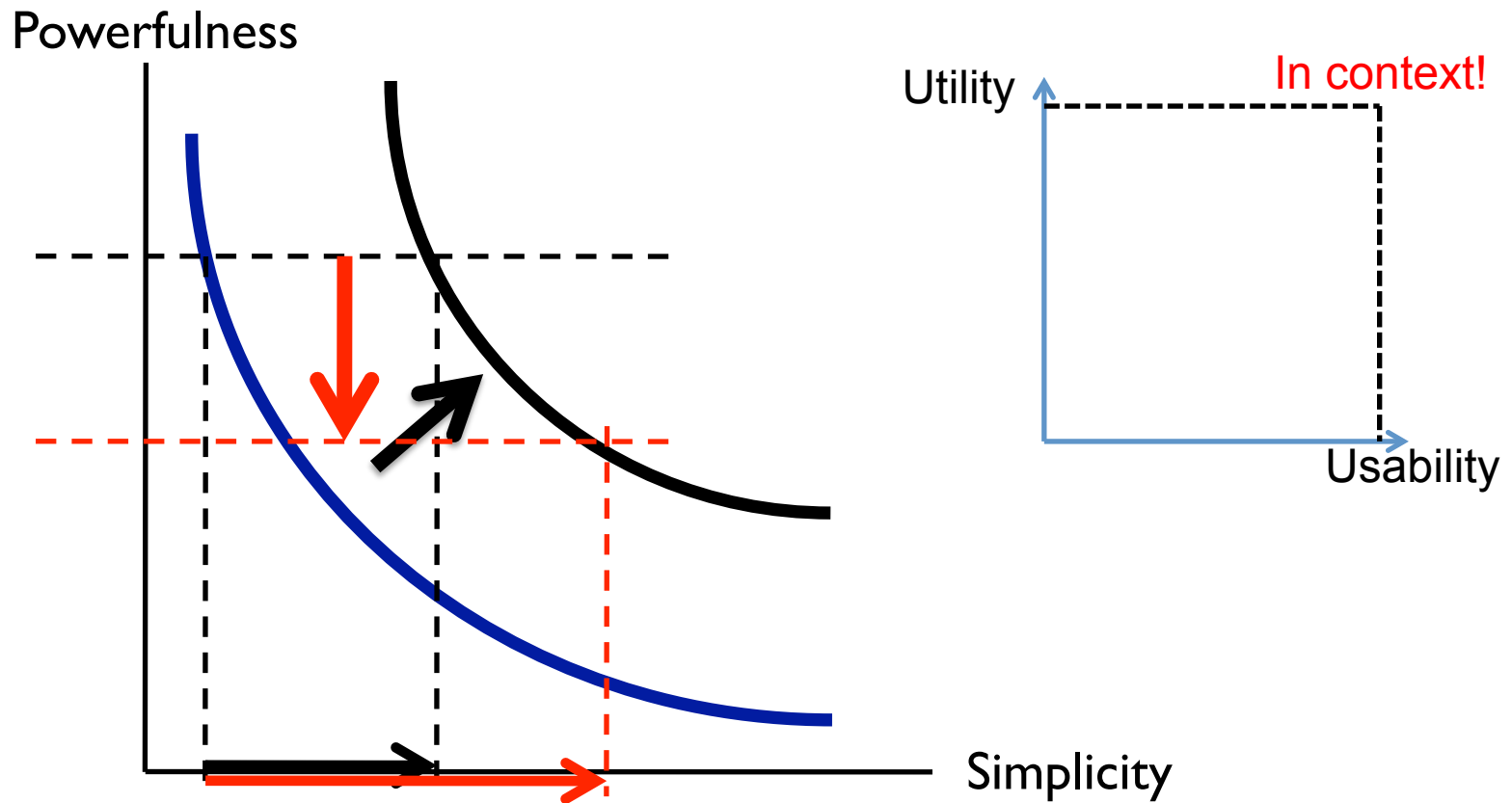
# From counter-example to example?



**What?**

# Challenge of HCI

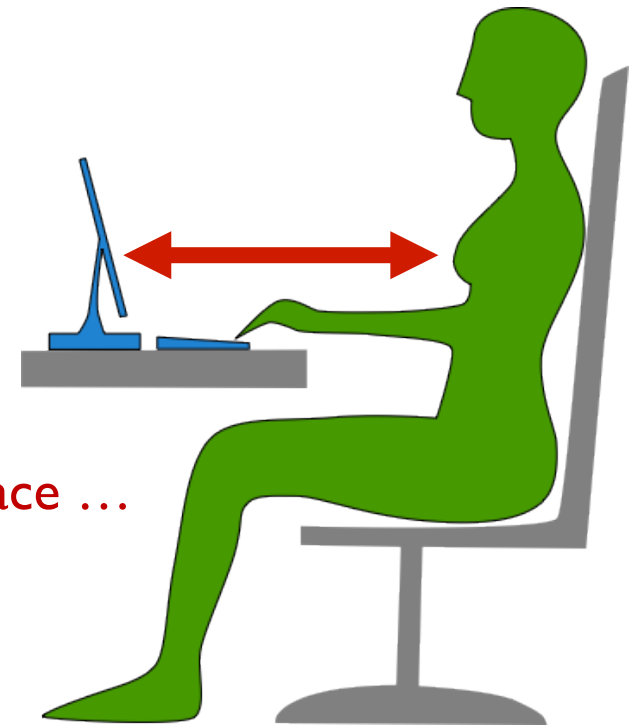
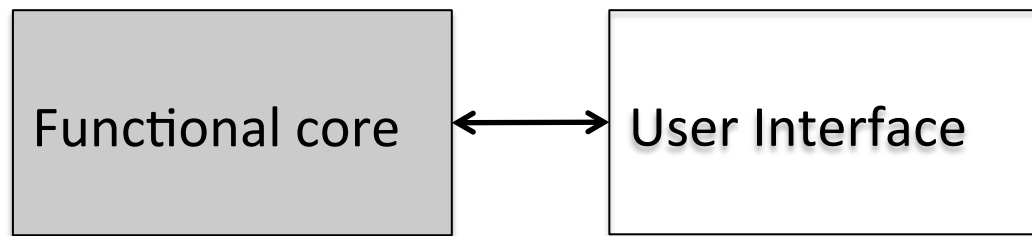
- Challenge



# Challenge of HCI

Getting the right design and the design right

The **right** information, function ...

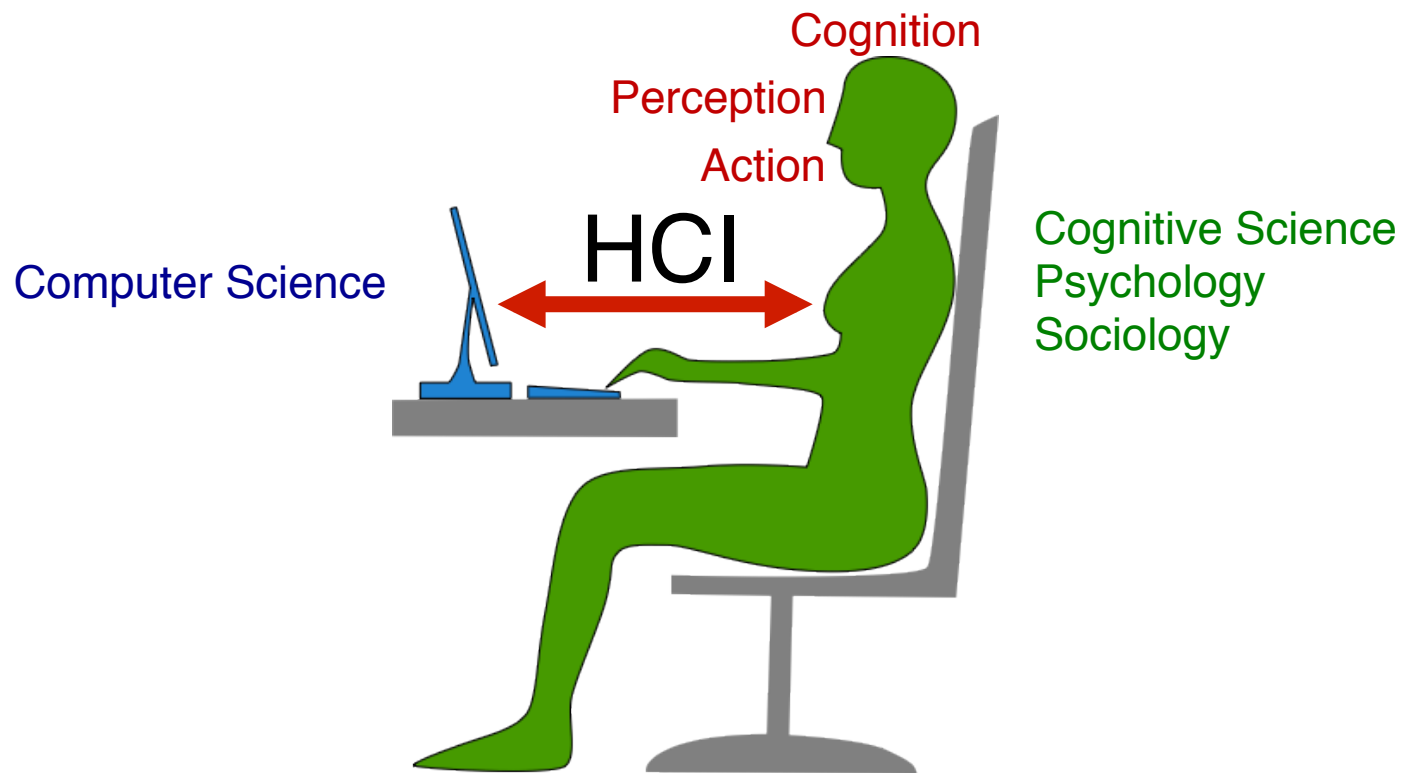


... at the **right** time, place ...

... with the **right** presentation ...

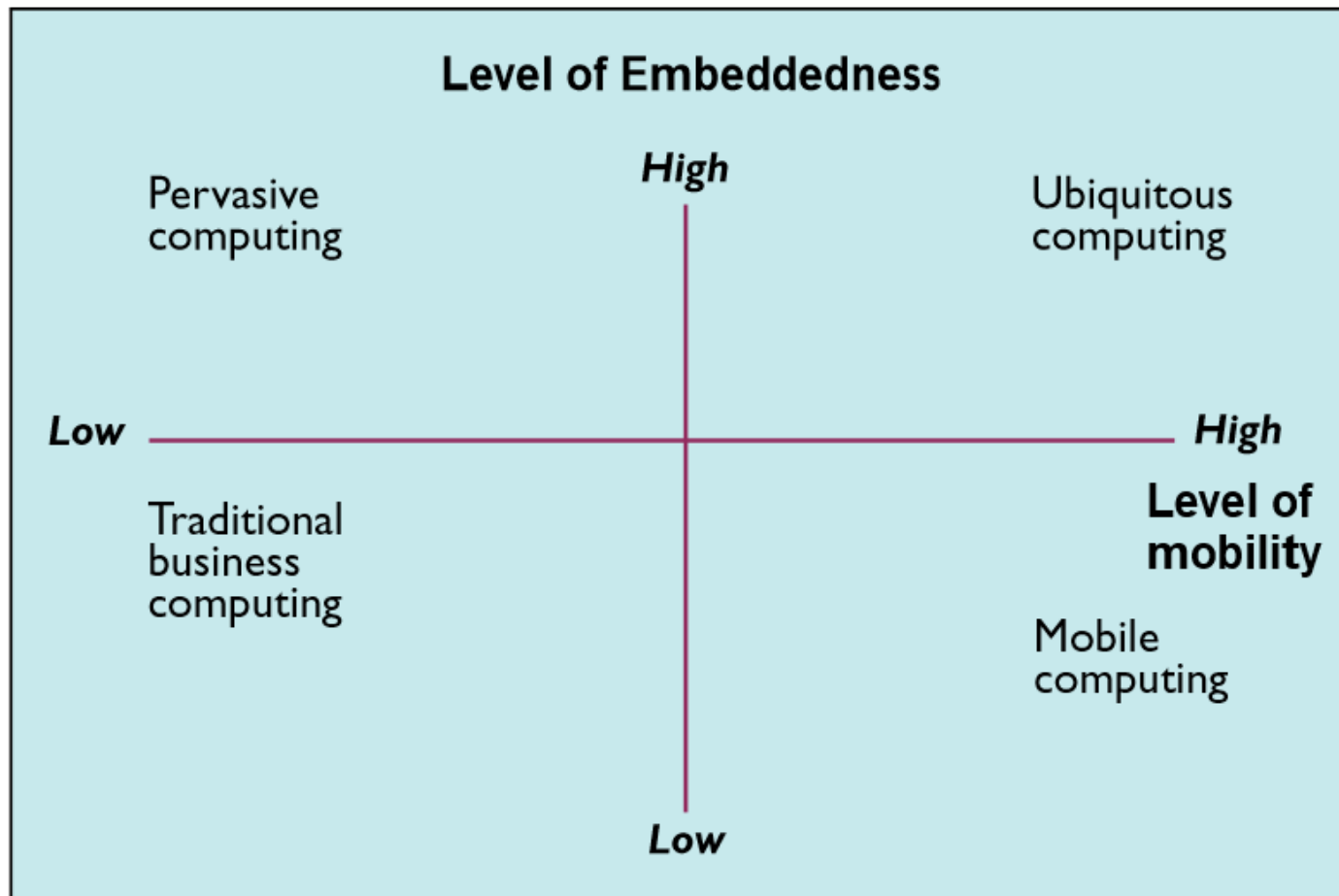
# Challenge of HCI

**EHCI: holistic design!**  
**At the cross-road of several disciplines**



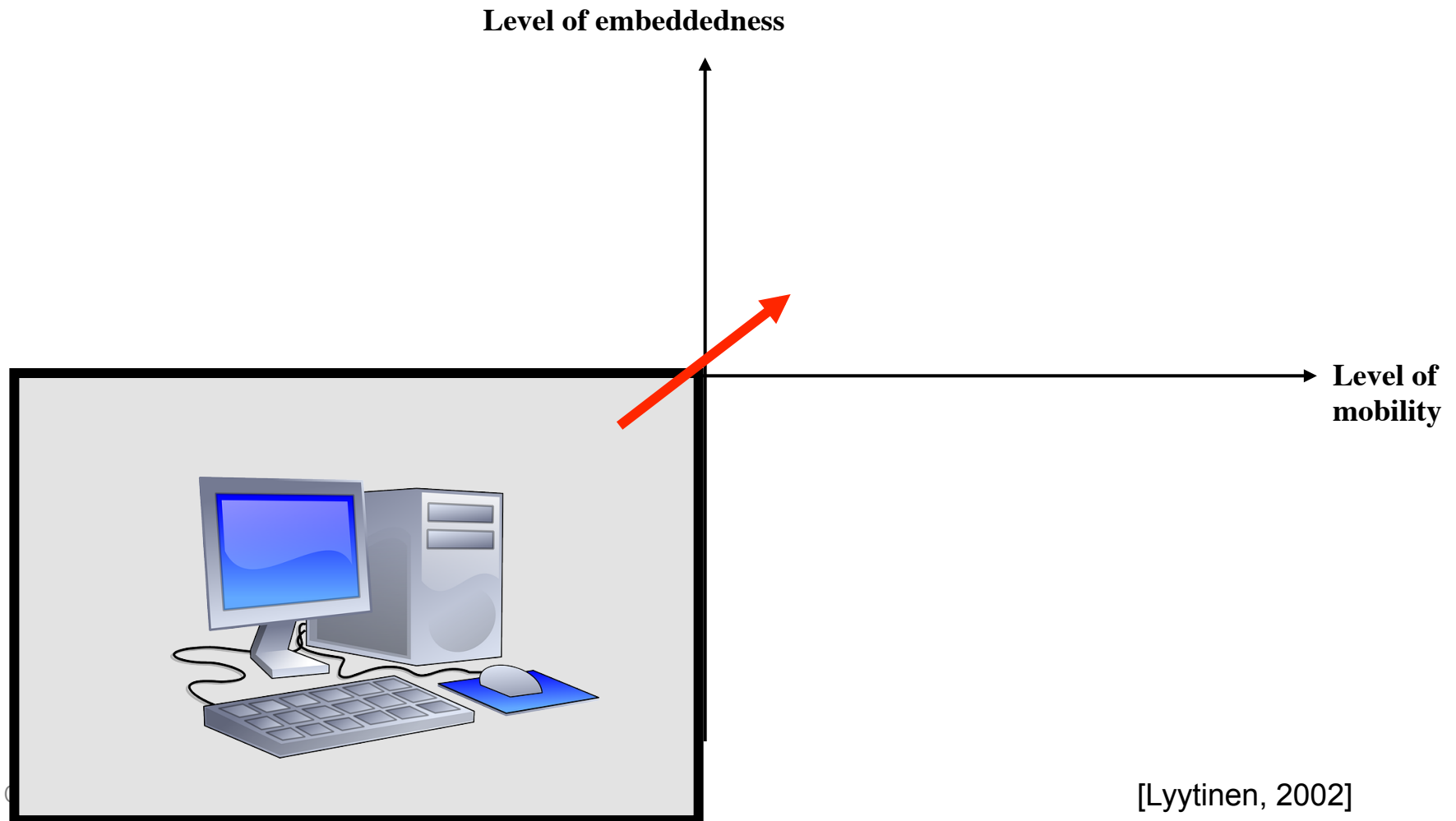


# Challenge of HCI

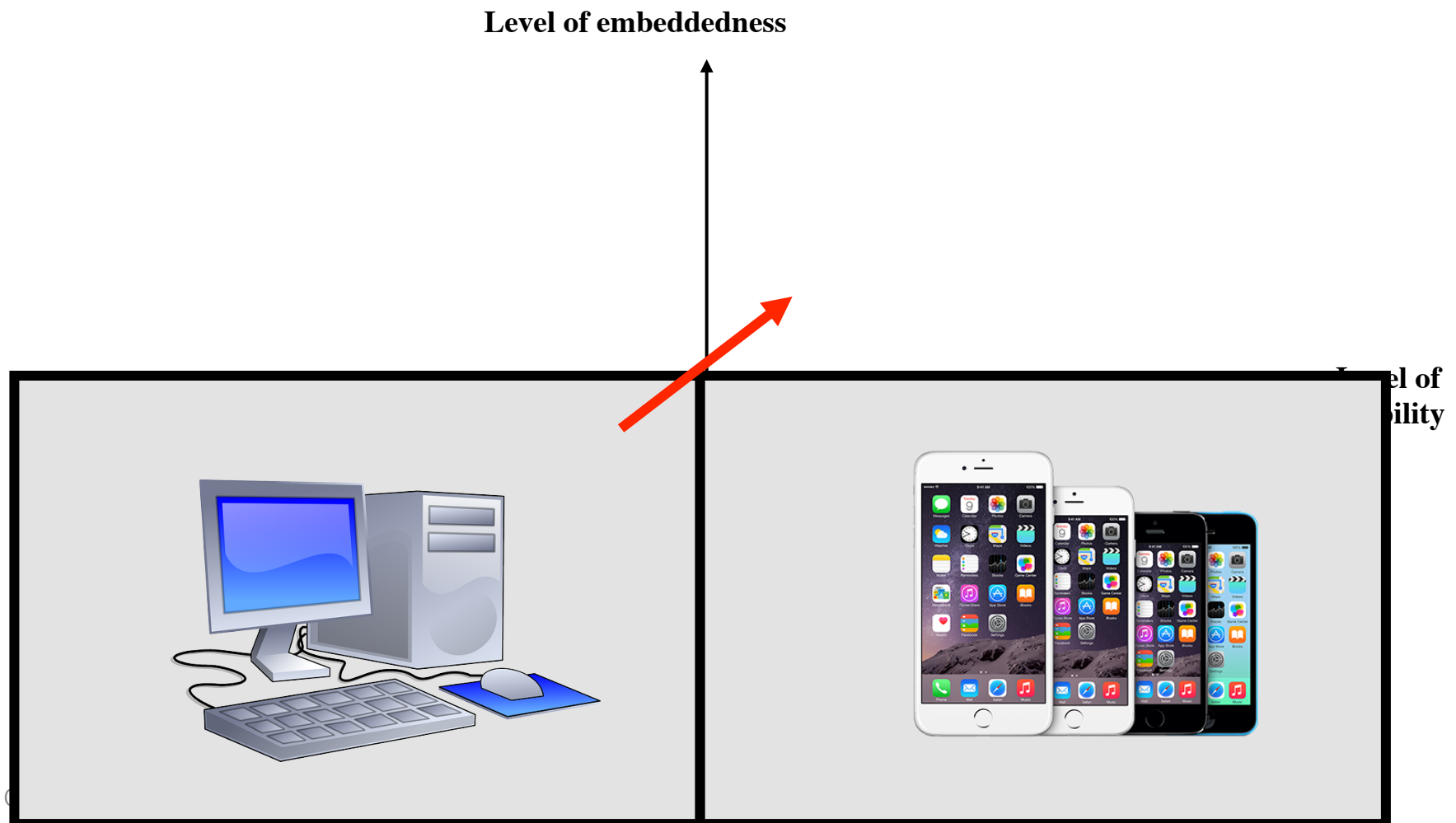


[Lyytinen, 2002]

# Challenge of HCI



# Challenge of HCI



# Challenge of HCI

[Miura, 2006]



RodDirect

Level of  
Ability

# Challenge of HCI

[Hinckley, 2003]



Level of  
ability

# Challenge of HCI

(The Economist 2007)



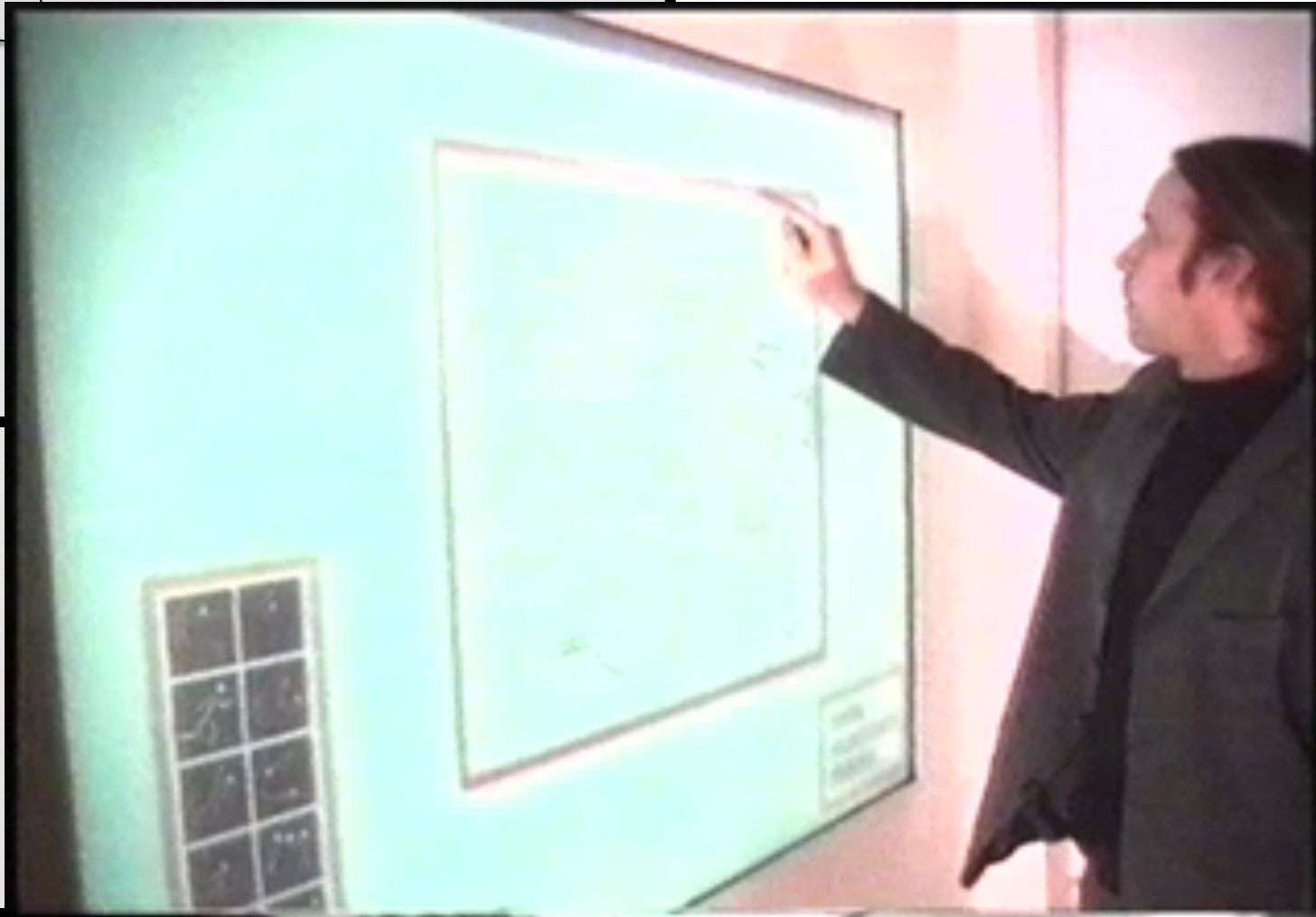
# Challenge of HCI



Level of  
ability

# Challenge of HCI

[Streitz, 1999]



Level of  
ability



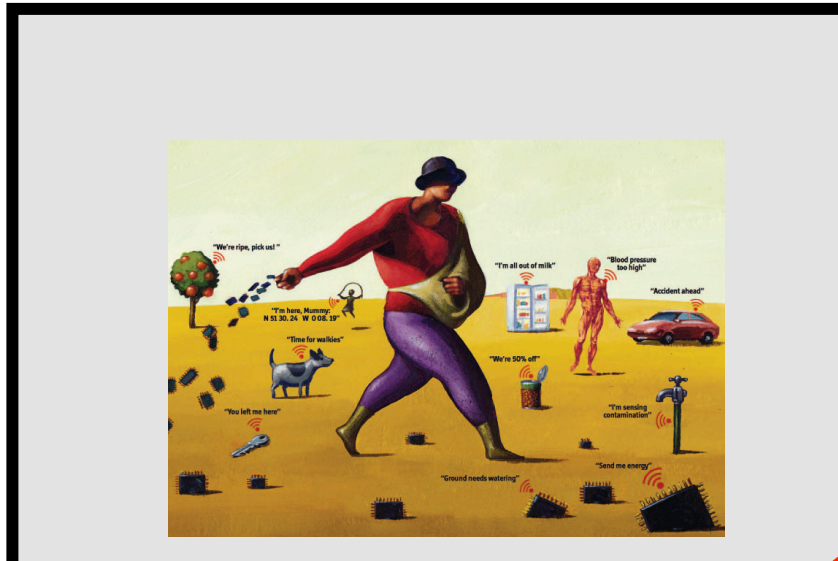
# Challenge of HCI

[Ishii, 1998]

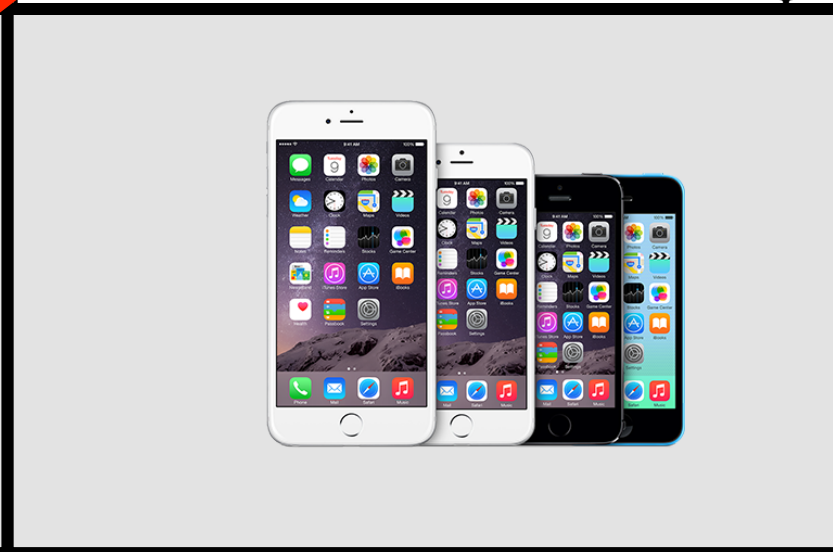
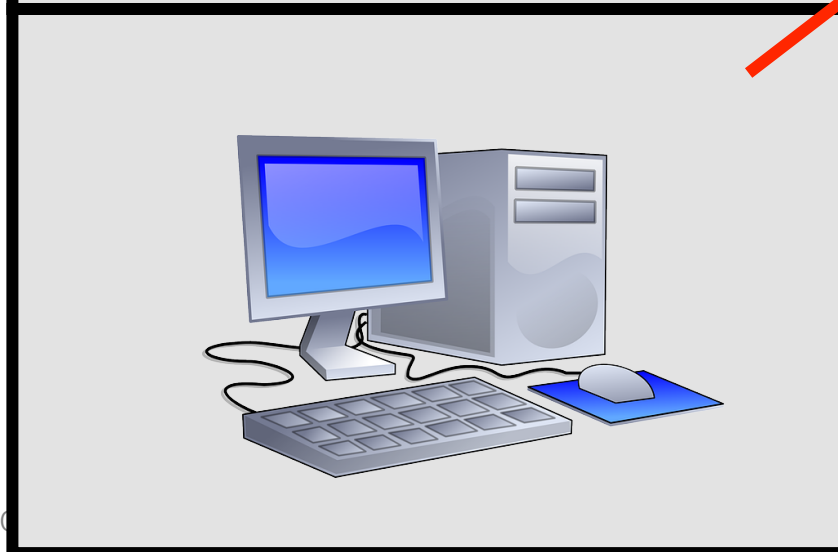


el of  
ility

# Challenge of HCI



edness



Level of  
ability

# Challenge of HCI



[Antoniac, 2002]



el of  
bility


# Challenge of HCI

[Harrison, 2010]



**Skinput: Appropriating the Body as an Input Surface**

Chris Harrison      Desney Tan      Dan Morris  
chris.harrison@cs.cmu.edu      desney@microsoft.com      dan@microsoft.com

 Human-Computer Interaction Institute

Carnegie Mellon  
**Microsoft**

el of  
ility

# Challenge of HCI

- Technological advances
  - Level of mobility
  - Level of embeddedness
- Problems
  - Heterogeneity, dynamicity, unforeseeability



# Challenge of HCI

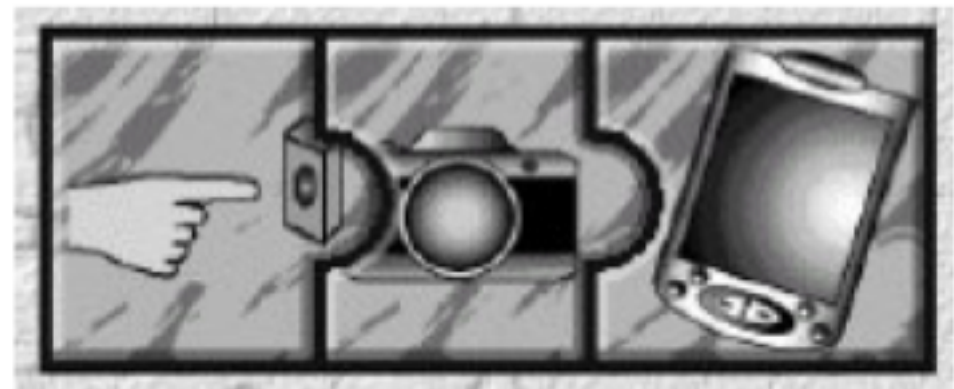
- Technological advances
  - Level of mobility
  - Level of embeddedness
- Problems
  - Heterogeneity, dynamicity, unforeseeability
  - Personnalisation, adaptation

(Maes, P., TED)

# Challenge of HCI

- Technological advances
  - Level of mobility
  - Level of embeddedness
- Problems
  - Heterogeneity, dynamicity, unforeseeability
  - Personnalisation, adaptation, end-user programming

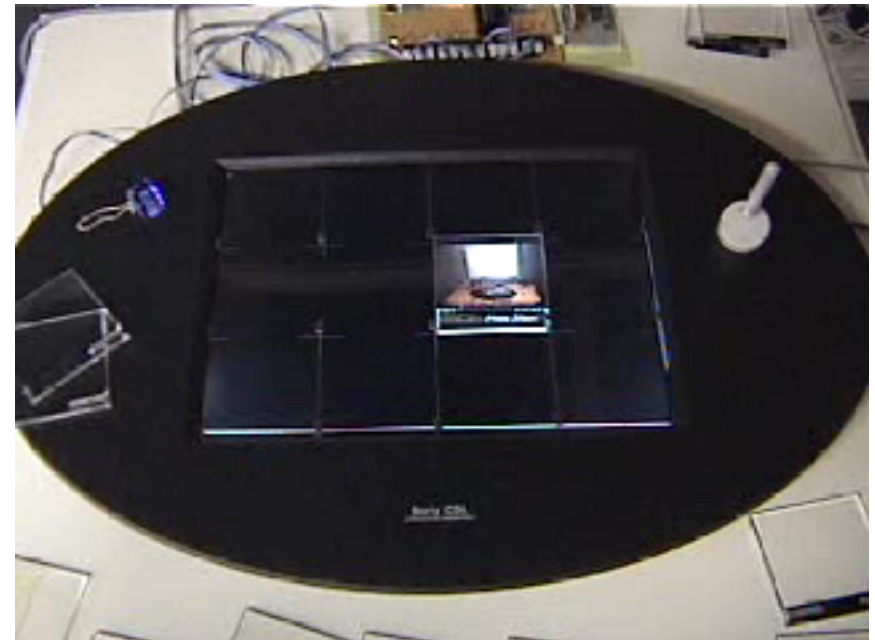
[Rodden, 2004]



# Challenge of HCI

- Technological advances
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  - Level of embeddedness
- Problems
  - Heterogeneity, dynamicity, unforeseeability
  - Personnalisation, adaptation, end-user programming

[Rekimoto, 1999]

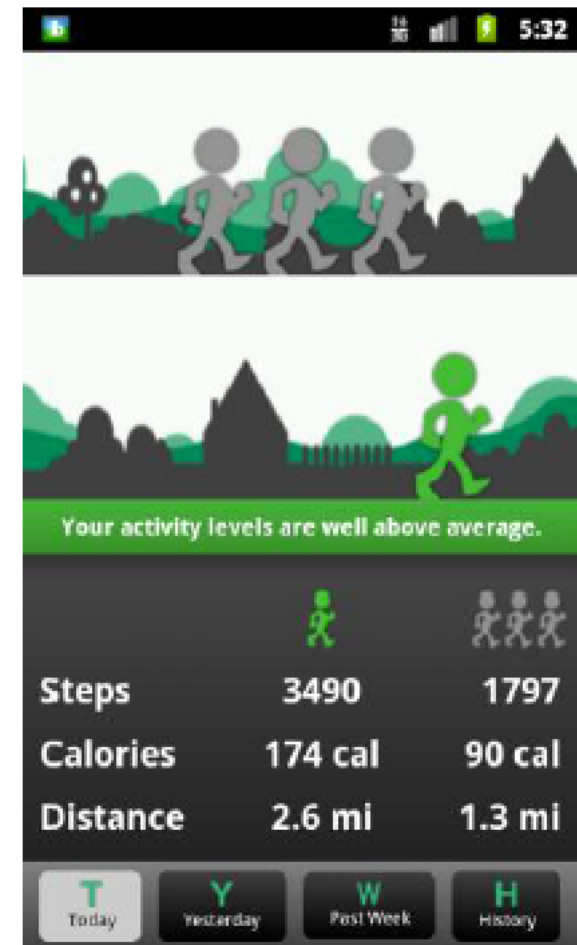
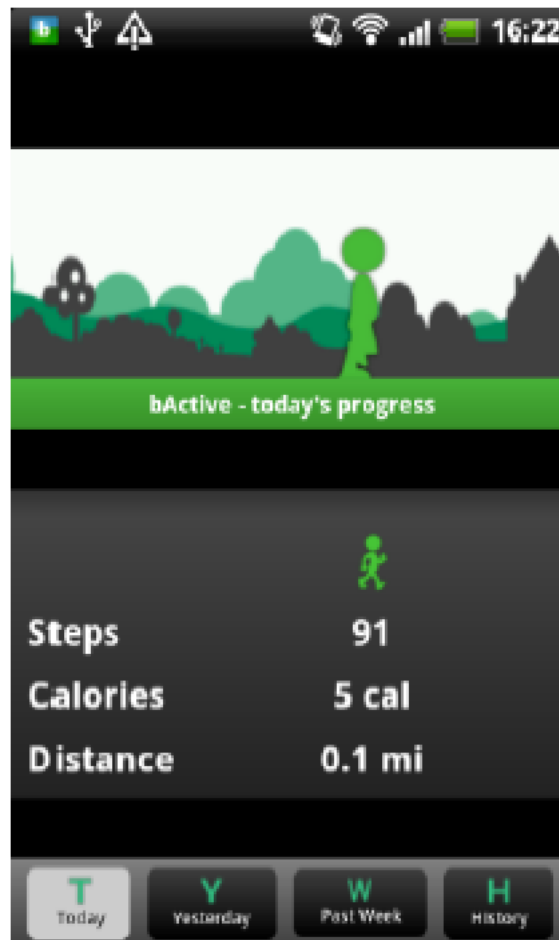
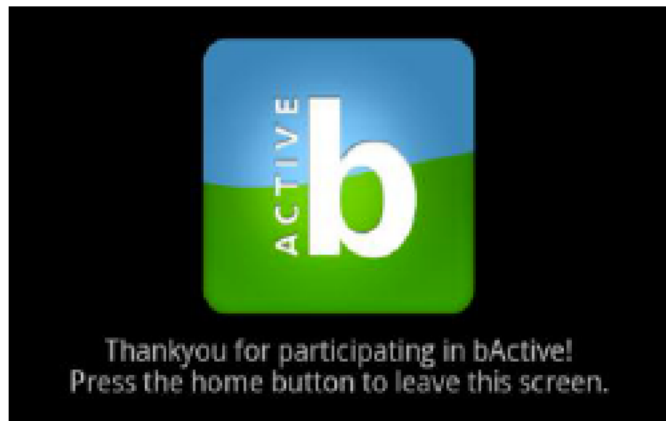




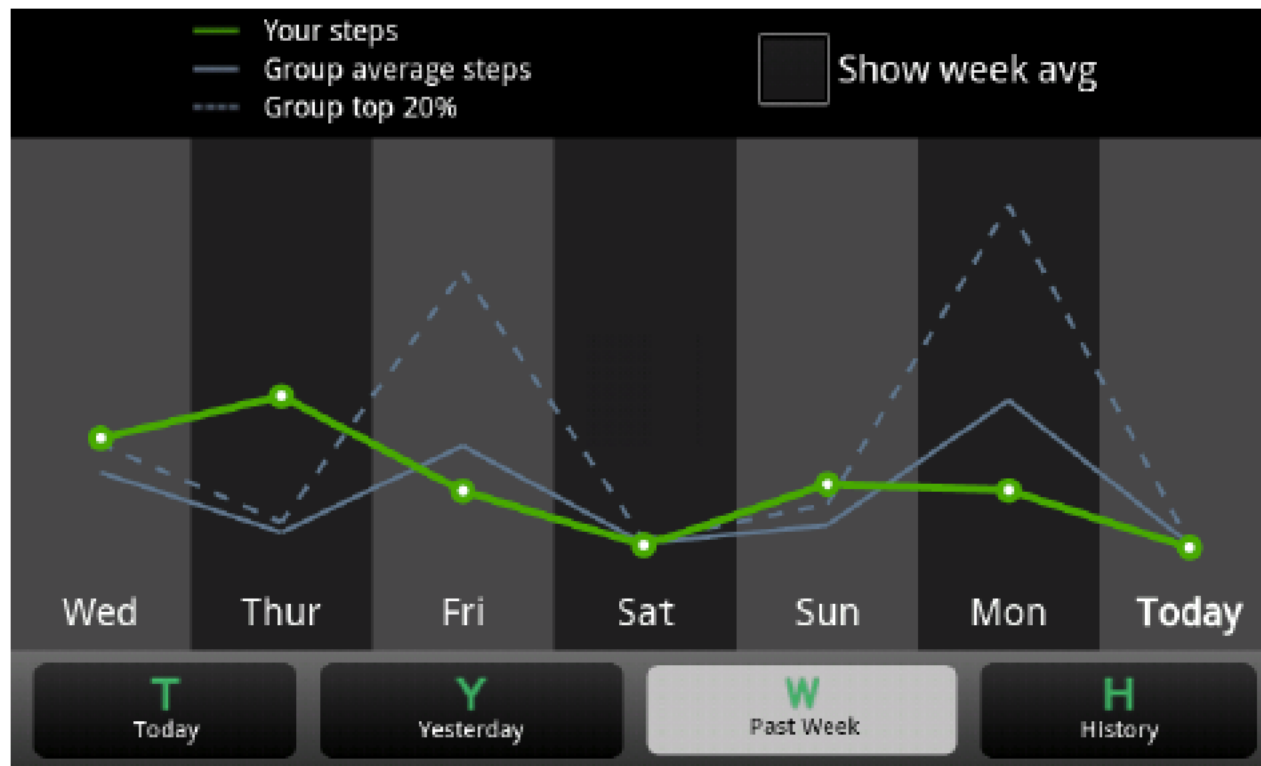
# Challenge of HCI

- Technological advances
  - Level of mobility
  - Level of embeddedness
- Problems
  - Heterogeneity, dynamicity, unforeseeability
  - Personnalisation, adaptation, end-user programming
  - Persuasion

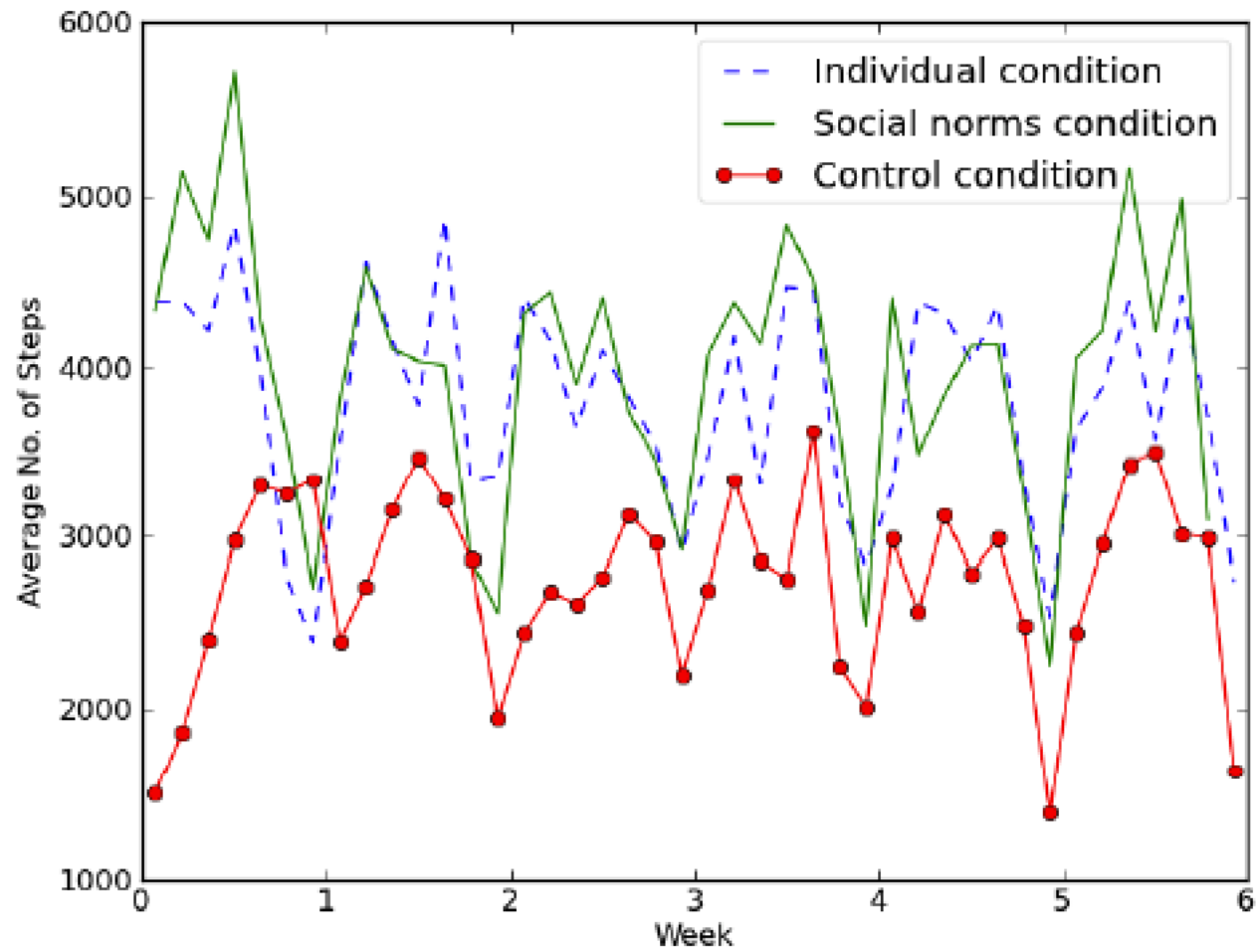
# Challenge of HCI



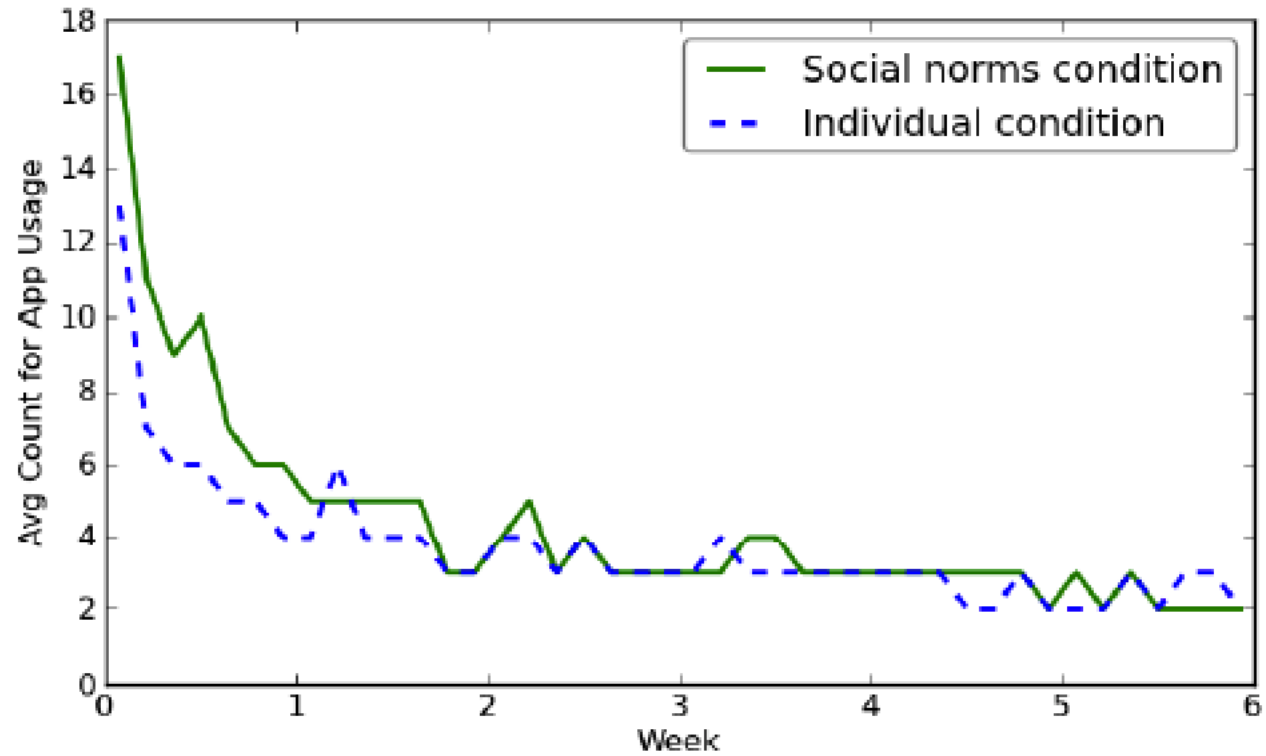
# Challenge of HCI



# Challenge of HCI



# Challenge of HCI



# Challenge of HCI

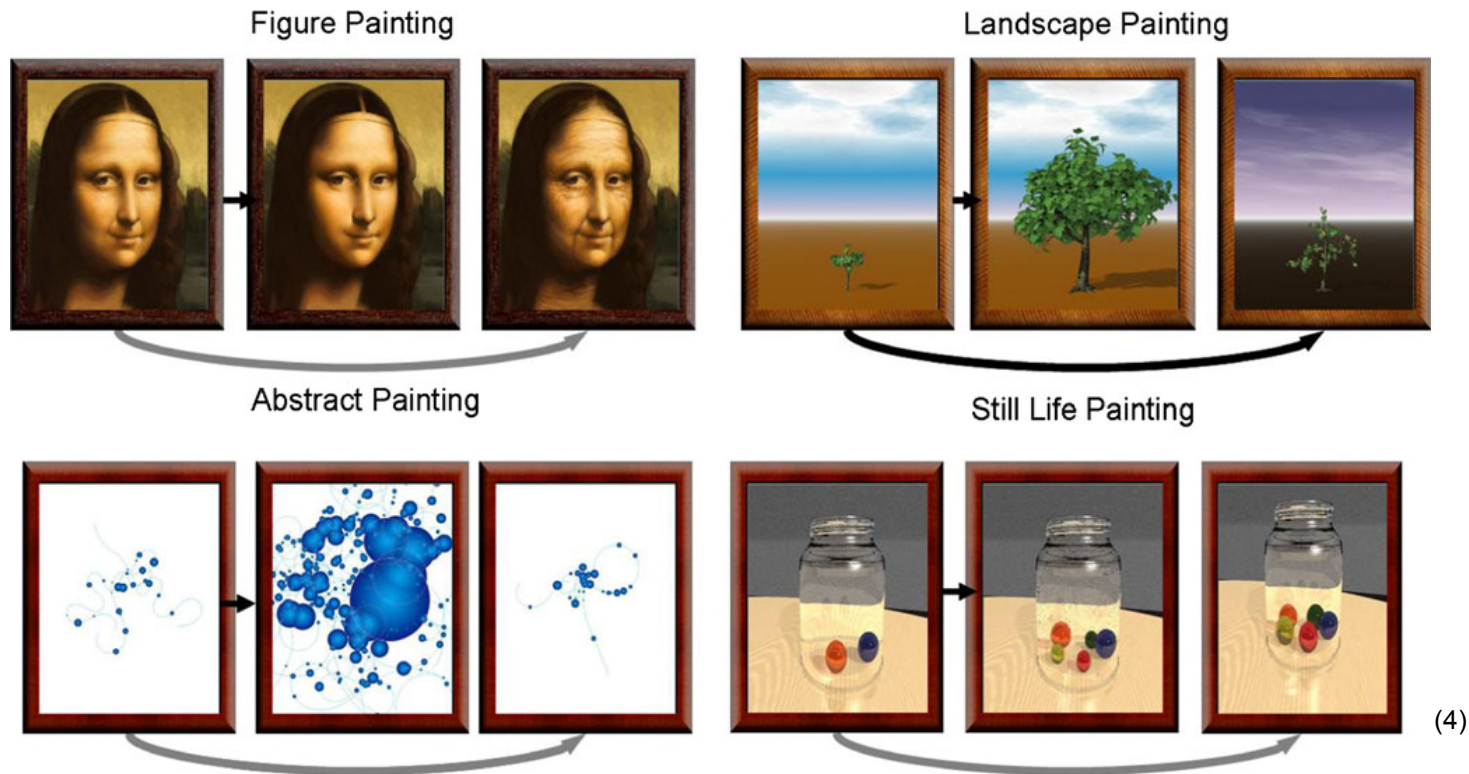


(1) Kuznetsov, Stacey, and Eric Paulos. 2010. "UpStream: Motivating Water Conservation with Low-Cost Water Flow Sensing and Persuasive Displays." In , 1851. ACM Press.

(2) Kappel, Karin, and Thomas Grechenig. 2009. "Show-Me: Water Consumption at a Glance to Promote Water Conservation in the Shower." In , 1. ACM Press.

(3) Laschke, Matthias, Marc Hassenzahl, Sarah Diefenbach, and Marius Tippkämper. 2011. "With a Little Help from a Friend: A Shower Calendar to Save Water." In , 633. ACM Press.

# Challenge of HCI



(4) Nakajima, Tatsuo, Hiroaki Kimura, Tetsuo Yamabe, Vili Lehdonvirta, Chihiro Takayama, Miyuki Shiraishi, and Yasuyuki Washio. 2008. "Using Aesthetic and Empathetic Expressions to Motivate Desirable Lifestyle." In *Smart Sensing and Context*, 5279:220–34. Berlin, Heidelberg: Springer Berlin Heidelberg.

# Challenge of HCI



Consolvo (2009)



# Challenge of HCI

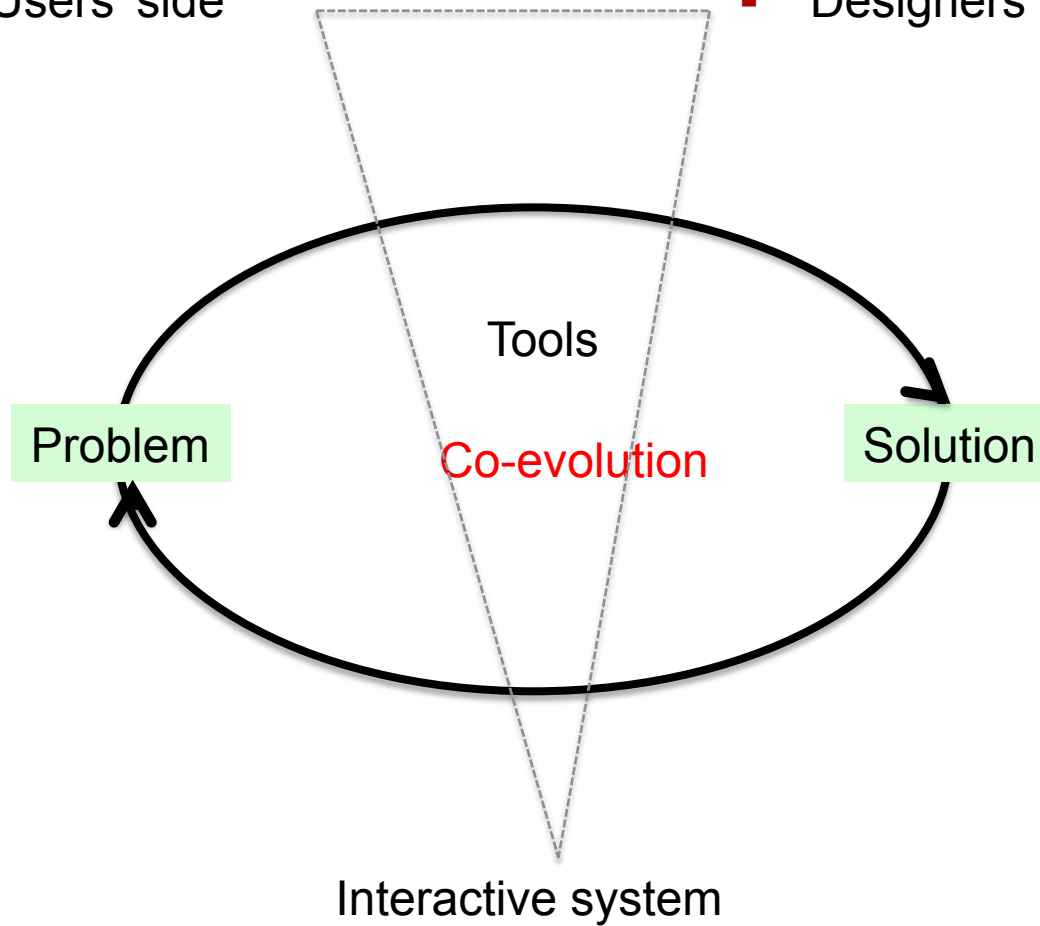


Elsmore (2010)

# Global picture

▪ Users' side

▪ Designers' side

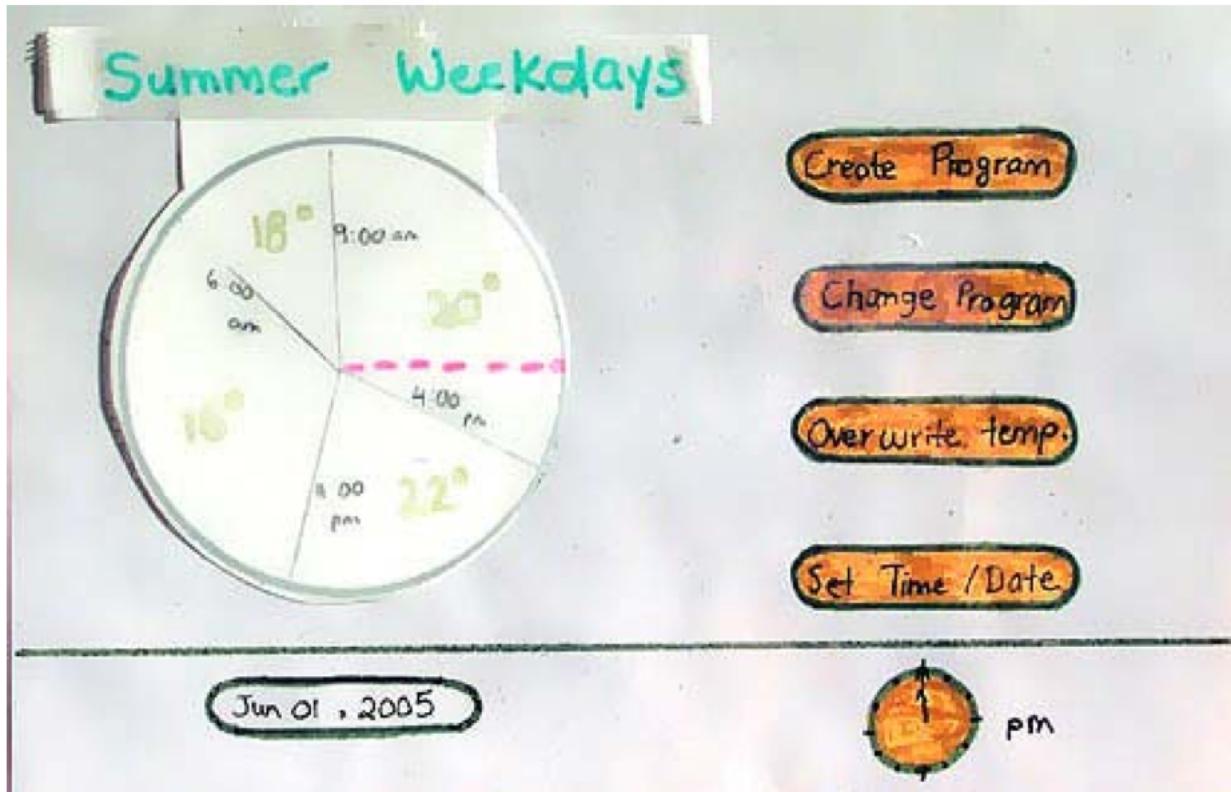


# Global picture

- Co-design



# Global picture



**Figure 1. The “Circular” paper prototype**

# Global picture

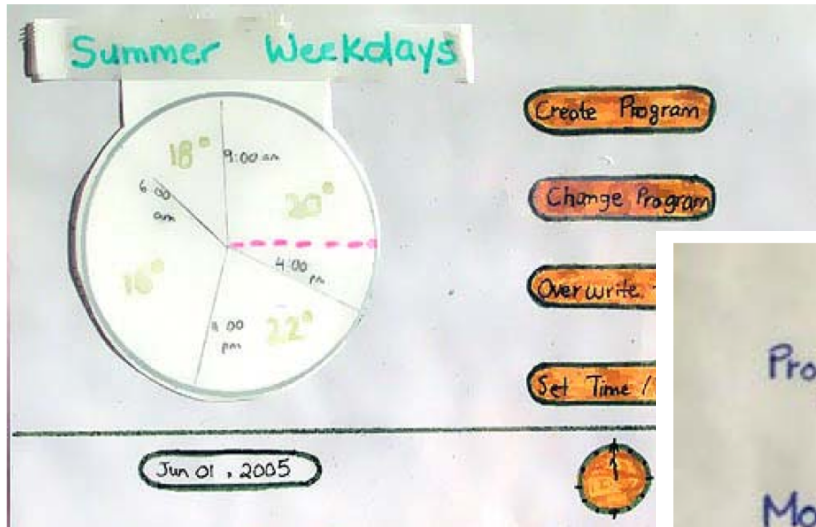


Figure 1. The “Circular” paper prototype

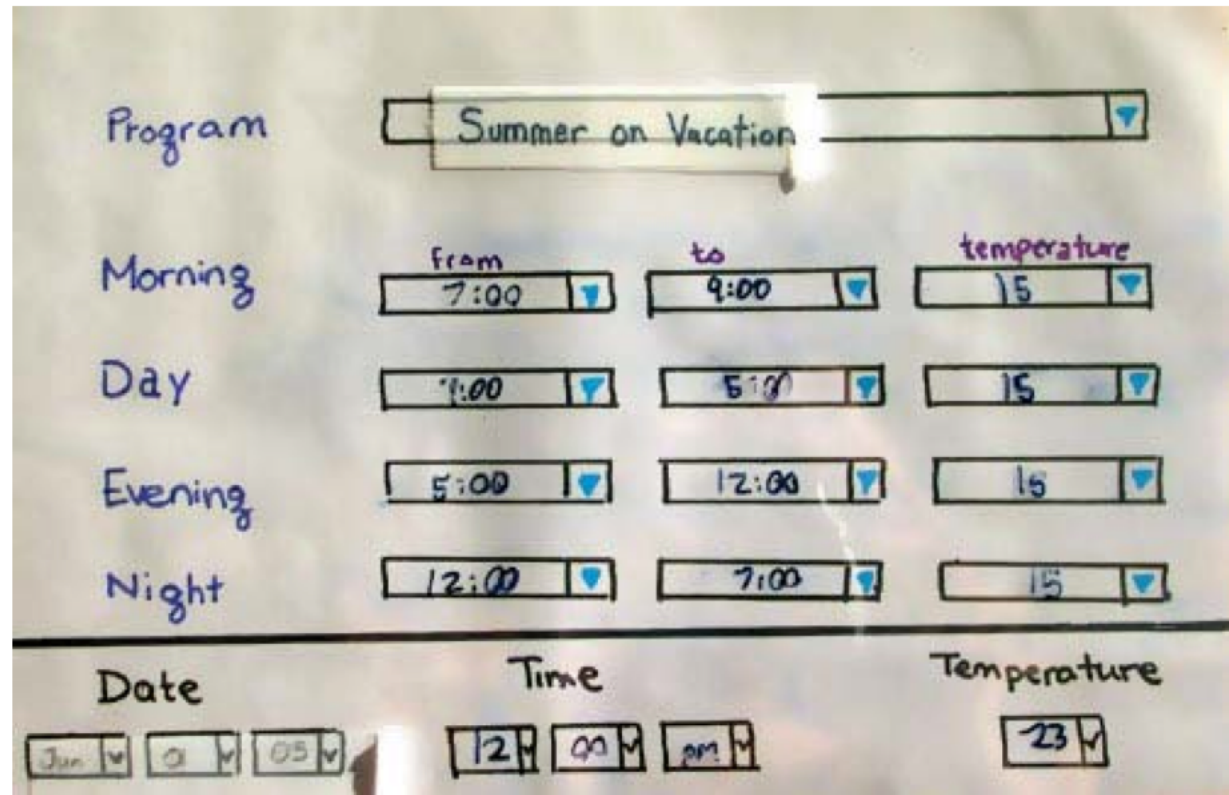


Figure 2. The “Tabular” paper prototype

# Global picture

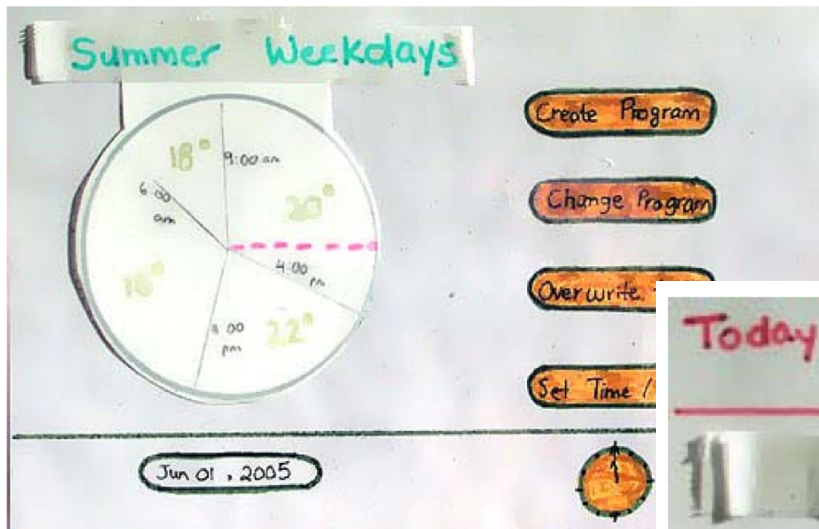


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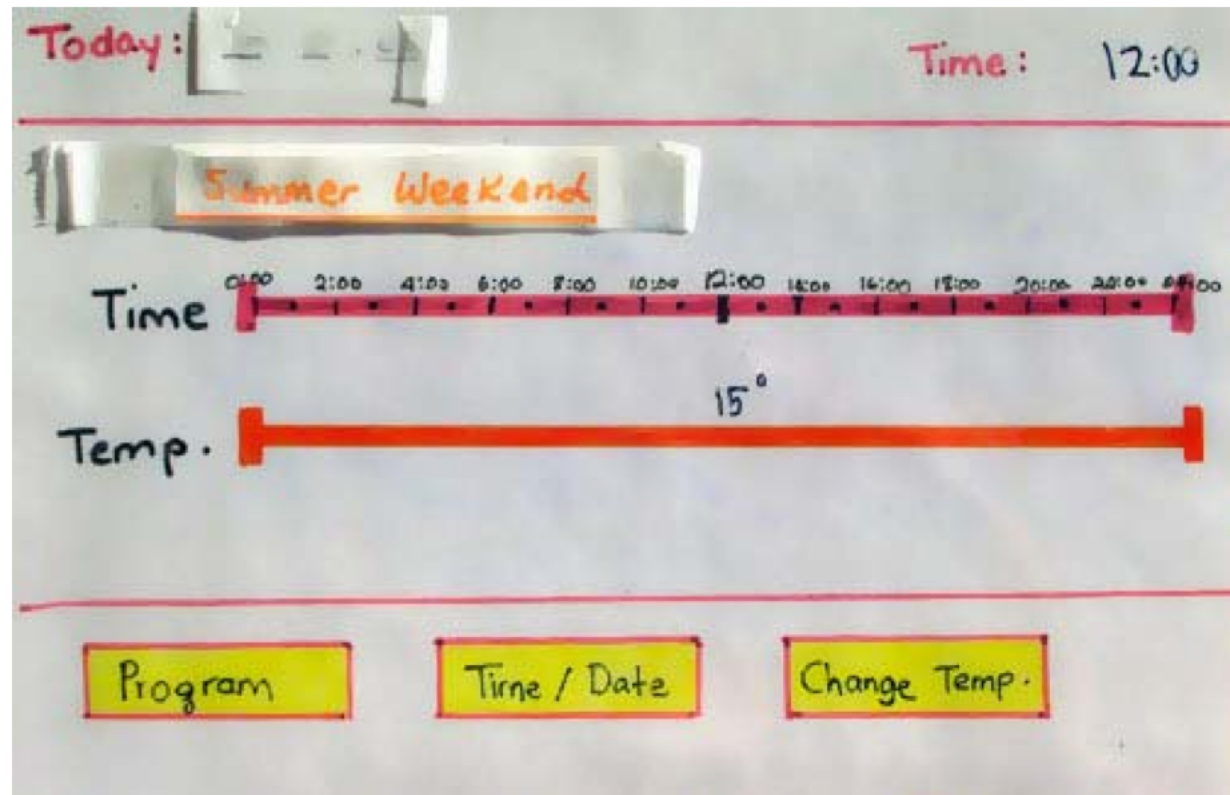
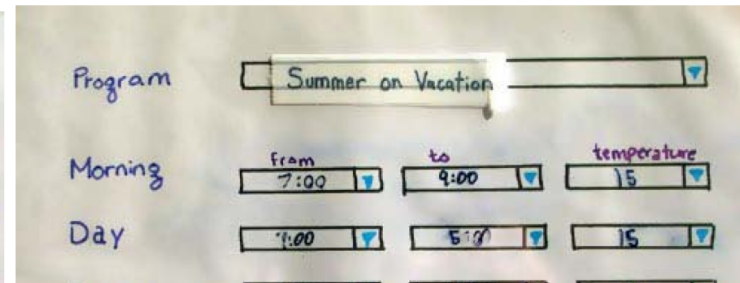


Figure 3. The "Linear" paper prototype  
[Tohidi 2006]

# Global picture

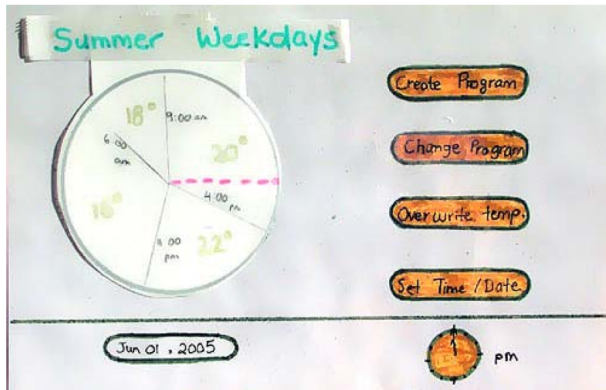


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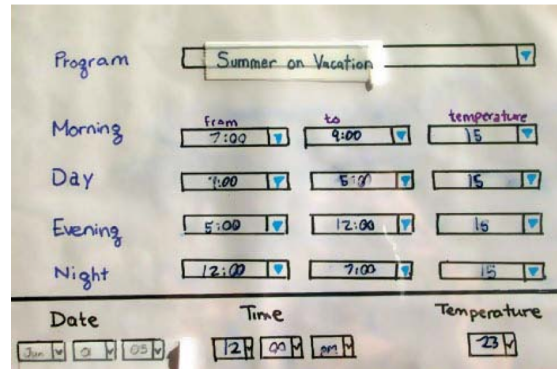


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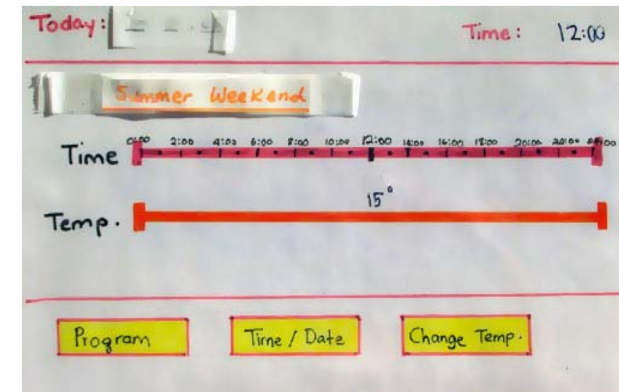


Figure 3. The "Linear" paper prototype

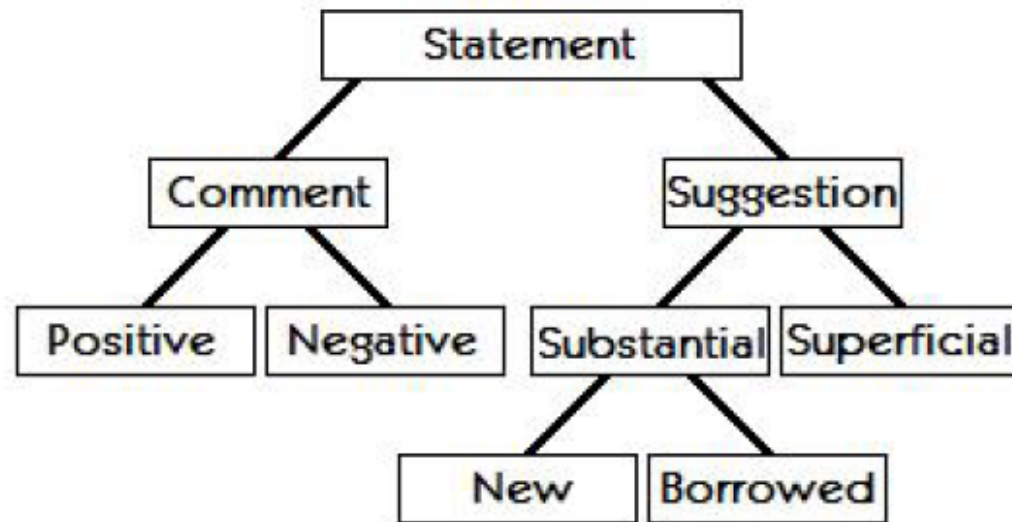


Figure 4. Categorization of User Feedback

# Global picture

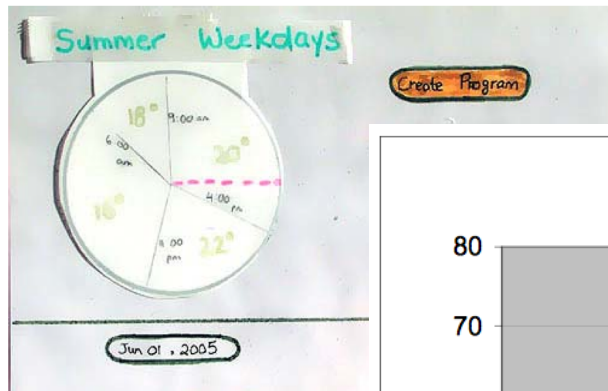
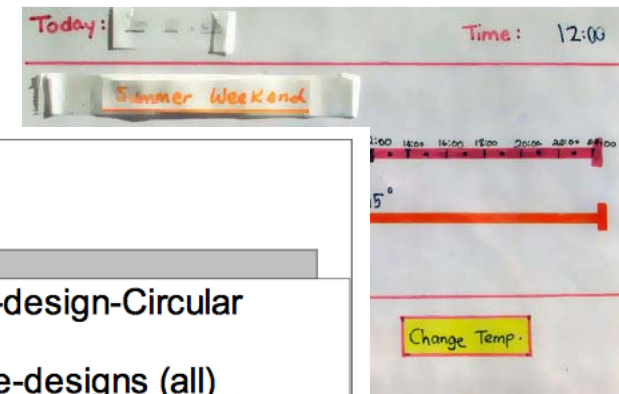
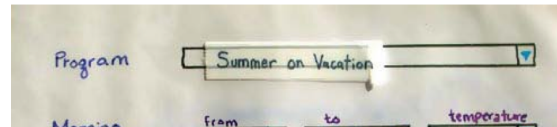


Figure 1. The “Circular” p



paper prototype

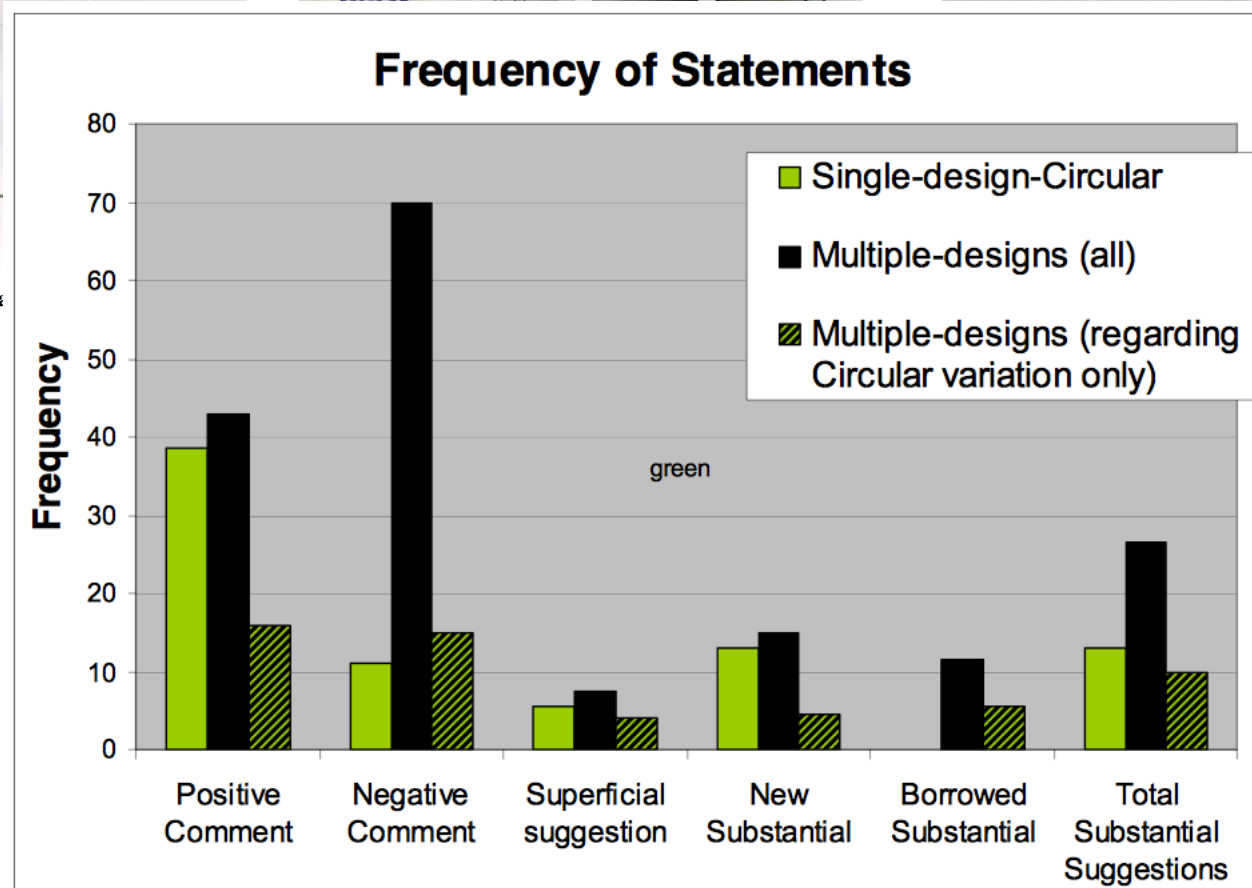


Figure 5. Frequency of statements for Circular prototype



# Global picture

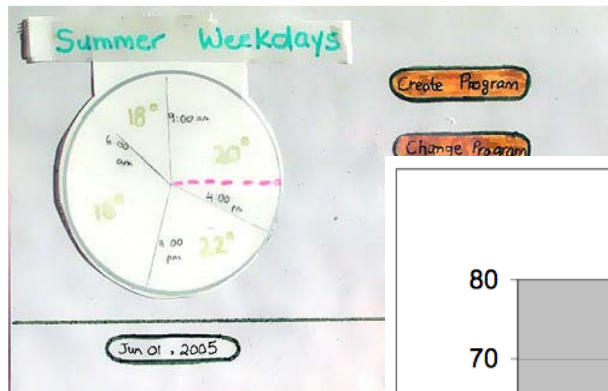
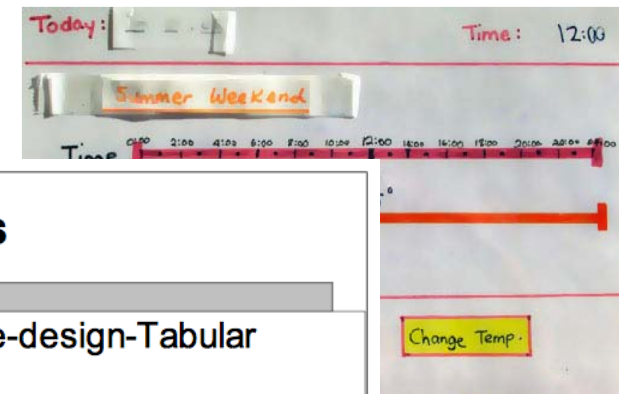
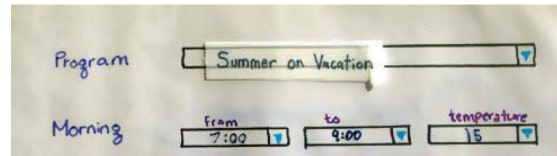


Figure 1. The "Circular" pap



paper prototype

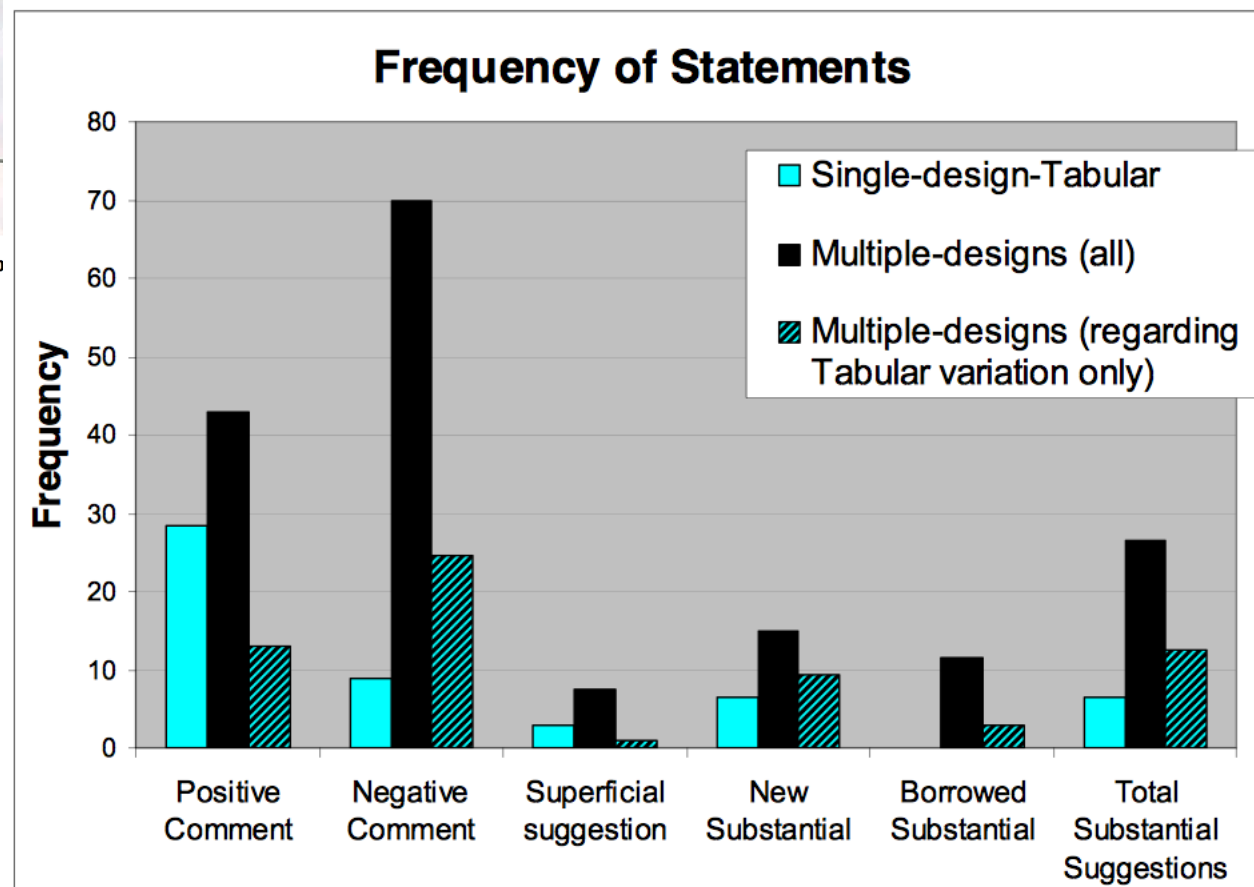


Figure 6. Frequency of statements for Tabular prototype

# Global picture

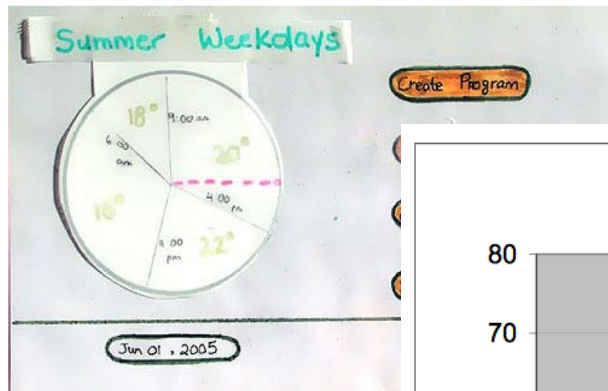
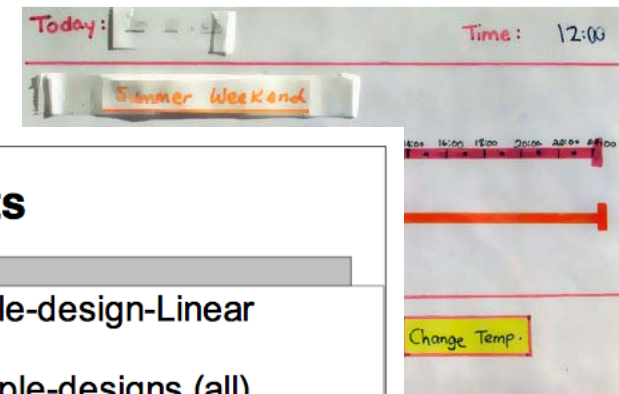
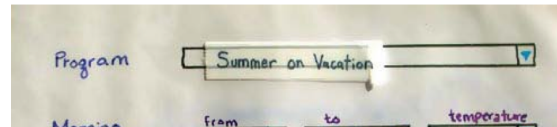


Figure 1. The “Circular” paper



er prototype

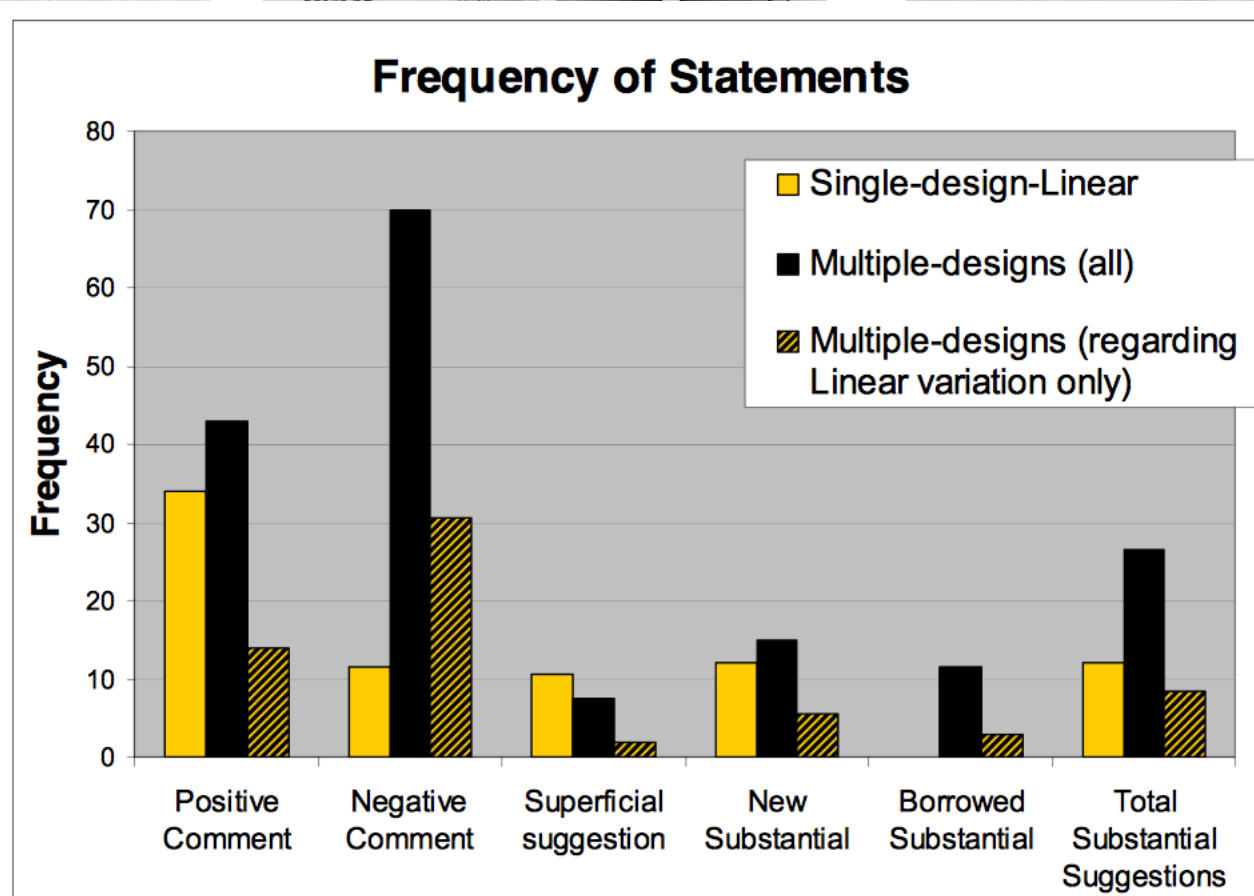


Figure 7. Frequency of statements for Linear prototype

[Tohidi 2006]

# Global picture

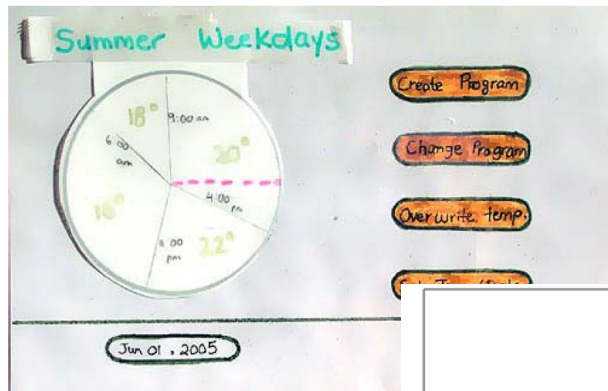
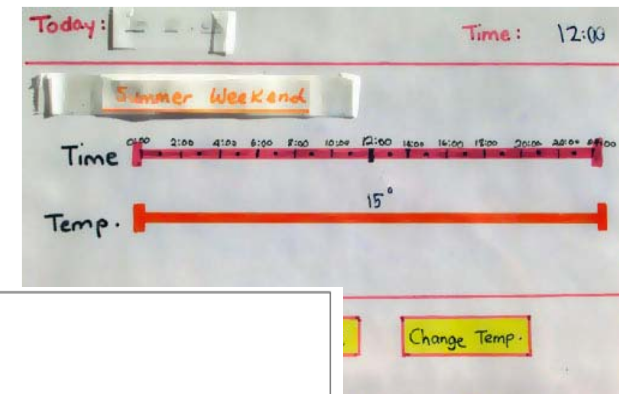
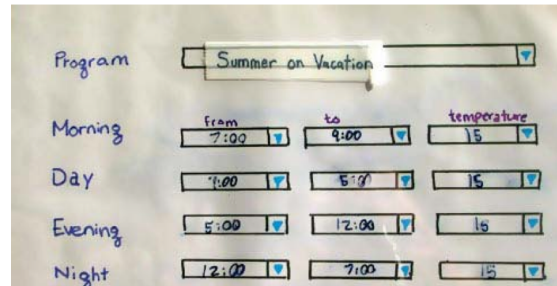


Figure 1. The "Circular" paper



" paper prototype

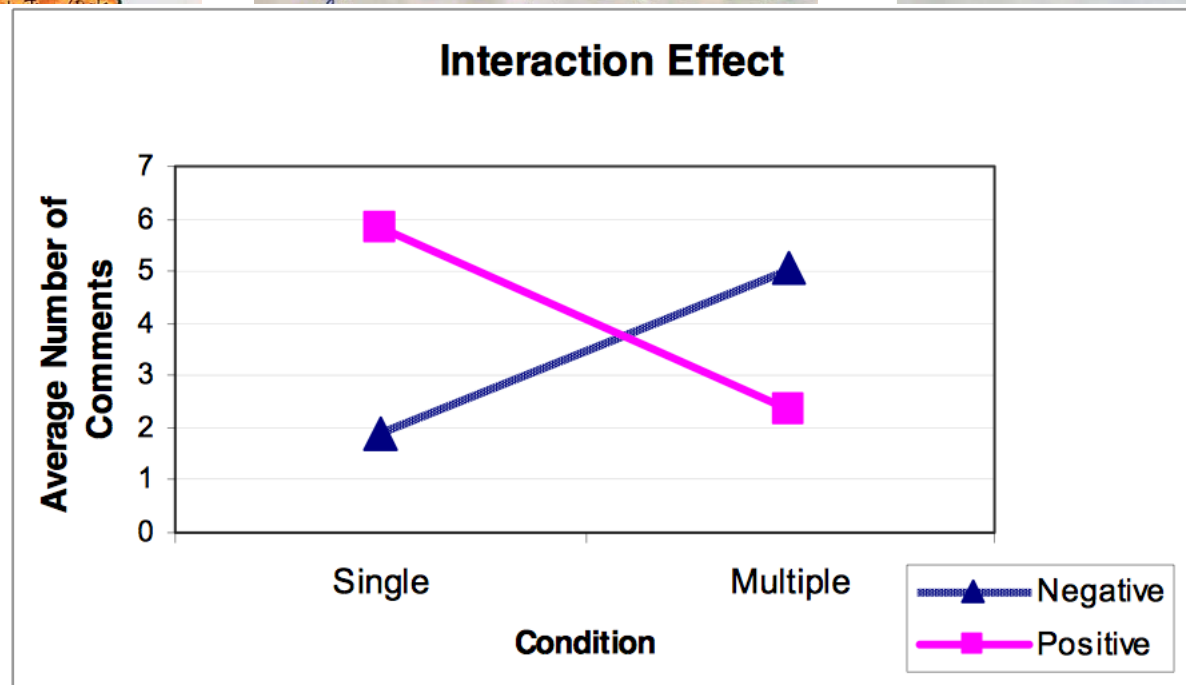


Figure 8. Interaction between positive and negative comments made in response to the Linear design in both conditions.

# Global picture

- Co-design
- Plasticity: adaptation is delegated to the system
- Persuasion?

**How?**

# Organization

- Lectures + Project
  - Persuasion: Yann Laurillau
  - Plasticity: Sophie Dupuy
  - Methodology + Application: Fatoumata Camara
- Grade
  - Written exam: 2h, 1.4
  - Project: continuously+defense, 0.6
- Website: <http://mosig.imag.fr/ClassNotes/UIS-EHCI>