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Accessibility and Special Issues in HCI

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SPRING 2020

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Week	Topic	Reading
1	Introduction to HCI; Design Principles	Chapter 1
2	User-Centred Design Process	Chapter 2 & 3 / Gould et al. (1987)
3	User Interaction and Interfaces	Chapters 4, 5 & 6 / Shin et al. (2017)
4	Interaction Design and Development I	Chapters 7 & 8
5	Interaction Design and Development II	Chapters 9 & 10
6	Interaction Design and Development III	Chapters 11 & 12
7	Information Presentation and Design Patterns	
8	Usability Evaluation Methods I	Chapters 13 / Borsci et al. (2015)
9	Usability Evaluation Methods II	Chapter 14, 15 & 16
10	Accessibility and Special Issues in HCI	Online: WCAG2.0
11	Models, Theories and Risks	MacKenzie (1992)
12	Mixed Reality and Future HCI	
13	Subject Revision	

This Week

Who do we need to consider?

Assistive Technologies

Accessibility

- EN 301 549
- WCAG 2.1
- Section 508

Subject Description

- The subject provides students with an understanding of Human Computer Interaction (HCI) principles and practices, and how to apply them in the context of developing usable interactive computer applications and systems. The subject also emphasises the importance of taking into account contextual, organisational, and social factors in the design of computer systems. Students will be taken through the analysis, design, development, and evaluation of user interfaces. They will acquire hands-on design skills through an interaction design project. The subject will cover topics including user-centred design, the development process, prototyping, usability testing, measuring and evaluating the user experience and accessibility.

Subject Learning Outcomes (SLOs)

- On successful completion of this subject, students will be able to:
 1. Identify and describe HCI principles and design issues.
 2. Discuss and justify HCI solutions based on design principles.
 3. Demonstrate an understanding of the HCI design process.
 4. Acquire skills to design and implement user-centred design.
 5. Select and use suitable methods of measuring and evaluating the user experience.

Accessibility:
Degree to which a
product is usable
and accessible by
as many people as
possible



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Consider...

- 2016 Census Data
 - Australian Population: 23.4 million
 - Median age of an Australian: 38 years
 - Population under 14: 18.7%
 - Population over 65: 15.7%
- ABS 4430.0 - Disability, Ageing and Carers, Australia: Summary of Findings, 2015
 - 18.3% reported a disability
 - 78.5% of people with disability reported a physical condition, such as back problems, as their main long-term health condition
 - 21.5% reported mental and behavioural disorders
 - >50% of those with disability aged 15 to 64 years participated in the labour force (53.4%), which is considerably fewer than those without disability (83.2%).
 - Older people are more likely to report a disability (50.7%)

<https://bit.ly/2zplkaZ> and <https://bit.ly/2pblaP8>

So...
Who do we need to
consider?



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Disabilities affecting computer accessibility

- Visual impairments
 - Blindness, low vision, colour blindness
- Hearing disabilities
- Speech impairments
- Mobility impairments
- Cognitive impairments
- Literacy

These can be Temporary or Life-long

Assistive Technologies



- Devices designed to provide people with solutions to allow them to perform typical activities that they would not have otherwise be unable to do.
- US – IDEA (Individuals with Disabilities Education Act) 2004: Assistive technology device means any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability. The term does not include a medical device that is surgically implanted, or the replacement of such device.

Assistive Technologies

- **Assistive technology:** hardware or software added to or connected to a system that increases accessibility for an individual
 - NOTE 1: Examples are Braille displays, screen readers, screen magnification software and eye tracking devices that are added to the ICT.
 - NOTE 2: Where ICT does not support directly connected assistive technology, but which can be operated by a system connected over a network or other remote connection, such a separate system (with any included assistive technology) can also be considered assistive technology.
- <http://mandate376.standards.eu/standard/definitions-and-abbreviations>

Can be:
Low Tech,
Medium Tech,
High Tech



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Can be:
Software or
Hardware



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Can be:
Built in or
Custom (3rd Party)



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Built in Accessibility Software Features

- Microsoft
 - <https://www.microsoft.com/en-gb/Accessibility/>
 - <https://docs.microsoft.com/en-us/windows/desktop/uxguide/inter-accessibility>
 - <https://docs.microsoft.com/en-us/windows/uwp/design/accessibility/accessibility>
- Apple
 - <https://www.apple.com/au/accessibility/>
 - <https://developer.apple.com/accessibility/>
- Android
 - <https://support.google.com/accessibility/android#topic=6007234>
 - <https://developer.android.com/guide/topics/ui/accessibility/>

Microsoft – Assistive Technology Partners

- “We recognise that third-party assistive technology products – such as screen readers, magnifiers and speciality accessibility hardware – are essential for many of our customers. That's why we work closely with providers to support compatibility with Microsoft technology.”
- Categories
 - Vision
 - Learning
 - Dexterity and Mobility
 - Language and Communication

<https://www.microsoft.com/en-gb/Accessibility/assistive-technology-partners>

Alternative Input Devices

- Keyboards (e.g. ZoomText)
 - Larger keys
 - Smaller keys
 - Alternative layouts (e.g. single handed)
 - On-screen
- Input Devices
 - Replacing the mouse
 - E.g. touchscreens, joysticks, eyetracking



Example

- <https://www.freedomscientific.com/products/blindness/focus-blue-family/>
- Providers:
 - https://at-aust.org/home/assistive_technology/assistive_technology
 - <http://www.zyteq.com.au/products>
 - https://ilcaustralia.org.au/search_category_paths
 - <https://talklink.org.nz/>

Alternative Output Devices

- Screen enlargers
- Braille embossers
- Light signaller alerts
- Text-to-speech

Vision

- Test systems using screen readers (e.g. [JAWS](#) or [Windows Eyes Screen Reader](#) – Vision Australia recommendation)
- Consider font sizes (including the viewing distance)
- Allow for audience to adjust the font size
- Consider contrast ratios (e.g. <http://webaim.org/resources/contrastchecker/>)
- Potential for subtitles with audio and video

Motor Control

- Review:
 - <https://material.google.com/usability/accessibility.html#accessibility-motion>
 - <https://msdn.microsoft.com/en-us/windows/uwp/input-and-devices/guidelines-for-targeting>

What does accessibility mean to you?



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How can anyone use assistive technologies?



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<https://www.australia.gov.au/accessibility>

- “Under the *Disability Discrimination Act 1992*, Australian Government agencies are required to ensure information and services are provided in a non-discriminatory accessible manner.
- *Australia.gov.au* has been designed to meet the Australian Government standard established in respect of this requirement.
- *Australia.gov.au* is currently compliant to Level A of the [Web content accessibility guidelines version 2.0 - external site](#) (WCAG 2.0) standard. It is being upgraded to Double A compliance over time. In some cases, content will be accessible to Level Triple A.
- WCAG 2.0 is a technical standard developed under the Web Accessibility Initiative of the World Wide Web Consortium (W3C).

Accessibility ICT Procurement Standard - Archived

- <https://www.finance.gov.au/blog/2016/09/09/Accessibility-ICT-Procurement-Standard/>
 - Direct text adoption of EN 301 549
 - “The standard will support access to ICT for people with disabilities and provide domestic ICT procurers with accessibility guidelines and certainty.
 - So what does ‘accessible’ mean in the context of ICT goods or services. Put simply, accessible ICT goods or services can be used by all intended users, taking into account their differing capabilities. A person's ability to use technology may be impaired due to various physical, sensory, emotional or cognitive disabilities.
 - Once adopted, the Australian standard can be used when determining technical specifications for the procurement of accessible ICT products and services. This includes generic requirements, ICT with video, ICT with 2-way voice, hardware, web content, software and documentation and support services.
 - The standard will mirror European Standard [EN 301 549](#) and be consistent with the [US Section 508](#) and [WCAG 2.0](#). In terms of next steps, public consultation will occur shortly before the standard can be adopted. It should then be in place before the end of the year and I'll provide updated advice once this occurs

Digital Transformation Agency

[HTTPS://WWW.DTA.GOV.AU/](https://www.dta.gov.au/)



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Standard EN 301 549

- Review: <http://mandate376.standards.eu/standard>
- Accessibility: extent to which products, systems, services, environments and facilities can be used by people from a population with the widest range of characteristics and capabilities, to achieve a specified goal in a specified context of use (from ISO 26800 [\[i.18\]](#))
- NOTE 1: Context of use includes direct use or use supported by assistive technologies.
- NOTE 2: The context in which the ICT is used may affect its overall accessibility. This context could include other products and services with which the ICT may interact.



Web Accessibility Initiative (WAI)



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Web for All

“The social value of the Web is that it enables human communication, commerce, and opportunities to share knowledge. One of W3C's primary goals is to make these benefits available to all people, whatever their hardware, software, network infrastructure, native language, culture, geographical location, or physical or mental ability.” (W3C, 2016)

Web Content Accessibility Guidelines (WCAG) 2.1

- <https://www.w3.org/TR/WCAG21/>
- Stable, referenceable technical Standard.
- 13 Guidelines
 - Organised under 4 principles
 - Perceivable
 - Operable
 - Understandable
 - Robust
- Testable Criteria
- Three levels
 - A, AA and AAA

WCAG 2.1 at a Glance



- **Perceivable**
 - Provide [text alternatives](#) for non-text content.
 - Provide [captions and other alternatives](#) for multimedia.
 - Create content that can be [presented in different ways](#), including by assistive technologies, without losing meaning.
 - Make it easier for users to [see and hear content](#).
- **Operable**
 - Make all functionality available from a [keyboard](#).
 - Give users [enough time](#) to read and use content.
 - Do not use content that causes [seizures](#) or physical reactions.
 - Help users [navigate and find content](#).
 - Make it easier to use [inputs other than keyboard](#).
- **Understandable**
 - Make text [readable and understandable](#).
 - Make content appear and operate in [predictable](#) ways.
 - Help users [avoid and correct mistakes](#).
- **Robust**
 - Maximize [compatibility](#) with current and future user tools.

Section 508

- Review: <https://www.section508.gov/>
- Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794 (d))
- “In 1998, Congress amended the Rehabilitation Act of 1973 to require Federal agencies to make their electronic and information technology (EIT) accessible to people with disabilities. The law ([29 U.S.C. § 794 \(d\)](#)) applies to all Federal agencies when they develop, procure, maintain, or use electronic and information technology. Under Section 508, agencies must give disabled employees and members of the public access to information that is comparable to access available to others. The United States Access Board [discusses the Section 508 law](#) and its responsibility for developing accessibility standards for EIT to incorporate into regulations that govern Federal procurement practices.

Case Studies

DIGITAL ACCESSIBILITY

- Students to read:
 - <https://www.w3.org/WAI/business-case/>
 - What are your thoughts on the different cases?
 - Drive Innovation
 - Enhance Your Brand
 - Extend Market Reach
 - Minimize Legal Risk
- Australian Case – Sydney 2000 Olympics
 - <https://www.independentliving.org/docs5/sydney-olympics-blind-accessibility-decision.html>

Activity

- Students to read:
 - <https://support.apple.com/en-au/HT208944>
- What do you think future products will enable?

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Take Home Message...

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How will you design interfaces in the future to include access
for all?



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Questions



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