Experiencing Technology before it Exists

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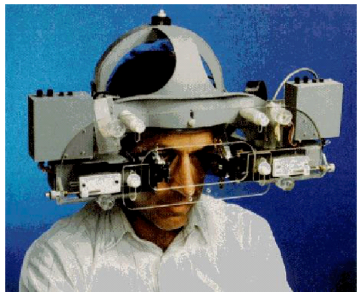
What's the Issue?

"Wearable Computing currently has
no concepts for application developments."

(Kjeldskov and Graham, MobileHCI 2003)

Tension between the Researcher's and the User's World

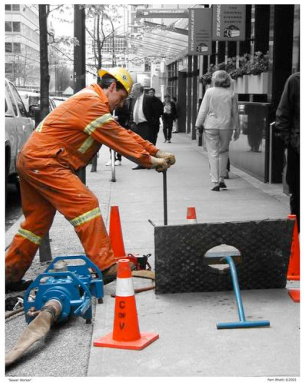
technical advancement



Researcher's World

- cutting edge technology
- focus on new ideas/concepts
- experimental showcases

Interaction



User's World

- daily work practice
- real life constraints
- 'local optimum' of productivity

time

Tension between the Researcher's and the User's World

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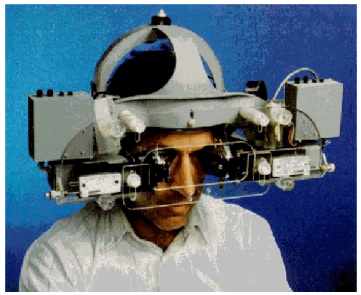

Researcher's World

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Interaction

User's World

- daily work practice
- real life constraints
- local maximum of productivity

Application

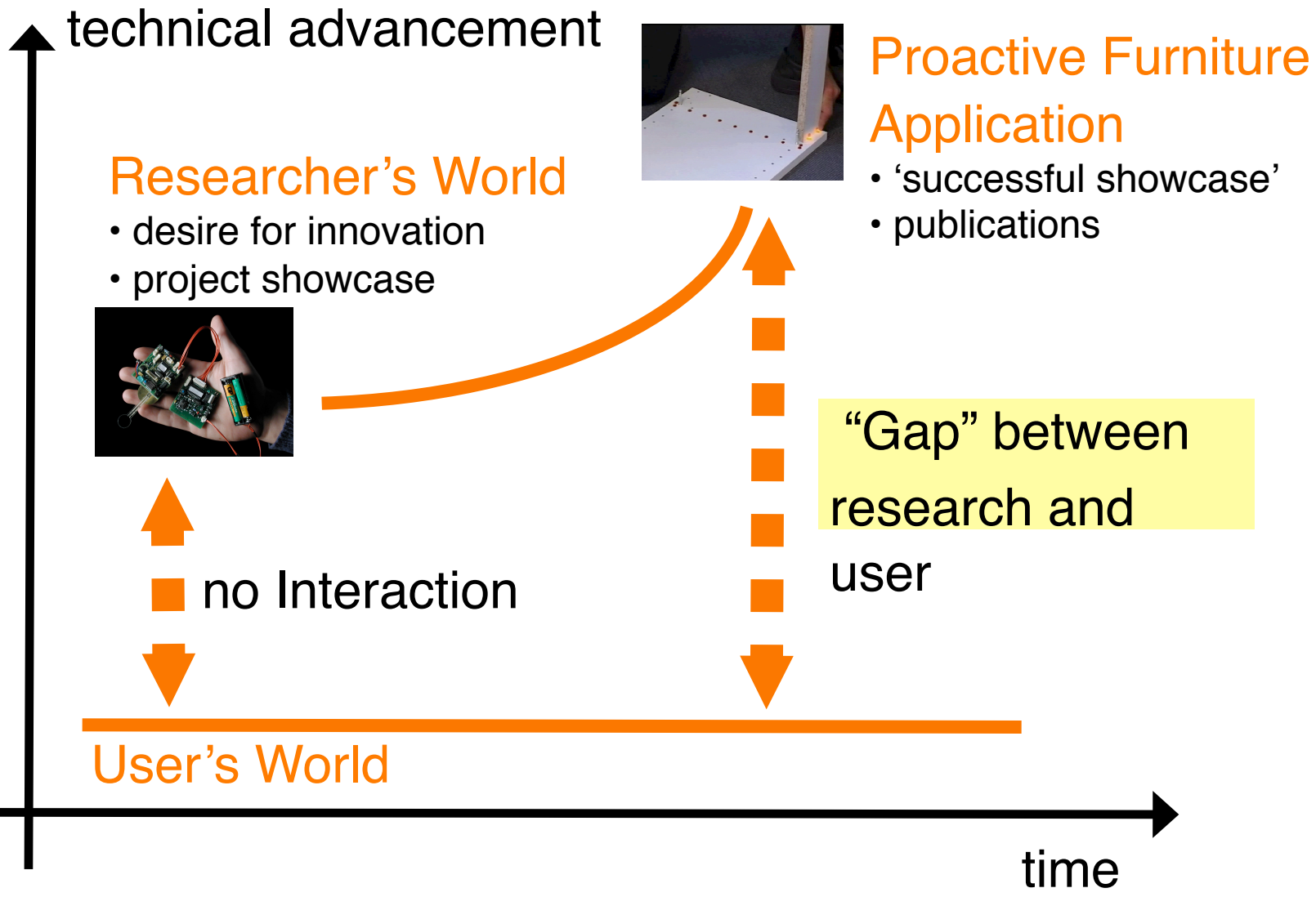
- successful & meaningful introduction of technology

time

Why bother with Applications?

- Developer/Researcher
  - ground research in practice, evaluate technology
  - test hypotheses, get user feedback
  - ...
- User
  - improvement of work, life and business practices
  - increase of efficiency, cost reduction
  - satisfaction
  - ...

Example 1: Proactive Furniture Assembly



Example 2: Wearable Assistant for Doctors

- Understand the Doctor's Current Work Practices
  - 3 days observation in hospital
  - General understanding of main tasks
  - Detailed understanding of specific tasks

- Make Doctors Participate in Design Process
  - Mockup: Wrist-Mounted Display & Button for Online Dictation of Anamnesis

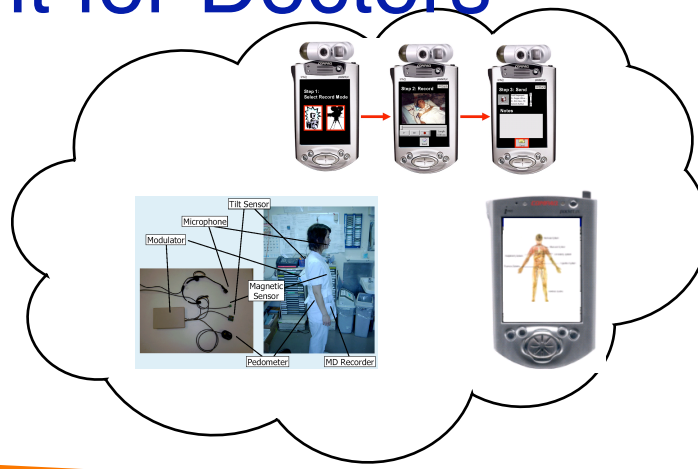
- BUT:
  - even though 'our' doctors were technology friendly
  - they are trapped in current work practices
  - mostly interested in immediate benefit (incremental)

Example 2: Wearable Assistant for Doctors

technical advancement

Researcher's World

- desire for innovation
- ground of research in practice



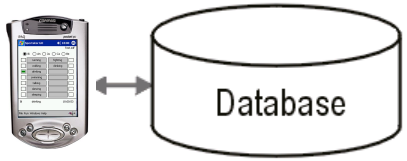
Interaction

Gap & conflict between research and user

User's World

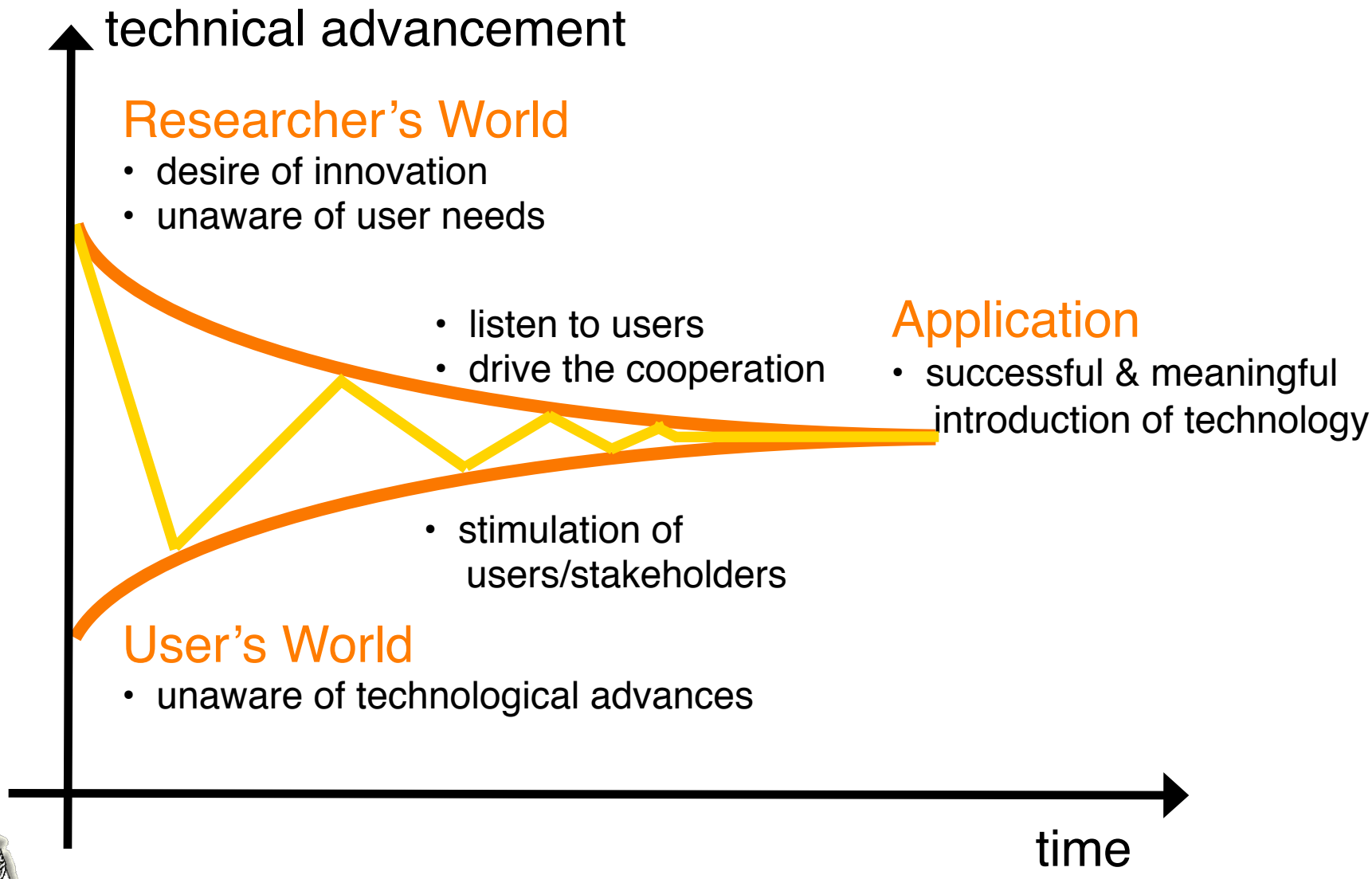
- short-term focus
- ideas bound to known technology

Application



time

How can this Process Converge?



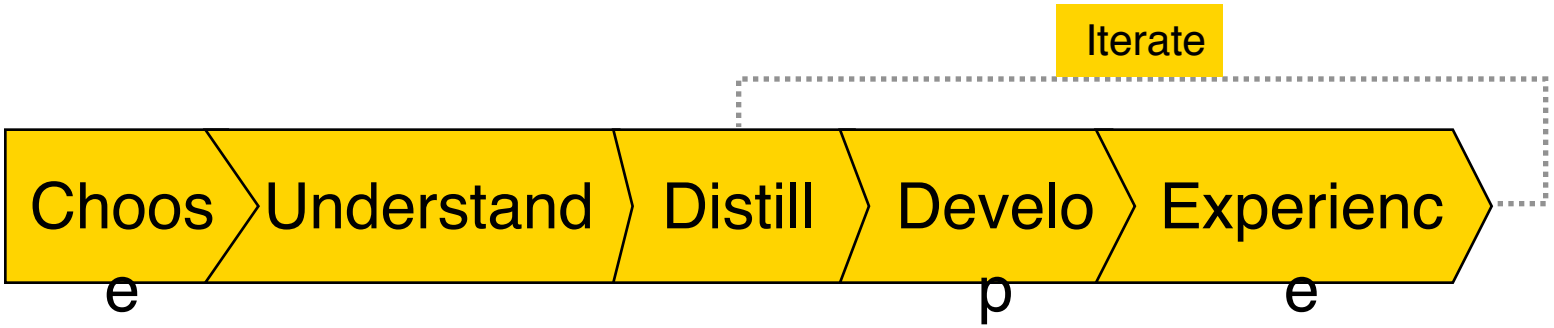
(Some) Important Principles from our own Experience

- Balanced User Involvement
  - avoid asymmetry between developers and users
- Radically Depart from Today
  - important to advance research
- Multiple Stakeholder Involvement
  - do not talk to end-users only
- Stimulation of Stakeholder
  - show (technological) potentials
  - make them think beyond today's work practices

(Some) Important Principles from our own Experience

- Mediation between Users and Researchers/Developers
  - e.g. use demonstrators and prototypes
- Early Stage Development Support
  - software toolkits, hardware toolkits
- Developer Guidance

Possible Concept: X'treme Prototyping



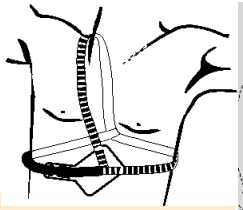
1. Choose a Compelling Problem Domain
2. Understand the Domain
3. Distill Opportunities for Change
4. Develop X'treme Prototype
5. Provide X'treme Experience
6. Iterate to step 3

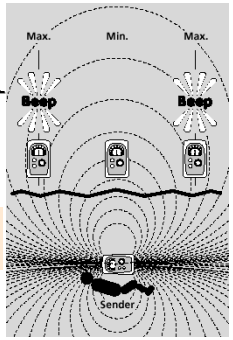
→ Ground research successfully in practice

→ Introduce ubiquitous-/wearable-computing

Example 3: A-Life

- Wearable Sensors for Avalanche Rescue
  - serious problem: saving live
  - technology-friendly domain
  - we involved multiple stakeholder:
    - mountaineers, rescuers, and emergency physicians





Avalanche Beacon

- results from user/stakeholder involvement:
  - key issue: measure heart rate
  - key technology: use radar to measure heart rate contact-free at a distance
- commercial outcome:
  - Swiss Avalanche beacon manufacturer plans to incorporate this technology into their next generation of avalanche beacon

Thank You - Questions ?

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