IDCnet Inclusive Design Curriculum Network - examples of good and bad practice in teaching design for all

This item was submitted to Loughborough University's Institutional Repository by the/an author.

Citation: NICOLLE, C., 2004. Examples of good and bad practice in teaching design for all. Presentation given at EdeAN/AAATE Workshop on Education and Training in Assistive Technology and Design for All, 13 November, Dusseldorf

Additional Information:

- This is a copy of the author's presentation given at this conference.

Metadata Record: https://dspace.lboro.ac.uk/2134/1028

Please cite the published version.
Examples and Good Practice in Teaching DfA

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Aims:

- To integrate information and identify core knowledge and skills for model curricula in design for all for ICT

- To support the creation of a European network to promote these interests, in line with
  - e-Europe objectives
  - EDeAN
IDCnet Pilot Activities

- To implement results of the Network in our own centres

- To highlight good practice, possible obstacles, and stumbling blocks to the implementation of DfA

- To validate the taxonomy (complete? useful?)
  - For DfA educators/course creators
  - For lecturers
  - For students: (fragmentary knowledge of barrier-free design through other classes but have not had systematic exposure to universal design)
  - For others: researchers, librarians
IDCnet Taxonomy of Design for All Knowledge Sets and Skills

General: applicable to all design disciplines
- Design for All Awareness. What is Design for All?
- Why Design for All: ethical considerations, compliance with legislation, commercial potential
- Recommendations: Principles, Guidelines, Standards, Best Practice, etc.
- Interpersonal Skills for Teamwork and Communication: effective communication in multidisciplinary design teams

Information and Communications Technologies (ICT) Sector
- Accessible Content
- Accessible Interaction: input and output
- New Paradigms of Interaction, Applications and Research
- User Centred Design
- Application Domains and Research

Examples and Good Practice in teaching DfA, November 2004
Topics (How) and their relationship to the Taxonomy (What)

- **what** and **why** teach inclusive design have been widely accepted in the form of the taxonomy, BUT
- Experts wish to share experiences on **how** to go about teaching each category, SO
- Pilot teaching activities illustrate **how** each category in the taxonomy can be implemented in practice:
  - Topics covered under each category
  - Specific resources under each category
  - Specific examples of teaching materials
Teaching Strategies, e.g.

- Lectures, presentations by different lecturers (from industry, hypermedia design, ergonomics)
- Projects, dissertations, joint projects
- Workshops
- Taster Classes
- On-line e-Learning for discussions/resources
- Meetings/focus groups with disabled people
- Input from multi-disciplinary teams in industry
- Practical exercises
- Case studies
- Videos
- Reading lists, conferences, etc.
User involvement, e.g.

- Blind users demonstrating the use of JAWS for browsing the web and commenting on inaccessible websites and also Braille note-takers and other technologies.

- A motor impaired young person in wheelchair, demonstrating the use of speech recognition and alternative input methods to access the computer.

- A person with hearing impairment presenting technical aids for the deaf and commenting on communication barriers.

- A teenage boy with Down syndrome, together with his older sister, commenting on his access to the TV, telephone, Internet and so on.

- A lawyer specialised in accessibility and Internet legislation.

- A representative from the university’s Disabilities and Additional Needs Service demonstrating software available to students with dyslexia.
Awareness of Design for All

- The Information Society and its dimensions of diversity
- Demographics, statistics and classifications
- Definitions: D4A, inclusive design, AT, etc.
- Physical/psychological capabilities of users
- Models of disability
- Bell curve, designing for diversity of users, not a ‘typical’ user, temporary and permanent disabilities
- Simulation exercises
- Student diaries from BBC Ouch! Website (www.bbc.co.uk/ouch)
Inclusive design is about ensuring that environments, products, services and interfaces work for people of all ages and abilities. Many people are interested in this, but there is no ready source of information, methods, tools and examples to help them achieve it. This website aims to plug that gap by bringing together new and existing information and making it accessible via a single interface.

This website is for design students and their tutors, professional designers, design managers and policy makers. It has been developed to introduce newcomers to key concepts, information and design/research methods. And also to support practitioners in undertaking individual projects and gathering together the information, examples and inspirational material they may need.

The aim is to make key information on inclusive design readily available to students, their tutors, and design professionals, and encourage them to build up their own collection of relevant information, tools and techniques. The website gives speedy access to information that is already available on the Internet, but perhaps not easy to locate, along with material that is no longer in print.
Why Design for All

- Demographics, statistics and classifications
- Business case for D4A, particularly emphasising the ageing population
- DASDA at www.design-for-all.info/
- Case Studies: successful D4A
- Legislation (also see Recommendations)
  - Progression from 1948 Declaration of Human Rights to adoption of equal opportunities for all
  - Push of ADA and the pull of Section 508
  - EU directives (education, transport, etc.)
Recommendations

- eEurope 2002 and 2005
- W3C-WAI WCAG 1.0 and draft 2.0 (guidelines, checkpoints, techniques, all taught with an example)
- U.S., European and national legislation, e.g. DDA
- Standards and Working groups (CEN, CENELEC, ETSI)
- Guidelines from companies (Microsoft, Sun, IBM, etc.)
- 7 Principles of Universal Design, finding examples of each of the 7, see if they can find an 8th.
- WHO’s ICF and emphasis on functioning rather than disability
Interpersonal Skills for Teamwork and Communication

- Inclusive Design Workshop
- Individual and Joint projects
- Collaboration between departments and multi-disciplinary teams, where possible
- Searching for and presenting examples of good and bad design
- Submitting material electronically and ensuring accessibility
- Making accessible presentations
- Making presentation materials accessible
Accessible Content

- Importance of content to Information Society
- Digital and non-digital content
- Comparison of usability with accessibility of user interfaces
- Managing and developing on-line applications
- Use of different types of media to convey different info, e.g. text description of a task compared to a diagram (may be redundant but offers reinforcement). Students invited to find counter examples.
- Example of Athens Olympic Website: problems for people with colour blindness, and Lang Tag missing from English version of the site.
- Improving accessibility of student’s own GUI
Accessible Interaction: input and output

- Alternative Keyboards, displays and mice
- Accessibility options in Windows
- Specialist devices/software; how they interface to standard environments and applications (Screen readers, speech synthesis and recognition, switches, scanning interfaces, etc.)
- Paper prototyping a novel interface (last year blindness, this year sign language users)
- Videos from WebAIM (www.webaim.org/) showing blind student demonstrating screen reader
  - Non-native English speakers, with poor room acoustics, and poor quality of speakers
  - Captions would have made video more accessible!
Benefits of assistive technology
New Paradigms of Interaction

✓ Some of the technologies:
  ● Virtual realities (immersive environments, avatars)
  ● Sensing and scanning technologies (location awareness and context sensitivity, Radio Frequency Identification, GPS, sensors)
  ● Robotics
  ● Convergence of some or all of these = new uses, new paradigms

✓ Non-visual interaction
✓ Smart computing applications (e.g., smart homes)
✓ Pervasive and mobile computing
✓ Ambient intelligence
✓ Digital TV and interactive services
✓ See also Application Domains and Research
## User-Centred Design

- User requirements and evaluation methods/tools in the context of design for all
- USERfit
- How to include a diversity of users, why that is useful for all design
- Core tools and their appropriateness for different user groups
- Role of ergonomics in Design and the AT sector
- Problems with User-Centred Design in AT
- Abandonment of AT
- Activity analysis, Occupational performance, related to computer use
- Design exercise and the use of anthropometric data
- Case studies:
  - of the whole design lifecycle
  - universally accessible interactive applications and services
  - the Third Age Suit

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Case study: The Third Age Suit

Student projects taking this further, e.g., simulating hand tremor, using EMS (for learning, design or evaluation)
Application Domains and Research

- eLearning (e.g., Loughborough University’s LearnServer and SENDA)
- Environmental control systems
- Smart homes (e.g., TIDE CASA project and TAHI review at http://www.lboro.ac.uk/research/esri/smarthomes/)
- AAC (e.g., IST WWAAC project)
- e-Health
  - Telemedicine
  - Patient monitoring
- Products, work and transport
- Leisure: sports and tourism
- TV (digital and interactive)
- e-Government
Example: Teaching Material

- Module at Loughborough University provides at least an introduction to all the categories, but especially:
  - Awareness, Why Design for All, Recommendations, and User-centred design

- Inclusive Design Workshop intended to:
  - Integrate the knowledge covered earlier in the module
  - Emphasise requirements capture and evaluation techniques with older and disabled people, and
  - Rehearse more effective Interpersonal Skills for Teamwork and Communication in the context of Design for All.
Objective

- To define a new or modified technology, designed to be as inclusive as possible, in one of the following areas:
  - Mobility
  - Work
  - Housing
  - Information and Communication
Logistics

- Concept originally used by GENIE project

- Ergonomics final year and post-grad students

- Ideally 2 lectures of 2 ½ hours each, but can be flexible

- One person in each group of ergonomists ‘role playing’ as an older or disabled person
Procedure

- Setting the scene
- Step 1: Opportunities and threats
- Step 2: User requirements
- Step 3: Development and evaluation
- Step 4: Feedback
Sample Scenario - Work

- Phil, who uses a wheelchair, with problems accessing cables at back of computer (doesn’t everybody?)
- New flippable PC tower to suit different home and office situations
- ‘Why do I have to come to Loughborough to see a design like this?’
The proposed solution

(Tower orientation with desk)
Students’ Discussion

- Design solutions led to discussion about other examples and benefits of inclusive design
- ‘In ISdAC’s view, there’s only one good methodology: direct user involvement’
- ‘In the end, the user should have control.’
Importance of DfA in Education: Student expectations and reactions

(via questionnaire based upon taxonomy)

Students had no apparent problem with the taxonomy of DfA material even when their thematic module cut across categories

To the DfA learning experience:

- On the whole positive
  - “Made me think about things I had never considered before…”
  - Will use this in other courses
  - Will be useful to me in the real world

- and with suggestions for improvements in the delivery
  - More practical work
  - Why didn’t we have this earlier?
  - Should be compulsory
How can we move forward? …

- Need to ensure that the wheel isn’t reinvented

- Sharing of improved resources and materials, including recommended lists of reading and web sites needs critical mass
  - *The EDeAN vehicle, especially SIG on DfA Curricula*
  - *Adapting materials for use by others takes time, resources and copyright permission*

- Benefiting from new initiatives, e.g. RSA Inclusive Design Resource at [http://www.inclusivedesign.org.uk/](http://www.inclusivedesign.org.uk/)

- IFIP WG13.1 and 13.3 continued collaboration

- Recognition required through Accreditation and Professional Associations
Discussion

- What steps can we take to support the take-up of existing materials to teachers of design for all?

- What steps can we take to promote the recognition of design for all by accreditation and professional associations?