



CHI 2002 Tutorial Proposal:

Flexible, Accessible Interfaces More Usable by Everyone

Submitted By:

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Duration of Proposed Tutorial:

Full Day (6 hours)

Learning Objectives:

1. To introduce the participants to the different disabilities and develop a basic understanding for the major problems faced by people with different disabilities in using computers and information technologies (including the World Wide Web).
2. To show how the problems and solutions for disability access parallel the constraints and solutions needed for the mass market customers (e.g., for data mining, mobile computing, etc.).
3. To provide hands-on experience with the accessibility issues and solutions.
4. To demonstrate low-cost strategies for building access into standard products (and increasing mass market ability simultaneously).
5. To help separate key accessibility issues from lower priority issues.
6. To acquaint participants with the resources available to draw on for additional information, training, or technical assistance.

Justification of This Tutorial for CHI Audience:

With both the changing demographics (aging) and the recent emphasis in Federal procurement of information technologies in order to have them be more accessible to people with disabilities (Section 508), there is and will continue to be increased interest in how emerging information technologies could be designed so that they are usable by individuals with a much broader range of abilities and limitations. This tutorial is focused on commercially practical and profitable strategies for enhancing the interfaces of information technologies so that they are more flexible and accommodate a wider range of users. In addition, it highlights research areas having to do with modality independent interfaces and machine readable, operable, and comprehensible interfaces and document formats, all of which are critical to next generation data mining and AI agent-based interfaces.

Topics Covered:

Although comprehensive coverage of the topic areas will not be possible in this short tutorial, we will be covering the following topics:

- Problems faced with use of standard information technology products and web pages by persons with the following types of disabilities:
 - Blindness
 - Low Vision
 - Hard of Hearing
 - Deafness
 - Deaf-blindness
 - Physical (including lack of control, absence of limbs, weakness, etc.)
 - Cognitive
 - Language
 - Speech
 - Multiple combinations of disabilities
- Common strategies and assistive technologies employed by people with disabilities to use information technologies
- Today's regulatory environment – including the Americans with Disabilities Act, Section 508, and Section 255 – and its impact on product design and web design.
- Essential techniques for making the following information technologies accessible for people with a variety of disabilities:
Computers (software and hardware)
 - Kiosks
 - PDAs
 - Cell phones
 - Web sites
- Web Content Accessibility Guidelines

- Future / emerging technologies, including:
 - Smart dust
 - Environments that can interact with us and give us feedback
 - Computers we can wear
 - Computers integrated into our clothes or our bodies
 - Devices embedded into our glasses
 - Assistance on demand
 - Other services on demand

How the Tutorial Will Be Conducted:

The course will start with an introduction to the topic of how we can design devices and information (e.g., web sites) so that they can be used by people in a wide variety of situations with different constraints. We will be showing that people who have disabilities are only one subset of people operating under constraints. For example, mobile computing users find themselves in environments where they cannot hear (due to noise), cannot see or look at the device (e.g., while driving), and where they must use displays that they cannot see very well (e.g., very small displays of web pages). We will also point out that the strategies for making information accessible also make the information available to next generation technologies, such as artificial agents, advanced data mining, auto translation, etc. We will then show examples of strategies that make products usable by people with physical and sensory disabilities make them more usable by others with temporary disabilities or who are in situations such as those described above.

The introductory presentation and demonstrations are then followed by hands-on “experience” sessions. In these sessions, participants will have the opportunity to discover what it is like to try to operate many of the products they encounter every day if they had a disability (e.g., blindness, low vision, deafness, hard-of-hearing, limited reach and dexterity, or loss of an arm). We will provide examples of products which appear to be essentially identical, but which are either impossible or easy to operate, due to simple differences in design. Participants will then be fitted with simple devices used to simulate various disabilities, and then will attempt to execute basic tasks using the products provided.

After the experience sessions, participants will be led through the process of examining each of the different types of constraints / disabilities and determining what the major issues are which cause products to be accessible or not accessible. They will also be identifying key strategies for addressing each of these issues. This process will involve simple, hands-on exercises and demonstrations. Exercise will first involve physical products (e.g., locating keys on differently-designed keyboards and keypads, list selection for blind, low vision, or illiterate). Then, demonstration covering web technologies will be done (e.g., demonstration of two apparently identical web pages where one is accessible and the other is not).

Next, we will review emerging and future technologies and discuss how these new technologies can greatly enhance the natural accessibility of the future IT environment. We will also point out ways that accessibility and compatibility with future technologies could overlap.

The tutorial will end with a short session on resources that participants can turn to for additional information, training, and technical assistance. Tutorial notes will contain lists of key web-based resources as well as a bibliography of key documents and other materials.

Schedule for Tutorial:

09:00 – 09:30	Introduction (Presentation / Demonstrations)
09:30 – 10:30	Experience Sessions (Small Groups)
10:30 – 11:00	Break
11:00 – 12:00	Experience Sessions – cont'd
12:00 – 13:15	Lunch
13:15 – 15:30	Issues and Strategies for IT Products (Demos / Exercises)
15:30 – 16:00	Break
16:00 – 16:45	Issues and Strategies for Web Access (Demos / Exercises)
16:45 – 17:15	Accessibility and Emerging / Future Technologies
17:15 – 17:30	Resources for Information, Training, and Technical Assistance
17:30	Adjourn

Tutorial Notes:

The first portion of the tutorial notes is essentially a workbook for participants to use for note-taking during presentations and demos, as well as providing instructions and worksheets for activities. Text from presentation slides will be included. Samples from the workbook portion are shown below.

Example 1: Note-taking page for presentations / demos. Participants will be shown examples and hear additional detail about each of the points below.

Type 1 Guidelines –

All Users without vision need:

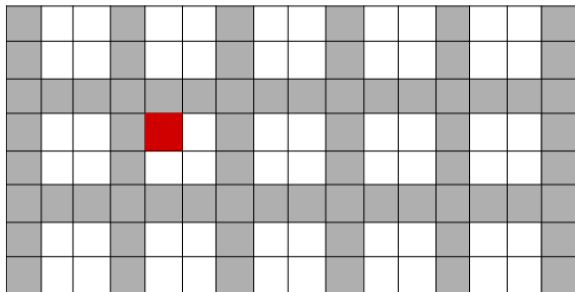
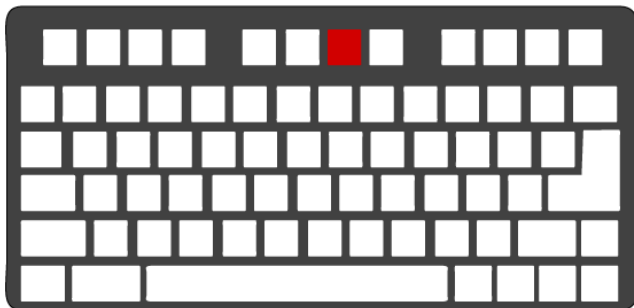
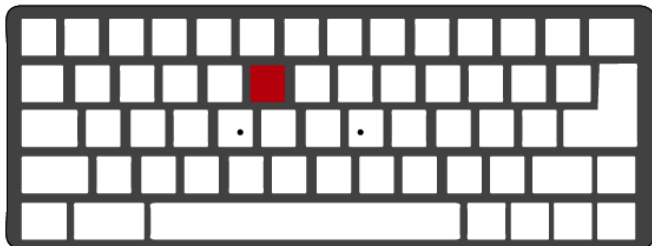
1. A means to perceive all (non-decorative) information (without vision).
 - Including:
 - All static and dynamically presented information
 - All control labels
 - All control status
 - Without requiring user to know Braille
2. A means to discern controls / mechanisms from their surroundings (without vision).
 - Only necessary for those controls needed to access all functions of product in one (non-visual) mode.
3. A means to tell when (these) controls have been activated (without vision).
4. A means to locate and operate controls without encountering touch-activated controls which would be accidentally activated.

Example 2. Worksheet for Group Activity. (Note that a set of cards accompanies this activity. The participant will not be keeping the cards.)

Instructions:

1. Wait for the signal.
2. Find the key on the keyboard in front of you that corresponds to the marked key on the screen.
3. Put your finger on the key and raise your hand.

Accessible Design Techniques Learned From This Activity:



The back portion will consist of a resource section, arranged topically, including the following:

- Resource Material on Disability –
 - Listing of Web Site Resources on Disabilities, Disability Organizations, and Disability Statistics
 - Basic Information on Disabilities
 - Eye Disease Simulations
 - Census Brief on Disabilities
- Resource Material on Assistive Technology –
 - Listing of Web Site Resources on Assistive Technology Products, Training, and Publications
- Resource Material on Regulations –
 - Listing of Web Site Resources on Government / Regulatory Information
 - “The Accessible Future” (excerpt from National Council on Disability Report of June, 2001)
- Resource Material on Web Accessibility
 - Listing of Web Site Resources on Web Accessibility, including Guidelines, Reference Materials for Creating Accessible Web Sites, Training Resources, General Web Access Resources, Accessibility Tools, and Sample Corporate Guidelines
 - W3C Web Accessibility Initiative Quick Tips
 - Comparison of Section 508 Guidelines on Web Accessibility and W3C Web Content Accessibility Guidelines
- Resource Material on Universal / Accessible Design
 - Listing of Web Site Resources
 - Basic Guidelines and Strategies for Access to Electronic Products and Documents
 - Principles of Universal Design
 - Fundamental Principles and Priority Setting for Universal Usability
 - Tests for Screening Product Designs Prior to User Testing by People with Functional Limitations

Instructors:

There will be two instructors: Gregg C. Vanderheiden, Ph.D., Director of the Trace R&D Center, Univ. of Wisconsin-Madison, and Shawn Lawton Henry, from Optavia Corporation. Dr. Vanderheiden will be the lead instructor (70%), and Shawn Henry will be the co-instructor (30%).

Tutorial History:

The demonstrations and exercises in this tutorial have been classroom-tested in a course entitled “Design and Human Disability and Aging,” offered over the past 12 years at the University of Wisconsin-Madison, Industrial Engineering Department – Human Factors Program (cross-listed with the Biomedical Engineering Department). Much of this material has also been used in a four-day industry training course, “Designing for Usability, Flexibility & Accessibility,” offered annually by the Trace R&D Center, Univ. of Wisconsin-Madison.

Earlier versions of this tutorial have been offered at the following conferences:

- CHI 99 (May 1999)
- Designing for the 21st Century Conference II, An International Conference on Universal Design (June 2000)
- RESNA 2001 (June 2001)
- HCI Int'l 2001 (August 2001)

The first three tutorials mentioned above were well-attended and highly-rated. (The third tutorial will be presented on August 6, 2001.) In the latter three instances, we were specifically invited to present the tutorial.

Modification of Tutorial:

This tutorial is undergoing constant update of content (e.g., demonstrations include up-to-date products and design strategies) as well as evolution of teaching methods.

The feedback from the forms completed by the CHI 99 participants included the following suggestions for improvement, which have been addressed in subsequent offerings:

1. Too much time in group break-out sessions (this time has been reduced significantly).
2. Greater emphasis on software design (has been added).
3. Too much cell phone (the initial tutorial particularly emphasized cell phones due to great interest in FCC regulations released in July 1999; the content of this workshop is much broader).
4. More examples of actual products (the initial tutorial had fewer examples because fewer existed at that time; the current version of the tutorial has many more product examples).
5. Keep worksheets used in group activities (the groups in the initial tutorial had one set of worksheets to complete; the current version provides copies of all worksheets to each individual, so all may make their own notes).
6. "Wish we could have had two days, so that I could learn more." (The current version of this tutorial devotes time at the end of the course to where further training and information may be obtained.)
7. First exercise should have been left out (we adopted this suggestion; the information is more efficiently covered in the initial presentation and integrated into the subsequent activities).
8. Less discussion of details about specific disabilities (the current version of the tutorial provides basic information about disabilities in the Tutorial Notes and relies on the experience sessions to provide most of the disability-specific information).
9. Clearer directions on assignment (the current version of the tutorial uses a workbook approach to present assignments, rather than relying solely on instructor presentation of directions).

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BENEFITS

You will gain hands-on experience of the usability problems an aging population and people with disabilities encounter when trying to use today's technology products and web sites – problems also encountered by people in constrained environments, and you will learn ways to address these problems that can result in commercially practical and profitable products that are more usable by everyone.

ORIGINS

This was a highly-rated tutorial at CHI 99. The lead instructor was the closing plenary speaker at CHI 2001.

FEATURES

- hands-on experience with the accessibility issues and solutions
- low-cost strategies for building access into standard products
- how to separate key accessibility issues from lower priority issues
- resources available to draw on for additional information, training, or technical assistance

AUDIENCE

Products developers, human factors or usability specialists, consultants, and researchers interested in universal usability / accessible design.

PRESENTATION

Includes "experience sessions" where participants will be introduced to the problems faced by people with sensory and physical disabilities, presentations and demonstrations of specific accessibility techniques on IT products and web sites, and activities to teach the essentials of accessible design.

INSTRUCTORS

Gregg Vanderheiden is Director of the Trace R&D Center and a professor of Industrial Engineering at the University of Wisconsin-Madison. He has been a pioneer in the field of disability and technology for 30 years. Achievements include development of access features used in Windows, MacOS, and many other standard operating systems, co-authoring of the W3C's Web Content Accessibility Guidelines, and development of the EZ™ Access techniques for providing cross-disability access in electronic products of all types (currently available in kiosk systems, including a new voting kiosk, and currently demonstrated in an ATM prototype and cell phone reference design).

Shawn Henry is Director of R&D at Optavia Corporation, a usability research and consulting firm for e-commerce. Shawn has led the user interface design effort for numerous projects, from analysis through usability testing. She has developed workshops on the process of UI design, UI standards, usability evaluation and testing, and accessibility of web interfaces, software, and consumer products.



Tutorial Requirements and Other Information

Supplies and A/V support: A computer projector capable of 1024 x 768. The table needs to be large enough that I have room to spread out my notes, transparencies, etc. Also I tend to move around while lecturing and so need some open space behind the table and around the table. Two chairs. Also need a flip chart and pens.

Room lighting and Sound amplification: In a large room we need to have the ability to control the level of illumination so that participants can easily see me, the computer projection, and still have enough light to be able to see their notes and take notes. More importantly, I need to be able to see and make eye contact with the participants. I will need a wireless lavalier microphone as I tend to move around a lot during the presentation and use my hands for demonstrations. A second wireless microphone for passing around so that anyone with a hearing problem can hear questions and answers. A large table with a table lectern on it.

Restriction on offering: NONE.

Seating Arrangements: Attendees will be using their notes for purposes of note taking and need plenty of space to spread out. If using classroom style seating at 8 foot tables there should be three rather than four people at each table if possible.

Tutorial notes: The tutorial notes should be copied and bound as if they were a book, with even numbered pages on the left and odd numbered pages on the right as the book lies open on the table in front of you. This is to ensure that some materials are not visible to the participants until after the demonstration is completed. Binding should be spiral so that they can be used without holding.