Chapter 3
Accessible and Inclusive Content and Applications

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ABSTRACT

As devices have become smaller and more pervasive, usage scenarios that have historically been common for people with disabilities are finding more general application for all users. Overall, the consideration of accessibility improves the usability of applications for all users. This chapter will discuss standards for accessibility, inclusive design, and topics related to the development of accessible mobile content and applications. The discussion will apply to mobile content, such as EPUB documents, and topics related to Web, native, and hybrid applications.

INTRODUCTION

The field of Accessibility is focused on ensuring that every person is able to access information and perform tasks regardless of that person's physical or cognitive capabilities at any given time. Practitioners in this field consider a wide range of capability types and impairment severities, including not only severe physical or cognitive disabilities, but also contextual limitations such as noisy environments.

The history of accessibility in the technology industry dates back to at least 1914, when IBM® hired its first employee with a disability. IBM® also led the evolution of assistive technologies with a Braille printer in 1975, a talking typewriter in 1980, and the IBM® Screen Reader product in the early 1980's (IBM, 2015). While this level of inclusion has been ingrained in companies like IBM®, legislation in this area is fairly recent - the Americans with Disabilities Act (ADA) was passed in 1990 and the Section 508 amendment to the Rehabilitation Act was passed in 1998.

For physical access, most local governments did not build accessible sidewalks and pathways until they were mandated by the ADA. In many cases, the need for these features was not immediately obvious since they do not impact everyone on a day-to-day basis. However, when the need arises, retrofit-

DOI: 10.4018/978-1-5225-0945-5.ch003

ting can be difficult and costly. Due to cost, historical preservation, and other issues, retrofitting is still occurring for many buildings.

Technology access has been a different environment. Due to the rapid turnover of hardware and software, and the relative ease of modification, accessibility has evolved much faster than in the physical space. Additionally, relatively recent technologies, such as the World Wide Web, have improved access to information like never before.

The power of the Web is in its universality. Access by everyone regardless of disability is an essential aspect. (Tim Berners-Lee, 1997)

Now that mobile devices are commonplace, the universality of access has been unshackled. It is no longer available only from the desktop in your home, it is also available from the phone in your pocket.

This mobile evolution has brought two areas of Accessibility closer together. People who rely on assistive technologies are able to participate in ways that have been historically unavailable to them. On the other hand, as people are performing more tasks on devices that are smaller and using them in situations where they may not be able to look at or hear the device, these individuals require assistive technologies that have traditionally focused on people with severe disabilities.

In a less-obvious manner, our perception and abilities have not evolved, but we are using devices that are smaller than ever before. Therefore, there is a strong desire from all users for day-to-day interactions with their devices to become personal, aware, and cognitive. When outdoors, our displays need to be brighter, and when in noisy environments, the sound may need to be louder or captions may need to be provided.

Technology should adapt to humans, not the other way around. Multimodal interactions provide another interaction pattern to consider. If the same operation can be performed via various modalities, users have more flexibility and choice in how they perform the operation. During multi modal interactions, the systems also need to prioritize and be selective about how to respond to and process interactions in order to avoid accidental input. Humans are easily able to switch and prioritize. Devices will have to be smarter about processing. To some extent, multimodal interaction is already available. However, the means to enable these interactions needs to be further simplified. Development tends to prefer simplicity, so the means to enable accessibility will have to be simplified to the extent that this blends in with new development paradigms.

Wearable devices present another technology that can improve access for the general population and also for people with disabilities. Early wearable devices are similar to wristwatches and add abilities to provide feedback via vibrations and provide input via tap. Some companies are already building devices that can be woven into fabric, allowing for the integration of sensors and feedback in clothing, shoes, jewelry, glasses, etc. Each of these provides new opportunities for a user to interact with devices.

While the possibilities are endless, it is up to the technical community to prioritize simplification and enablement of accessibility. Sometimes more gadgets is not the answer; simplifying the existing ones and investing the time to understand the usage patterns can yield good results.

Many of the technologies that have enabled the mobile evolution have their roots in accessibility. Those with vision impairments leverage magnifiers and zoom technologies. Text-to-speech technology has provided additional information channels for those who are blind or have visual or cognitive impairments. Speech recognition has provided an input mechanism for those who cannot type, such as people with physical impairments.