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Inclusion of Design for All in the training of Computing Engineers

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Laboratory of Human-Computer interaction for Special Needs Behar Berezitarako Pertsona-Konputagailu Elkarrekintza Laborategia


<http://www.sc.ehu.es/acwbbpke/>

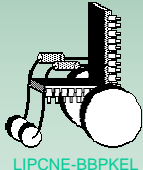


- **Founded in 1985**
- **11 lecturers + 9 contracted researchers and Ph. D. students.**
- **Research fields**
 - (Physical, Sensory and Cognitive) Web Accessibility
 - Augmentative and Alternative Communication and Mobility (AAC&M)
 - Ubiquitous computing, Ambient Intelligence, Smart Homes.


International Committees

- IFIP TC 13 Human-Computer Interaction
- IFIP WG13.3 HCI and Disability
- COST219 bis “Telecommunications Access for Disabled People and Elderly” (1997-01)
- COST219 ter “Accessibility for All to Services and Terminals for Next Generation Networks” (2003-2006)
- EDeAN, IST/CE, etc.

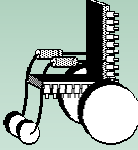




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What is Desing for All



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Some definitions (I)

"In Europe the term "design for all" has a similar meaning to "universal design". However the term "inclusive design" also includes the concept of "reasonable" in the definition.

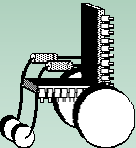
The most commonly used definition for **inclusive design** is "**The design of mainstream products and/or services** that are accessible to, and usable by, as many people as **reasonably possible** on a global basis, in a wide variety of situations and to the greatest extent possible without the need for special adaptation or specialized design".

In tiresias. Org: Guidelines. Inclusive Design
<http://www.tiresias.org/guidelines/inclusive.htm>

4



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Some definitions (II)

"...**design for all** in the Information Society is the conscious and systematic effort to proactively apply principles, methods and tools, in order to develop IT&T products and services which are accessible and usable by all citizens, **thus avoiding the need for a posteriori adaptations, or specialised design.**"

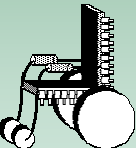
"...the term **design for all** (or **universal design**, the terms are used interchangeably)..."

Stephanidis et al. Toward an Information Society for All: An International R&D Agenda. International Journal of Human-Computer Interaction, Vol.10(2), 1998, pp. 107-134

5



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We use:

"Inclusive Design"

- the design that avoids the inclusion of unnecessary accessibility barriers
- to users with (sensory, physical or cognitive) restrictions provided with appropriate access devices
- due to
 - disability, aging or illness
 - the use of obsolete equipment
 - the special conditions to access (driving, working...)
 - etc.

6



Design for All vs Assistive Technology

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E-accessibility:

- Design for all/Universal Design/Inclusive Design
- Assistive technology

8



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Our approach to Design for **All** (I)

Inclusive design + Assistive Technology

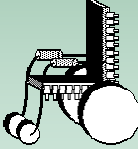
Two different and complementary levels:

- Design for all
 - Usability & Accessibility
 - User centred design
 - Accessibility barriers free
- Assistive Technology
 - Special user interfaces for people with special needs

9



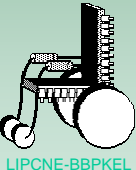
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Why should be taught D4A

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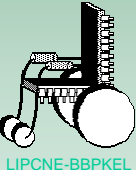


Why to teach D4A?


- To be useful, inclusive design has to be applied to **mainstream design process**
- To comply with inclusive laws, standards, norms and guidelines
- Other motivations for lectures and students: better design quality, larger market, more and happier users, better job opportunities, etc.
- To avoid the **e-exclusion**

14


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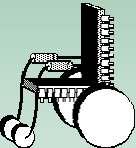
E-exclusion



15



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Other reasons to teach D4A

- The D4A enhances the capacity of the designers to tackle the real user needs
 - “rehabilitation engineers have longer experience that mainstream applications designers in the practical use of the tailored design of adaptive and intelligent interfaces”

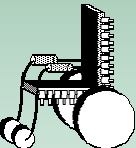
Newell y Gregor
 - The experience in design for all can generate an special ability to face the general usability problems

Nielsen

16



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Other reasons to teach D4A

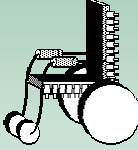
“Badly designed systems handicap all users”
H. Thimbleby

17




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What (and how) should be taught D4A



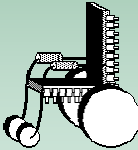
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Now is the time

- Bolonia process: New and renewed curricula
- Redefinition of IEEE/ACM Computer Science 2001 Curriculum
- Spain: Libro Blanco del D4A en la Universidad



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19

IEEE/ACM CS 2001 Interim Review (June 2008)

HUMAN-COMPUTER INTERACTION

Contents

1 HC/Foundations [core]

2 HC/BuildingGUIInterfaces [core]

3 HC/UserCenteredSoftwareEvaluation [elective]

4 HC/UserCenteredSoftwareDevelopment [elective]

5 HC/GUIDesign [elective]

6 HC/GUIProgramming [elective]

7 HC/MultimediaAndMultimodalSystems [elective]

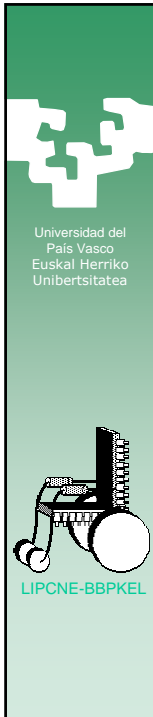
8 HC/CollaborationAndCommunication [elective]

9 HC/InteractionDesignForNewEnvironments [elective]

10 HC/HumanFactorsAndSecurity [elective]

- http://wiki.acm.org/cs2001/index.php?title=HUMAN-COMPUTER_INTERACTION

20



HC/Foundations [core]

Minimum core coverage time: 6 hours

Topics:


- Motivation: Why the study of how people interact with technology is vital for the development of most usable and acceptable systems
- Process for user-centred development: early focus on users, empirical testing, iterative design.
- Different measures for evaluation: utility, efficiency, learnability, user satisfaction.
- ...
- **Accommodating human diversity, including universal design and accessibility and designing for multiple cultural and linguistic contexts.**
- ...

Learning objectives:

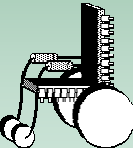
- Discuss why user-centred product development is important.
- Explain why both individual human models and social models are important to consider in design of human-computer interaction.
- Define a user-centred design process that explicitly recognizes that the user is not like the developer or her acquaintances.
- ...

21





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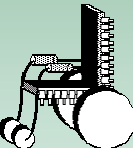
Teaching Design for all

- What is needed to teach Design for all in Human Computer Interaction?
 - Inclusive design guidelines
 - Sound methodologies
 - Adequate Tools

22



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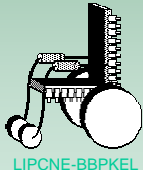
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Inclusive Design Guidelines (I)

- They help students to apprehend the field knowledge
- They provide the designer with previous (successful) experiences
- Their application can not be automatic: they require experience and common sense
- They do not eliminate the designer freedom and creativity

23

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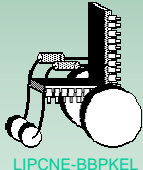


Inclusive Design Guidelines (II)

- Many sets of guidelines can be found in the Internet
- Depending on the design purpose students should be encouraged to find, analyse, discuss and apply them
- A good example: WAI guidelines

24

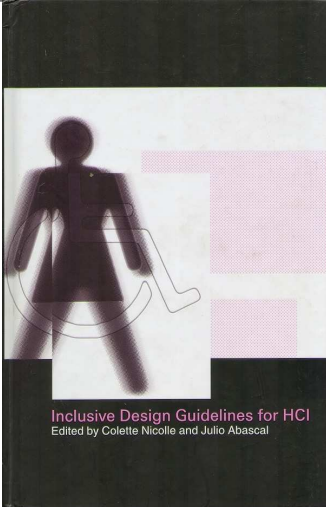
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Inclusive Design Guidelines (III)

Literature:

- C. Nicolle et al. (Eds.) **Inclusive Design Guidelines for HCI**. Taylor & Francis. London, 2001.
- C. Farenc & J. Vanderdonckt (eds.) **Tools for Working with Guidelines**. Springer, 2000.



Inclusive Design Guidelines for HCI
Edited by Colette Nicolle and Julio Abascal

25



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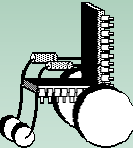
Inclusive Methodologies (I)

- Accessibility for all must be a figure of merit of **quality** (similarly to Usability)
- Inclusive methodologies cannot be outside of the general cycle of life of the applications' development.
- They must be **integrated** in the Software Engineering Methodology used by the development team.

26

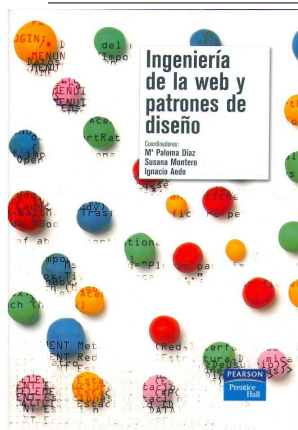


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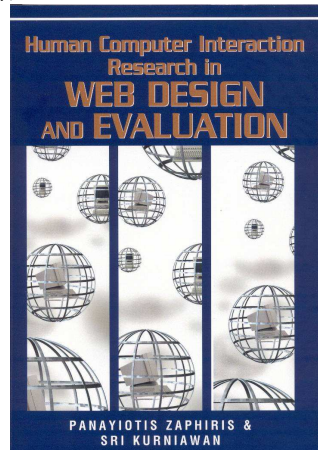
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Inclusive Methodologies (II)



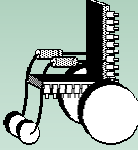
Capítulo 9. **Ingeniería de la accesibilidad a la web.** J. Abascal, M. Arrue, N. Garay, J. M. López, M. Vigo. 267-306. En: *Ingeniería de la web y patrones de diseño*. P. Díaz et al. (eds.). Pearson, 2005.

A Methodology for Web Accessibility Development and Maintenance. In: *Human-Computer Interaction Research in Web Design and Evaluation*. P. Zaphiris (ed.), Centre for HCI Design, City University, London.





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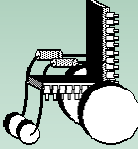
Adequate integrated tools

- D4A issues must be integrated in the standard tools used by the team
- Integrated tools are a key issue:
 - They help to apply methodologies
 - facilitating their application and
 - maintaining coherence

29



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Our experience of Teaching Design for All

Diverse courses

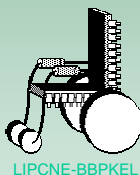
At the School of Informatics. University of Basque Country

- Pre-graduate courses in HCI
 - *Human-Computer Interaction* ⇒ *Interface design*
 - Advanced interaction systems ⇒ Devices and procedures for novel interaction paradigms
- Diverse doctorate courses on Web Accessibility (containing Design for All fundamentals)
 - From 1996

In other universities

- Diverse doctorate courses on Web Accessibility (containing Design for All fundamentals)
 - University of Deusto. Bilbao (from 1998...)
 - University of Cienfuegos
 - University of Granada
- Summer courses on Design for All
 - University of Castilla-La Mancha (2003)
 - Summer University of Andalucia (2007)

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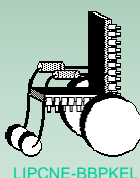


32


Students evaluation of the courses

- Practical work with real designs (even if they are only exercises) was highly appreciated
- They discovered their own ignorance about user issues, and the need to collaborate with other people to solve them
- They detected their tendency to go directly to the designing/building phase, and their difficulty to "lose time" in early discussions about user needs
- They opine that **design for a all** and/or **accessibility & usability** courses should be taught earlier

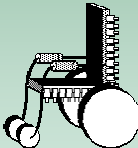
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Conclusions

- Design for All should be taught in all the design related undergraduate courses
 - A practical approach is crucial
- A key issue: Compilation of teaching materials
- Lectures (and students) have to be motivated to introduce it

but

- Stakeholders **HAVE TO LOBBY** for the inclusion of the Design for All in engineering undergraduate curricula

36



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