THE ACCESSIBILITY AND MOBILE APPS STORY

Once upon a time, cell phones could only make and receive calls. Nowadays, people are using cell phones for so much more than just verbal communication. They can reach out to those around them via texts and e-mails, read up on current events, browse the web, check the weather forecast, listen to music, snap pictures, play games, and so much more. Apps (short for mobile applications) have not only granted the public access to an abundance of information and entertainment, but they have also provided individuals with disabilities with an entryway to greater independence and productivity. Apps have revolutionized the ways in which individuals with disabilities can perform day-to-day tasks, communicate, interact with other people and become involved in their communities. There is no telling how many more doors to accessibility developers will open for individuals with disabilities through mobile apps. All we know for sure is that this is not the end.

How We Got to This Point

In 1983, the Motorola DynaTAC 8000X made its marketing debut as the first portable cellular (cell) phone. Measuring 13" x 1.75" x 3.5" and weighing about 2.5 pounds, the Motorola DynaTAC 8000X, commonly referred to as the "brick," was a revolutionary innovation. It not only allowed users to make and receive calls for the first time while on the go, but it served as the catalyst that catapulted the advancement of mobile communications.

From Functional to Entertaining

It wasn't long before the first "time-waster" games, like Snake, Pong, and Tetris began lighting up mobile screens. As more and more people got on the mobile bandwagon, cell phone prices dropped, reception areas grew, and demand for more features and games increased. To respond, developers found the Wireless Application Protocol (WAP).

From Entertaining to Informational

The WAP, which is a stripped-down version of the basic protocol of the World Wide Web, allowed users to access the news, stock market quotes, and sports scores on their phones. It also allowed them to personalize their phones with WAP applications such as wallpaper and ring tone catalogues. However, WAP browsers were slow and expensive, so development continued.

In 1993, Bellsouth introduced the IBM Simon - a mobile phone that had a personal digital assistant (PDA), calculator, address book, and faxing capability. And in 2002, the mobile industry unveiled the first Smartphone, a cellular phone with advanced functionality in addition to standard functionality.

Smartphones: Functional, Entertaining, and Informational

The same operating systems that run desktop computers and laptops (e.g., Linux and Windows) were embedded into Smartphones, essentially making them handheld computers. Users can access the Web at higher speeds, view and edit documents, download files, create music playlists, or manage multiple email/messaging accounts.

Emergence of Apps

The smartphone's operating system is also a platform where developers can run apps. Given how convenient and accessible apps are, it is no wonder that apps have become increasingly popular over the years.

According to Portio Research, more apps were downloaded in 2012 than in the previous five years combined. Additionally, they predict that an excess of 200 billion apps will be downloaded by 2017.

These figures should come as no surprise given the diverse array of mobile apps that are currently available. According to Statistic Brain, as of July 2014 the breakdown of the app market by category was:

- Games - 23%
- Entertainment - 11%

Top Smartphone Apps Of 2014

1. Facebook
2. Google Search
3. YouTube
4. Google Play
5. Google Maps
6. Gmail
7. Facebook Messenger
8. Google+
9. Instagram
10. Music (iTunes Radio/iCloud)

Source: Nielsen

- Utilities - 10%
- Education - 7%
- Productivity - 5%
- Book - 5%
- Lifestyle - 5%
- Reference - 4%
- Healthcare & Fitness - 4%
- Travel - 4%
- Music - 3%
- Navigation - 3%
- Sports - 3%
- Business - 3%
- Finance - 3%
- Photography - 2%
- Social Networking - 2%
- News - 1%

Increasing Accessibility through Apps

In addition to serving as entertainment and informational platforms, mobile devices have been a revolutionary new platform for assistive technology (AT). There are hundreds of apps relating to disabilities and health. These tools provide valuable information on topics concerning disability and/or health issues and offer many individuals with disabilities the support they need to live more independently, communicate more effectively, and increase their quality of life.

Most apps target one or more aspects of disabilities, and address single or multiple needs. Here are some of the popular disability-related apps that are for sale at various app stores, categorized by disability type:

Blind/Low-Vision:
- TapTapSee - This app is designed to help individuals who are blind or visually impaired to identify objects. After the individual has taken a picture of an item in front of him/her, the application will identify it and speak the object name back to the person.
- LookTel Money Reader - This app "instantly recognizes currency and speaks the denomination" aloud, enabling people who are blind or have low vision to identify and count bills.
- WalkyTalky and Intersection Explorer - Both of these Google driven apps help people with visual impairments navigate unfamiliar streets and communities. Both apps sync with Google Maps to deliver directions in spoken instructions based on the user's location.

- Color ID and Color Identifier - Using the smartphone's camera to identify colors, both these apps enable people with visual impairments to coordinate their wardrobes and interpret the limited light and images they may be able to see.

Deaf/Hard of Hearing:

- Voice Dream Reader - This app can interpret spoken words into text for those with hearing impairments. SpeechTrans Ultimate for Hearing Impaired - This speech recognition app enables individuals with hearing impairments to conduct real-time two-way conversations without the need for sign language or an in-person translator. When the speaker talks into the user's mobile device, the speech is converted into text that automatically appears in the user's device. The user can then respond by typing in his or her message.
- SoundAMP - This app can turn the phone into an amplified/noise cancelling listening device. By plugging in headphones and launching the application, individuals who are hard of hearing can experience an increased sound volume. Users benefit from 'boost' mode, which amplifies higher frequency sounds, and a 'zoom' mode, which reduces background sound levels.

Communication and Developmental Disabilities:

- Proloquo2Go - This app is a communication solution for people who have difficulty speaking. It offers text-to-speech voices and up to 8,000 up-to-date symbols.
- Tap to Talk - This app turns the phone into an AAC (augmentative and alternative communication) device, allowing the user to click on words or symbols to verbally communicate with others. It's especially helpful for people with autism or cerebral palsy, as well as any speech-preventing conditions.
- Make Sentences - This is an interactive language app that teaches young children how to construct simple sentences from a collection of words by using the Applied Behavior Analysis method of intervention delivery to children with developmental disabilities, special education needs, or autism.
- iConverse - This app is geared for young children and other individuals with communication disabilities to indicate basic needs. Users can click on icons representing six basic everyday needs (bathroom, drink, food, sick, break, and help) to help others understand their needs.

Physical Disabilities:

- Dynamic Controls - This app turns an iPhone into a remote control for power wheelchairs. It connects to the chair over Bluetooth to allow the rider to control several aspects of the chair through an intuitive interface.
- Tecla Shield DOS™ - This app is specifically designed for individuals who have difficulty using a touch-screen (e.g., individuals with spinal cord injuries, multiple sclerosis, Amyotrophic Lateral Sclerosis, muscular dystrophy, cerebral palsy, brain injury, stroke, etc.). With Tecla, people can use their external switches or

the driving controls of their powered wheelchair to send and receive e-mail and text messages; browse the web; read books; access environmental controls (e.g., temperature, TV, etc.); make phone calls; and enter text and commands with their voice.

These apps are just the tip of the iceberg. There is a vast expanse of apps currently under development that are intended to extend accessibility even further for individuals with disabilities.

Future of Apps

Here is a sneak peak of two apps that are currently under development:

App Warns of Obstacles for People with Vision Disability

Researchers at the University of Alicante in Spain developed an app that warns individuals who are blind or visually impaired about obstacles that might be in their way, to help them better navigate through their surroundings. The phone's built-in 3D camera has two lenses, which allows the software to estimate the distance to objects within its field of view. When the app calculates that an object is closer than six feet, the phone vibrates or sounds a tone. The frequency of vibrations or sound level increases as the obstacle gets closer. A full version of the app is expected to be available in 2015.

Smartphone App Detects Bipolar Disorder Mood Swings Via Voice Analysis

*University of Michigan (U-M) research suggests that s*ubtle changes in one's voice could act as early warning signs of need for care for those affected by bipolar disorder. U-M researchers hope the app will eventually give people with bipolar disorder and their health care teams an advance warning of the changing moods so that it may be possible to intervene early. The app is based on machine learning and speech analysis programs. It still needs much testing before widespread use, but early results from a small group of patients show its potential to monitor moods. They call the project PRIORI, because they hope it will yield a biological marker to prioritize bipolar disorder care to those who need it most urgently to stabilize their moods.

Many more apps will likely be developed in the next few years. Even if there is no app available today that addresses your needs, perhaps there will be tomorrow. This is not a fairy tale -- keep checking back and you may one day find your happy ending!

Resources

- Apps for Windows Phone can be found at: http://www.microsoft.com/windowsphone/en-us/apps/default.aspx
- Apps for Apple devices such as iPod, iPad and iPhone can be found at the Apple App Store for:
  - iPhone: http://www.apple.com/iphone/apps-for-iphone

- o iPad: http://www.apple.com/ipad/apps-for-ipad
  - o iPod Touch: http://www.apple.com/ipodtouch/features/app-store.html
- Apps for Android Devices can be obtained from: https://market.android.com
- Apps for BlackBerry at BlackBerry's App
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