**EC601 Project 4: Societal Impact**

**Accessibility Application Design**

Gianna Iafrate

23 November 2021

Our world today is ruled by technology and devices. Without our devices, such as mobile phones, laptops, or tablets, most of our day-to-day tasks would not be possible. For a lot of people, the usage and accessibility of the devices does not have much thought, for the device itself already provides all minimum necessary tools to perform said tasks. For others, however, the devices must accommodate their various needs through accessibility, whether that be for hearing impairment, speech impairment, or other disabilities. Allowing accessibility designs for applications enhances the usage for everyone, allowing for an equal experience for every person. Today, accessibility in applications and devices has increased tremendously, by following Web Content Accessibility Guidelines, or WCAG. These guidelines are developed “with a goal of providing a single shared standard for web content accessibility that meets the needs of individuals, organizations, and governments internationally[[1]](#footnote-1).” By following these guidelines and reviews of customers, accessibility has grown in many ways over the years.

One of the major areas we see accessibility growing is in our mobile devices, such as iOS and Android. In 2009, Apple added its first accessibility feature to iOS 3, with a VoiceOver function to help those with vision impairments, similar to what Apple has used on the Macbook. While the features have had their ups and downs over the years, we have seen tremendous growth in mobile device accessibility features. According to Apple, approximately one in seven people worldwide have a disability that affects the way they interact with the world and their devices.[[2]](#footnote-2) Recognizing how many user experiences are impacted, Apple has added accessibility options for those disabilities surrounding vision, hearing, physical and motor, and literacy and learning. The VoiceOver feature discussed before can describe people, objects, text, and graphs, as well as allowing screen navigation using a Bluetooth keyboard or trackpad. In addition, the VoiceOver feature allows for braille display by connecting a display through Bluetooth or using the Braille Screen Input on your device. For those with hearing impairments, Apple has enhanced the closed captioning features and implemented a Type to Siri mode, which allows users to utilize Siri, a voice command feature, to type text and perform tasks. In addition to these two areas, Apple has implemented switch control, which allows users to navigate through their devices using certain buttons to switch through and select various features. There are also features for typing feedback, Siri help, and safari reading. The features seen across iOS are also commonly seen across other devices, such as Android, making user accessibility an option for many people, regardless of the application they choose to use.

When looking at state of the art options for accessibility design, the key element is to try to view the product from all user perspectives, regardless of how it may appear to one person. By expanding the horizons of the developers, the accessibility designs will grow to accommodate more people every day. One of the most fascinating additions to iOS was the ability to unlock one’s device while wearing a face mask, which was implemented upon mask mandates and the COVID-19 pandemic. If you are out in public, you are wearing a face mask for majority of the time and, with the latest iPhones using face recognition to unlock the devices, this makes access difficult when in public settings. If you have an Apple Watch and you are wearing it in relative distance to your iPhone, a glance at your iPhone while wearing the mask will unlock your phone. By having your two devices near one another, Apple can confirm that it is you trying to enter the phone and unlock it for you. This feature has been great for me personally, as someone who rides the MBTA every day and needs to unlock their phone on the subway while keeping the mask on. However, just like any new development, the feature is not perfect. It also does not work for those that do not have an Apple Watch or do not have the watch on them at the time. However, that is where the state-of-the-art design comes in; the features will always be changed and updated to accommodate the needs of the users every day.

Another way that features are enhanced and understood are by viewing the reviews of users themselves to understand how they are utilizing the features. In 2018, a study was conducted on the accessibility features for blind and normal-vision users. The study utilized 4 websites and applications for users to navigate and perform tasks. One of the major problem areas found was in navigation for blind users. The study found that “navigation elements do not help users find what they are seeking and the sequence of interaction is not clear[[3]](#footnote-3).” In addition, there were no alternatives to some images, such as a text alternative, and overall unclear functionality and sequencing for even normal-vision users.

Another review conducted was on iOS 11, specifically the accessibility features. This review walked through all the changes this iOS update had for accessibility features, as well as what works and what doesn’t. Some common issues that arose from this review were random cursor movements for braille translation, and Text to Siri communication issues. Even something small like these bugs helps develops understand how the features are performing. Studies and reviews like these help developers understand what works, what doesn’t, and what improvements need to be made. For example, in the latest iOS release, iOS 15, new accessibility features were added for deaf and blind users. For example, the Siri feature has been enhanced, by allowing certain tasks to be performed without using the internet and following-up with someone through text. Siri is also able to be dictated in more languages now as well. The VoiceOver settings in this iOS update also allows access to even more setting and groups certain types of screens together to allow for better interaction and navigation. Another fascinating element that this iOS added was the ability to adjust and set your own visual accommodations. This update comes from the recognition that not all disabilities are alike, and people may need different accommodations. This allows users to create the experience that works best for them. While this update may only include a few refurbishments and improvements, it is expected that updates following this will join the pattern of enhancing user experience for all.

Outside of Apple iOS and other software updates, there are many other applications and services that allow for user accessibility. One amazing application created for those with Diabetes is Dexcom, which connects a blood sugar monitor from your body to a mobile device application through Bluetooth, allowing for constant tracking of your blood level just by opening the app. For someone whose sister is a diabetic, I have seen the ups and downs of this type of application. In some ways, it is amazing. This feature allows diabetics to live an easier life, where they don’t need to perform finger pricks every few hours to see where their levels are at and how much insulin they need to give themselves before a meal. It also has a feature that sets off an alarm on the mobile device if blood sugar levels drop too low. However, like anything else, this application has some downfalls. Sometimes, the Bluetooth connection isn’t perfect, and it can take hours to update and calibrate to the body. It also does not have a long lifeline; the user must replace their Dexcom device and re-calibrate to their mobile device every 10 days. This application and device can also be extremely expensive, which makes accessibility difficult for those that do not have enough financial coverage to utilize this device. Expense is a large barrier in accessibility accommodations when it comes to applications and devices, even though these accommodations should be readily available to all that need it.

Accessibility in devices and applications has proven to be an amazing enhancement that constantly needs updating. Financial burdens and application bugs are two of the largest focus areas when it comes to accessibility features. For devices and applications like Dexcom, this accessibility feature may not be available to everyone due to finances. For iOS and Android updates, small bugs and mistakes in the development software can have a major impact on user experiences that may hinder their device usage. Despite the barriers that developers must climb over, accessibility has drastically improved over the years, and will continue to improve so that all users everywhere have the same experience despite what disabilities they may deal with.

**References**

Carvalho, Dias, Reis, Freire (April 2018). Accessibility and Usability Problems Encountered on Websites and Applications in Mobile Devices by Blind and Normal-Vision Users. *Universidade Federal de Lavras,* <https://dl.acm.org/doi/pdf/10.1145/3167132.3167349>.

Davert, Scott. “What’s New in iOS 15 Accessibility for Blind and DeafBlind Users.” *AppleVis*, 19 September 2021, <https://www.applevis.com/blog/whats-new-ios-15-accessibility-blind-and-deafblind-users>.

Fletcher, Jenna & Rishe, Jenneh. “Dexcom Review: Brand and Products.” *Medical News Today*, Healthline Media, 4 August 2021, <https://www.medicalnewstoday.com/articles/dexcom-review#_noHeaderPrefixedContent>.

Henrey, Shawn Lawton. “Web Content Accessibility Guidelines Overview.” *Web Accessibility Initiative*. W3C, 29 April 2021, <https://www.w3.org/WAI/standards-guidelines/wcag/>.

“Human Interface Guidelines: Accessibility.” *Apple Developer*. Apple Inc., 2021, <https://developer.apple.com/design/human-interface-guidelines/accessibility/overview/introduction/>.

Ingber, Janet. “What’s New in iOS 11.” *American Foundation for the Blind*. November 2017, <https://www.afb.org/aw/18/11/15262>.

Sorrel, Charlie. “How the iPhone made accessibility accessible to everyone.” *Cult of Mac,* 28 June 2017, <https://www.cultofmac.com/488348/iphone-accessibility/>.

“Unlock your iPhone with Apple Watch when you’re wearing a face mask or sunglasses.” *Apple Support*. Apple Inc., 27 September 2021, <https://support.apple.com/en-us/HT212208>.

1. https://www.w3.org/WAI/standards-guidelines/wcag/ [↑](#footnote-ref-1)
2. https://developer.apple.com/design/human-interface-guidelines/accessibility/overview/introduction/ [↑](#footnote-ref-2)
3. https://dl.acm.org/doi/pdf/10.1145/3167132.3167349 [↑](#footnote-ref-3)