Disability and the Ethics of Inclusive User Interface Design

Length: 1 Day (80 min)

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Problem Statement: Designing accessible user interfaces requires understanding a wide range of possible user experiences, and this cannot be done well without input from the communities being designed for.

Learning Objectives:

Students will understand the medical and social models of disability and their relation to design responsibilities.

Students will understand the difference between universal, inclusive, and adaptive design.

Students will understand the principle that good inclusive design requires input from the communities being designed for.

Description: This module begins with two common models of disability, the medical and social models. The implications of the social model for designers are stressed. Three forms of accessible design are then described (Universal, Inclusive, and Adaptive). Students are then asked to navigate an unfamiliar interface modality. The second half of the module discusses inclusivity in terms of community engagement, where it is stressed that designing well for people with impairments requires their input.

Topic 1: Disability and Types of Design

Medical vs Social Models of Disability

There are many different ways to think of disability. Two common approaches are the medical model and the social model. In the medical model, disability is understood primarily as a personal health issue, where one is considered disabled if there is capacity they do not have or that capacity is impaired in some way, compared to some model of "normal functioning." Disabilities, then, are understood as medical issues first, with the design of related products seen as adaptations or mediations to lessen the impact of one's disability on their life. The social model, on the other hand, sees disability as a situation that arises out of a combination of the built environment and people's impairments.[1] In other words, it separates impairment (physical inability, dysfunction, morphological difference, etc.) from disability (not being able to make use of a service, access a building, etc.). While impairment may be a medical issue, disability, on the social model, is first and foremost a result of social practices and how buildings, interfaces, etc. are designed. For an example of the social model, one is disabled not because they require a wheelchair for mobility due to a spinal impairment. Rather, they are disabled by the lack of ramps, elevators, and other design features that would make traversing spaces via a wheelchair possible.

[1] While the social model is generally taken to have surpassed problems with the medical model, it is not without its criticisms. For a summary of its history, advantages, and disadvantages, see Shakespeare, 2017.

The social model of disability puts a certain level of responsibility on designers, because their design choices can literally produce or alleviate disability. Products that, when coupled with certain impairments, produce a situation of disability do harm to the people they exclude from ease of use. If it is possible to have designed the product in a way that did not lead to a situation of disability, then it is in the designers' power to prevent these harms. And generally speaking, when someone has the power to prevent a harm, they should.

Three Types of Accessible Design

While there are many different ways to design products with different abilities and impairments in mind, they can be broadly grouped into three categories, each with various tradeoffs. These three are universal, inclusive, and adaptive design.

Note: this language shifts somewhat depending on usage, and sometimes people will use the terms accessible, universal, or inclusive design to refer to all three under one heading. To refer to all three approaches, we will use "accessibility" or "accessible design" in this module.

Universal design aims to produce a product that is usable by everyone, and where everyone has the same experience. That is, everyone can access the product in the same way, without special adaptations for specific users and get the same result. A building with motion activated doors and lights in each room is an example of universal design because regardless of how one enters a room (walking, wheelchair, etc.), the door will open and the lights will turn on automatically, thereby providing the same experience. While the ideal is that universal design is, well, universal, it is often not possible to design for absolutely every possible user in a way that provides them all with the same exact experience.

Inclusive design aims to produce a product such that it can be used in a variety of ways by a vary of users, such that it produces the same or similar result, but a different experience. For example, video games can be designed to be more inclusive by adding screen reading features. If done well, then any relevant information conveyed via graphics is also conveyed via audio. Visually impaired players are then able to play the game. Sighted and visually impaired players will have different experiences, but a similar result (ideally, enjoying the game). While it may seem like Universal design is ideal and Inclusive design is somehow a compromise, this is not necessarily the case. If, for example, what matters in a video game is that it is an enjoyable exploration of agency for players, then it is perfectly fine that this result is achieved through providing different experiences to different players. Furthermore, sometimes trying to produce a universal solution actually makes the product inaccessible to some.[2]

Adaptive design modifies existing infrastructure or products to increase accessibility. This is generally done by retrofitting existing products with new features. The main difference between this and Universal and Inclusive design is that it is added onto, rather than designed from the ground up for the groups it is supposed to be made accessible to. While this may often be non-ideal compared to Universal and Inclusive options, it may not be possible to simply rebuild a product from the ground up, especially

[2] See for example this article about a failed attempt to produce a universal system for accessibility for video game graphics for people with colorblindness: https://igda-gasig.org/how/platform-level-accessibility-recommendations/do-not-implement-colorblind-filters/

with physical infrastructure. Adding a ramp onto an old building, or a patch that institutes a new accessibility feature for old software would be examples of adaptive design.

Note that while this module focuses on design and disability, universal, inclusive, and adaptive design are not only about designing with disabilities in mind. For example, designing speech-to-text software for a specific language that does not correctly recognize and transcribe dialects of that language would be a failure of inclusive design.

Comprehension questions:

Give students examples of design choices and ask whether they are universal, inclusive, or accessible. Sample questions include:

Case 1: Tactile maps and braille signs are added to a local park to help people navigate it better.

Answer: Adaptive

Case 2: Designers choose to use text boxes for their user information page rather than drop boxes or lists of pre-determined categories.

Answer: Universal

Case 3: A designer includes a colorblind mode option on the touchscreen of a self-checkout device.

Answer: Inclusive

Activity 1: Navigate an Unfamiliar Interface

Either demonstrate or have students try navigating a web browser via an unfamiliar interface modality. If all students in the class are sighted, this can most easily be done by using a Screen Reader (Safari and Firefox have built-in screen readers, Chrome has a free plug-in screen reader available from Google). A screen reader allows a person who is blind or visually impaired to navigate an interface by reading out whatever is currently moused over. If students are navigating the screen reader themselves in class, remind them first to close any window or tab that might contain personal, sensitive, or classroom inappropriate material, such as email, as it may be read aloud by the screen reader.

Discussion 1:

Ask students what they thought of the experience. After getting a few responses, point out that the same feature or design choice can be an example of inclusive or adaptive design, depending on how it is implemented. Ask if they think the layouts of a website, app, or computer interface are designed with screen readers in mind? Would this make the screen reader an example of adaptive or inclusive design? (Answer: if not, adaptive, if so, inclusive). Ask students how the layout of a website might be better designed for the use of a screen reader.

Example of what can be done with a screen reader:

Ross Minor, an accessibility consultant and video game player who is blind, gives an accessibility review of Diablo 4. https://www.youtube.com/watch?v=WUynAuWHx_E The video is somewhat long for class, but the first 5 minutes or so cover much of the details and positives, and a criticism is offered at 16 minutes.

Ross Minor defeats Diablo 4 final boss solo using the screen reader feature: https://www.youtube.com/watch?v=IcYTVThFcos Again, the video is somewhat long, but the first 30 seconds give an introduction, and the sections marked "Lillith Fight Stage 1" and "Lilith Fight Stage 2" contain gameplay footage. The screen reader audio, however, is not included in the footage, as explained in the Introduction.

Topic 2: Community Inclusion

There are many examples of missteps in accessible design. The video game industry has made several attempts to make games more accessible to players with various forms of colorblindness. Important information is often conveyed via color in video games, and this can make certain games unplayable (or at least incredibly frustrating, thereby preventing enjoyment) for players with colorblindness.[3] Many of these attempts, however, have had less than ideal results, sometimes even making games more difficult for people with colorblindness.[4] In particular, the use of whole screen color filters to alter how colors appear has been included in many high-profile games in recent years, yet they are regularly criticized for failing to provide the accessibility they claim to offer. Such filters are not the only possible fix, and several relatively simple design alternatives exist. According to Ó Casaide 2021, people with colorblindness report vastly preferring the option to customize color markers themselves or the use of simple shapes paired with color information.

The people with the most direct expertise on whether an inclusive design choice will be successful are the people for whose use it is being designed. The social model of disability suggests that the way to prevent harms is social inclusion. In terms of design, this means being included in the design process itself, whether as designer if one has the relevant expertise, as a consultant, through test groups, etc.

Disability is not merely being less able than able-bodied people. People with disabilities develop new and different ways of navigating the world. For instance, blind people have different and often more nuanced ways of navigating via sound than do sighted people. To be useful to such groups, user interface design must take these skills into account. If the design team does not have contact with the people and communities they are designing for, they would be unaware of the strategies, skills, and understandings that different groups use to navigate their environments. If you are sighted and we blindfolded you and gave you braille for the first time, it would likely feel counter-intuitive, clunky, etc., whereas for a person without sight who has been reading braille for most of their life, it will be easy and intuitive. (You can ask students here to reflect on **Activity 1** and whether a difficulty they encountered was from lack of familiarity or poor design choices.)

[3] See, for example, https://www.thegamer.com/games-colorblind-cant-play/

[4] For examples, see https://www.gamersexperience.com/colorblind-accessibility-in-video-games-is-the-industry-heading-in-the-right-direction/

Similarly, people's imaginations are often limited by what they find familiar. This can lead to less accessible design when an inclusive alternative unnecessarily preserves details or features only relevant to people who do not need that alternative. The history of braille may be illustrative here. Before braille, it was common to teach students with visual impairments using raised letters, that is, the letters of the alphabet are raised off the surface so that they could be recognized by touch. The idea was that it would give visually impaired students the same information as sighted students, but in a form they could access. This turned out to be incredibly difficult for several reasons, one of which being that many letters felt the same or similar enough as to be very hard to distinguish (Such as C, G, Q, O). Visually impaired students then had greater difficulties learning to read due to the writing system they were being taught (note how this is also an example of the social model of disability). Louis Braille, who was blind, instead developed a system of raised bumps that were much easier to distinguish by touch alone. This system ultimately conveys the same information as being about to see letters does, but in a way that is not similar in its mode of conveying that information but is better adapted to receiving information tactilely. While it is not impossible for a sighted person to have thought up (braille is inspired by a form of tactile writing invented by a sighted person that soldiers could use to read messages at night), a person's imagination is informed and shaped by what they are familiar with. So, it is in some sense harder for a sighted person to have designed such a system of writing as they are 1: likely be limited by what they are familiar with and 2: lack the skills that a visually impaired person would have developed.

While some difficulties can be foreseen, it is unlikely that a person without a specific disability will be able to understand and design for these different skills by way of empathy and imagination alone. These skills are specific to the disabilities, and combinations thereof, that a person or group has. That is, being disabled in one way does not necessary give insight into other forms of disability and the skills people with that second type of disability use to navigate the world. Disabilities are also not merely additive (e.g., getting input from a blind person and a deaf person will not add up to the input of a person who is both blind and deaf). This is why some disability activists adopt the slogan "don't design for us without us." In other words, designing for various groups requires either including members of that group in the design process (whether as designers or consultants), or at least first learning from them.

While this is a limit on what a specific designer should be expected to imagine and create, it is a positive for design in that such input opens new possibilities for design (in addition to the obvious benefits of accessible design on its own). Many features that were implemented for people with specific impairments end up benefiting people without those impairments as well.

Discussion 2 Question:

What responsibilities do designers have to make accessible products?

How might the design process itself be made more inclusive?

Sources and Further Reading:

"Beyond Accessible to Universal Design." Whole Building Design Guide. https://www.wbdg.org/design-objectives/accessible/beyond-accessibility-universal-design

Harden, Bill. 2016. "Colorblind Accessibility in Video Games – Is the Industry Heading in the Right Direction?" https://www.gamersexperience.com/colorblind-accessibility-in-video-games-is-the-industry-heading-in-the-right-direction/

"Inclusive Design." Nielson Norman Group. https://www.nngroup.com/articles/inclusive-design/

International Game Developers Association Game Accessibility Special Interest Group. 2023. "Do Not Implement Colorblind Filters."

Davis, Lennard J., ed. 2016. *The Disability Studies Reader*. 5th edition. New York: Routledge.

Minor, Ross. 2023a. "Diablo IV Blind Accessibility Review: So Much Progress Made!" https://www.youtube.com/watch?v=WUynAuWHx_E

_____. 2023b. "Gamer Without Sight Defeats Lilith for the First Time." https://www.youtube.com/watch?v=IcYTVThFcos

Ó Casaide, Marc. 2021. *An Analysis of Video Game Accessibility Design Focusing on: Gamers with Colour Deficiencies.* Dissertation. https://doi.org/10.13140/RG.2.2.29065.36960.

O'Neill, Rebecca. 2021. "Ten Games People with Colorblindness Can't Play." *The Gamer*. https://www.thegamer.com/games-colorblind-cant-play/

Shakespeare, Tom. 2017. "The Social Model of Disability." *The Disability Studies Reader*. Ed Lennard J. Davis. Fifth Edition. Routledge.