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Rethinking assistive technologies in the age of individuation

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OUTLINE

- Assistive technologies as a separate HCI domain
- Three claims on the need for continuity of HCI
- Diversity and ICT long-term dynamics
- Individuation: the current challenge of HCI
- Conclusions

OUR INITIAL CLAIM

Research on assistive technologies has been traditionally seen as a separate HCI domain

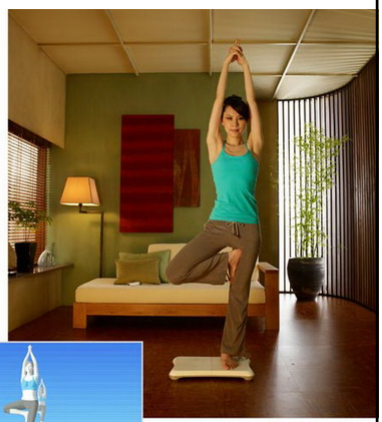
Main consequences:

- Limited dialogue with the “rest of HCI”
- Limited dialogue among the various assistive applications
- No economic driver: each assistive device is targeted just for that specific niche

ARE ASSISTIVE TECHS A SEPARATE HCI DOMAIN?

Multi-modal interaction as a case of continuity

- Sonification
- Gaze-based
- Gesture-based
- Brain-computer



ARE ASSISTIVE TECHS A SEPARATE HCI DOMAIN?

Research fallout: HTML tags to magnify pages

- from screen readers
- to ipo-vision
- to portable devices

[Hanson & Richards, 2005. Achieving a more usable World Wide Web. Behaviour & Information Technology, 24, 3, pp.231-46]

THREE CLAIMS ON THE NEED FOR CONTINUITY OF HCI

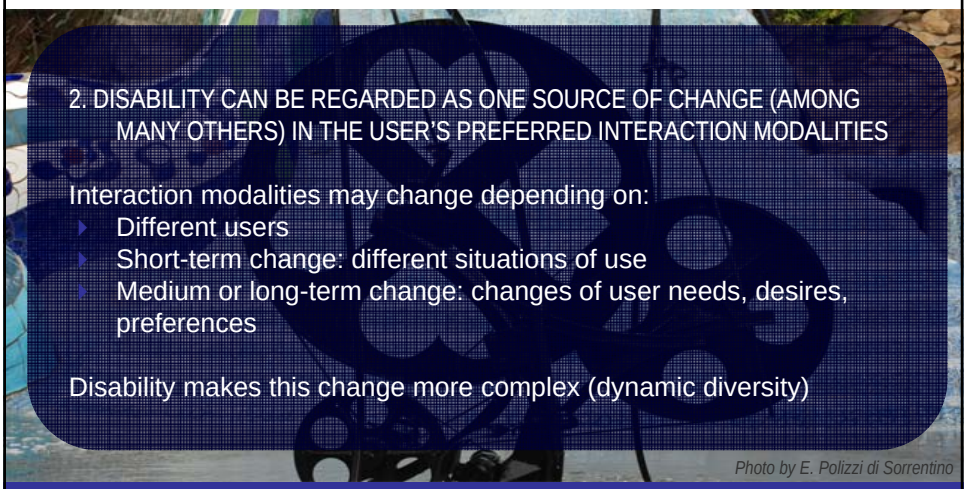
1. THE DESIGN OF ASSISTIVE TECHNOLOGIES FACES THE SAME CHALLENGES OF ALL HCI DOMAINS: THE DESIGN OF PERSONALISED TECHNOLOGIES FOR A DYNAMIC USE

Some differences – a more dynamic diversity:

- Variety of disabilities and combination of disabilities
- Time fluctuations: in-session fatigue, ageing…
- Tighter symbiosis

Not qualitatively different, the same common goal: address human needs and desires with personalised ICT

THREE CLAIMS ON THE NEED FOR CONTINUITY OF HCI



2. DISABILITY CAN BE REGARDED AS ONE SOURCE OF CHANGE (AMONG MANY OTHERS) IN THE USER'S PREFERRED INTERACTION MODALITIES

Interaction modalities may change depending on:

- Different users
- Short-term change: different situations of use
- Medium or long-term change: changes of user needs, desires, preferences

Disability makes this change more complex (dynamic diversity)

Photo by E. Polizzi di Sorrentino

PREFERRED INTERACTION MODALITIES

E.g.: a mobile phone and different situations of use

- On the move: car, plane, walking, cycling, etc.
- Different places: cinema, conference, outside in direct sunlight, restaurant, meeting, etc.
- Different mobiles

A different set of interaction modalities used in each situation

Photo by M. Ba[illegible]

THREE CLAIMS ON THE NEED FOR CONTINUITY OF HCI

3. LIMITATION OF ACTIVITY AND RESTRICTION ON PARTICIPATION [WHO, 2001] CONCERN EVERYONE'S INTERACTION WITH ICT

- They are related to physical, cognitive or social impairments
- But also to the changing nature of society, work and ICT use (ICT literacy)
- They depend on the tool, on the context, on our goals
- Difficulties can arise or change at any time; it is not possible to overcome them once and for all

THE CONTINUITY OF HCI

The same goals:

- Address human needs and desires with ICT
- Support user's favourite interaction modalities

The same challenge:

- Supporting diversity of preferred interaction modalities
  - Users: dynamic diversity and idiosyncratic uses
  - Use situations: dynamic and heterogeneous
  - Technological pace of change

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DIVERSITY AND ICT LONG-TERM DYNAMICS

Users:
- User-generated contents
- From mass-markets to multitude-markets
- Driven by desires rather than by needs

Tools:
- The end of interface stability
- The end of tool stability

FROM BROWSING TO USER-GENERATED CONTENT

1996

- 250.000 web sites, nearly all “read-only”
- 45.000.000 users
- user tasks: browsing and searching

2006

- 80.000.000 sites, nearly all “read-write”
- 33% of contents are user-generated
- more than one billion users

Contents are as diversified as users are

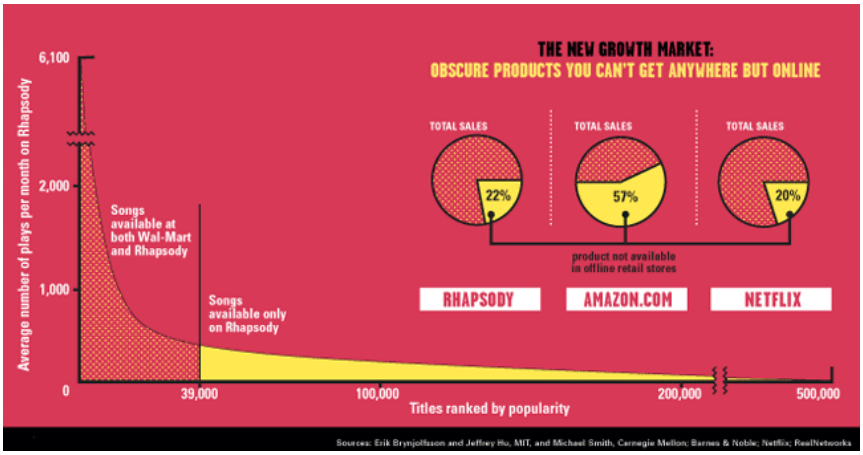
FROM MASS-MARKETS TO MULTITUDE-MARKETS

- Mass-market: large groups of indifferentiated users, with the same behaviour patterns, same characteristics, same preferences, etc.
- Multitude-market: each user is different, has a specific set of behaviours, unique characteristics and preferences

THE LONG TAIL [Anderson, 2004]

- Traditional market: 80% of revenues from 20% of the products
- Users group around few choices
- Digital market: 98% of the products sells at least 1 copy every 3 months
- Users have endless options (and they actually use such variety)

MULTITUDE-MARKETS: THE LONG TAIL [Anderson, 2004]



DESIRES RATHER THAN NEEDS

[J. Hollan]

People interact with technologies to have rewarding use experiences

- outside of the workplace
- to communicate
- for entertainment
- to be emotionally engaged
- …

E.g. the iPod does not solve a problem

Desires change more rapidly and drastically than needs

THE END OF INTERFACE STABILITY [Being Human, 2008]

- From command lines to GUI, to gesture, to speech recognition, multi touch, RFID, bluetooth, tangible interfaces, smart fabrics, etc.

THE END OF TOOL STABILITY [Scott, 2009]

E.g: iPhone applications: Urban Spoon, restaurant recommendations based on your location

5 “systems”:

- iPhone store
- interaction modality (shake)
- the rating interface
- restaurant data (number and update rate)
- GPS (resolution)

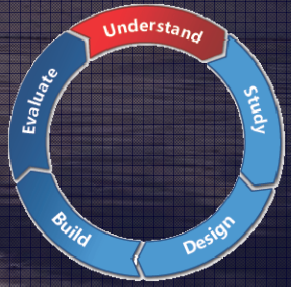
THE END OF TOOL STABILITY [Scott, 2009]

- Tools have become too complex (mash-ups: 5 in 1)
- Too pervasive, used in too many contexts
- Too easy to build: fast iteration cycles, user-generated tools

INDIVIDUATION: THE CURRENT CHALLENGE FOR HCI [Hancock, 2009]

Extend user-studies to understand diversity

- Individuation: understand users by understanding the individuals (idiographic research)
- Individuality not as error variations outside of the average
- Capture nuances of person-specific interaction: do we need (new) methods?
  - inter-individual AND intra-individual difference



INDIVIDUATION: THE FACEBOOK WEB

- Google aggregates behaviour of anonymous users
- Facebook knows the individuals: you and your friends

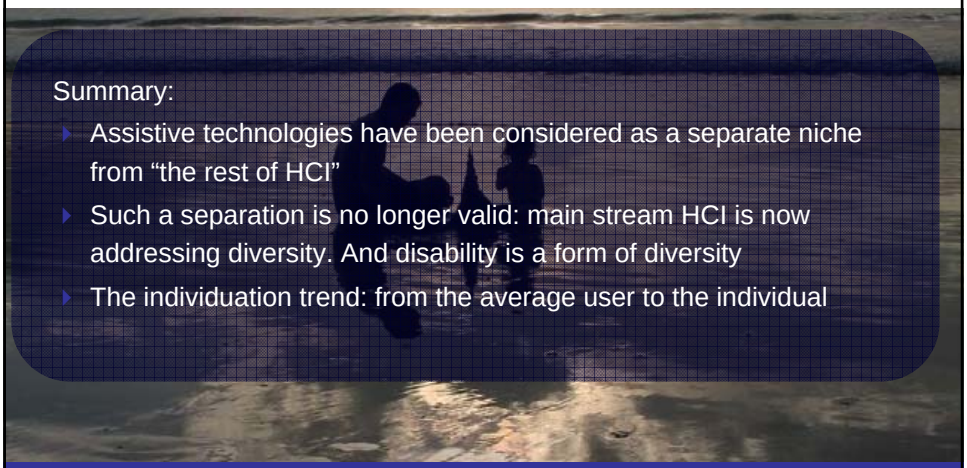
Facebook tools for individualised information: Connect & Open Stream

"Do you want to see which restaurant some anonymous guy recommends in Florence? Use Google"

"Want to see what your friends recommend? Use the Facebook web"

Facebook tools ensure that you browse the Facebook web and not the Google web

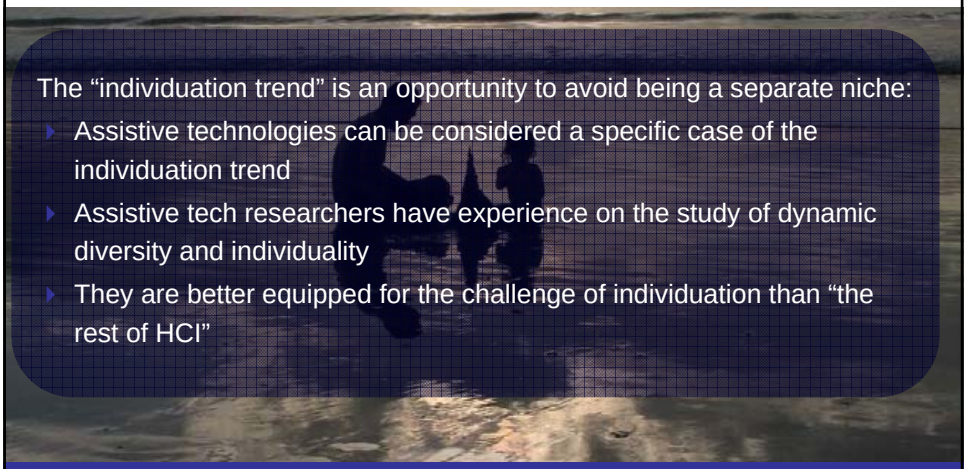
CONCLUSIONS: MORE THAN A NICHE



Summary:

- Assistive technologies have been considered as a separate niche from "the rest of HCI"
- Such a separation is no longer valid: main stream HCI is now addressing diversity. And disability is a form of diversity
- The individuation trend: from the average user to the individual

CONCLUSIONS: MORE THAN A NICHE



The “individuation trend” is an opportunity to avoid being a separate niche:

- Assistive technologies can be considered a specific case of the individuation trend
- Assistive tech researchers have experience on the study of dynamic diversity and individuality
- They are better equipped for the challenge of individuation than “the rest of HCI”

Thanks for your attention. Questions?

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