

Mobile Accessibility

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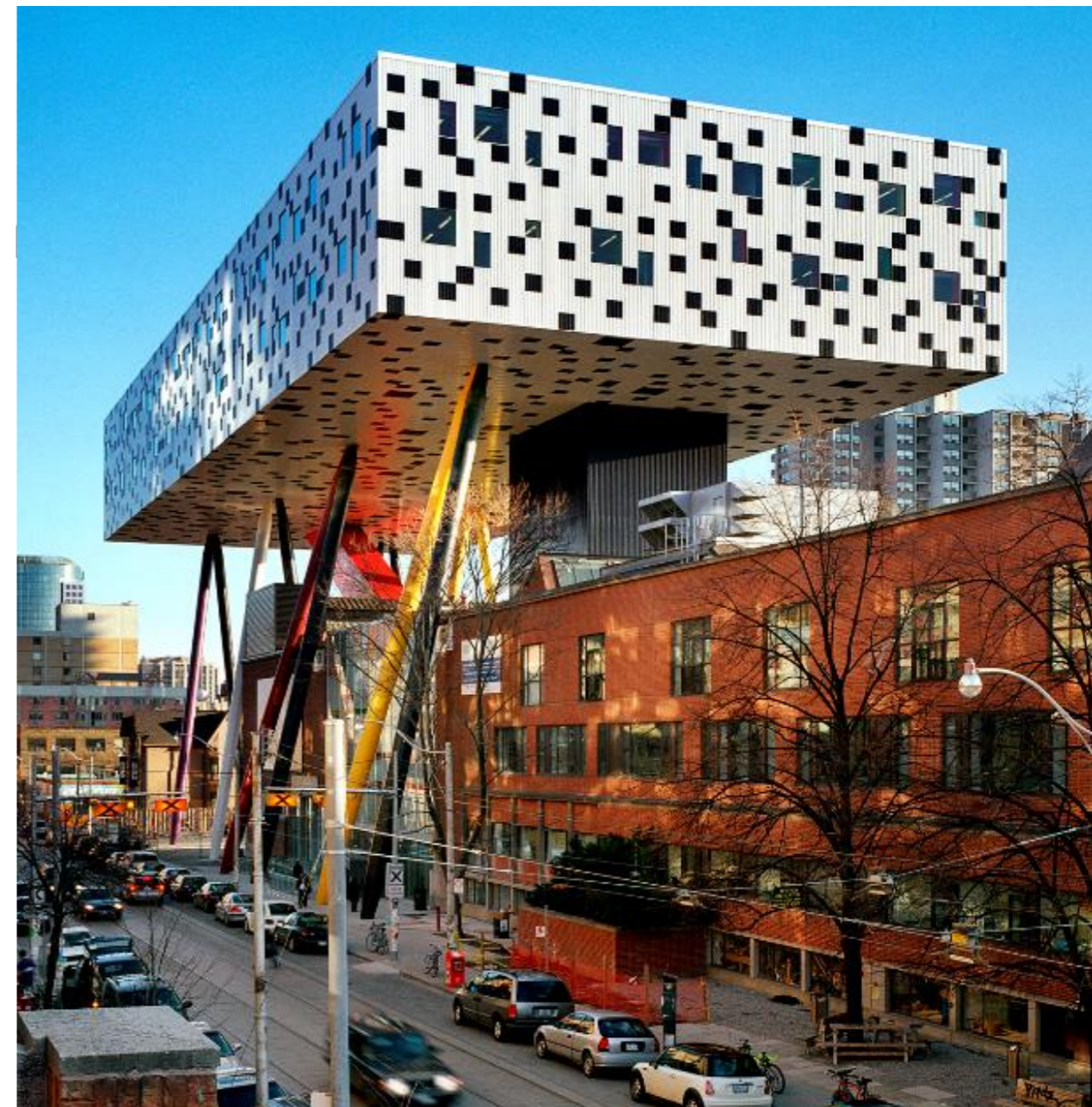
Inclusive Design Research Centre

OCAD University



Overview

- I work at the **Inclusive Design Research Centre (IDRC)**.
 - Located at **OCAD University** in downtown Toronto.
- I research and consult in the area of **mobile accessibility**.
 - With the goal of making mobile devices usable by the widest range of users!



Overview

- Students are on-line and mobile and they expect their educators to be as well.
- This is a challenge, but also an opportunity to provide information and education in accessible new ways.



Overview

- Inclusive Design and Mobile Devices
- Classes of Mobile Devices
- Built-in Accessibility Features
- Support for Peripherals
- Accessibility Apps
- Developing Accessible Apps
- Mobile Enablement

Mobile Accessibility

INCLUSIVE DESIGN AND MOBILE DEVICES

What is Inclusive Design?

- **Inclusive design** recognizes that the **accessibility of any activity**, depends on the **goal**, the **environment** and the person's **abilities**:



Mobile Device Accessibility

- While some people experience disabilities regularly, **everyone** experiences disabling situations sometimes. Due to:
 - Injury
 - Environment (cold, glare,...)
 - Distraction
- And these are more **common** with mobile devices because we take them **everywhere!**




Getting Mobile

CLASSES OF MOBILE DEVICES

Basic Phones

- **Pros:**

- ✓ Cellular only 
- ✓ Phone calls, text messages
- ✓ Long battery life (several days)
- ✓ Flip-phones are intuitive to call/hang-up
- ✓ Familiar physical phone keypad

- **Cons:**

- ✗ Very limited internet
- ✗ Very limited apps
- ✗ Very limited accessibility features
- ✗ Difficult to type text messages without a QWERTY keyboard



Smartphones

- **Smartphones** are a combination of a pocket-sized computer and a basic phone.
 - They have an operating system (OS) and run software applications like a laptop.
 - And they can make phone calls and send text messages like a basic cell phone.
- The main smartphone operating systems are (in order of sales):

 Android

 Apple iOS



 Windows Phone

 Blackberry OS



Smartphones

- **Pros:**

- ✓ Cellular and WiFi  
- ✓ Phone calls, text messages, Internet, email, etc.
- ✓ Lots of apps!
- ✓ Accessibility features



- **Cons:**

- ✗ Short battery life (~1 day)
- ✗ Small screen can make extended reading difficult



Large Smartphones (“Phablets”)

- **Pros:**

- ✓ Cellular and WiFi  
- ✓ Phone calls, text messages, Internet, email, etc.
- ✓ Lots of apps!
- ✓ Accessibility features
- ✓ Larger screen is easier for reading easier
- ✓ Some include a stylus

- **Cons:**

- ✗ Short battery life (~1 day)
- ✗ Can be hard to hold during phone calls

 Android


 Windows Phone



Tablets

- **Pros:**

- ✓ WiFi 

- (Cellular models are available for additional cost)* 

- ✓ Internet, email, etc.

- ✓ Lots of apps!

- ✓ Accessibility features

- ✓ Extra-large screen is easier for reading

- ✓ Battery life (~3 days)

- **Cons:**






- ✗ Too large to carry in a pocket



Mobile Device Accessibility

- There are three types of features that improve mobile device accessibility:
 - ✓ Built-in accessibility features
 - ✓ Support for peripherals
 - ✓ Accessibility apps

Device groups:

-  Basic Phones
-  Android
-  Apple iOS
-  Blackberry
-  Windows Phone



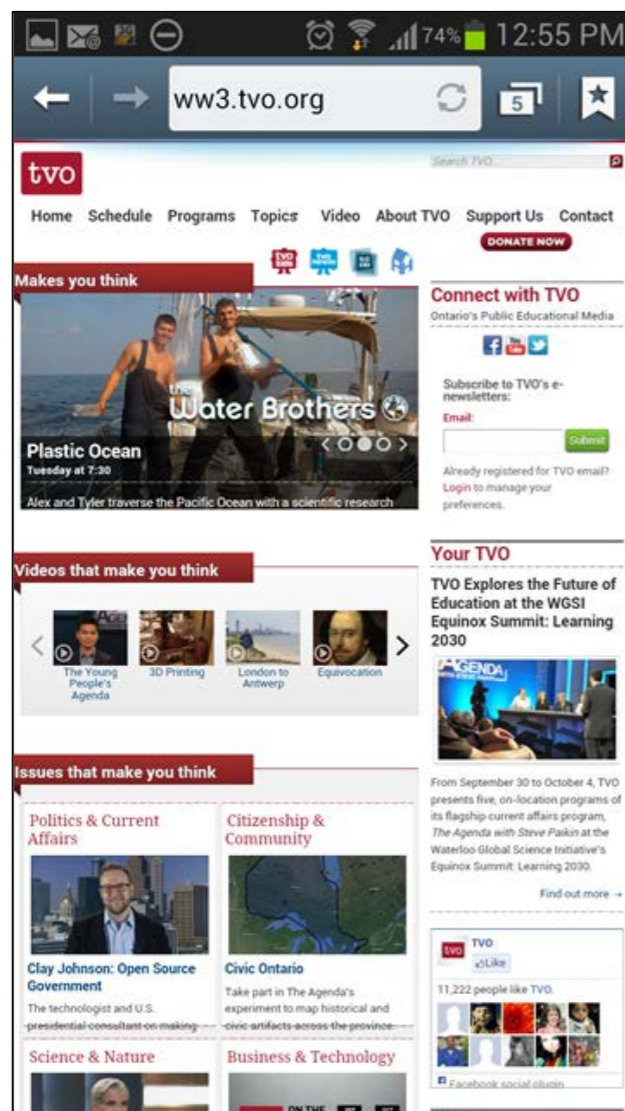
Mobile Accessibility

BUILT-IN ACCESSIBILITY FEATURES

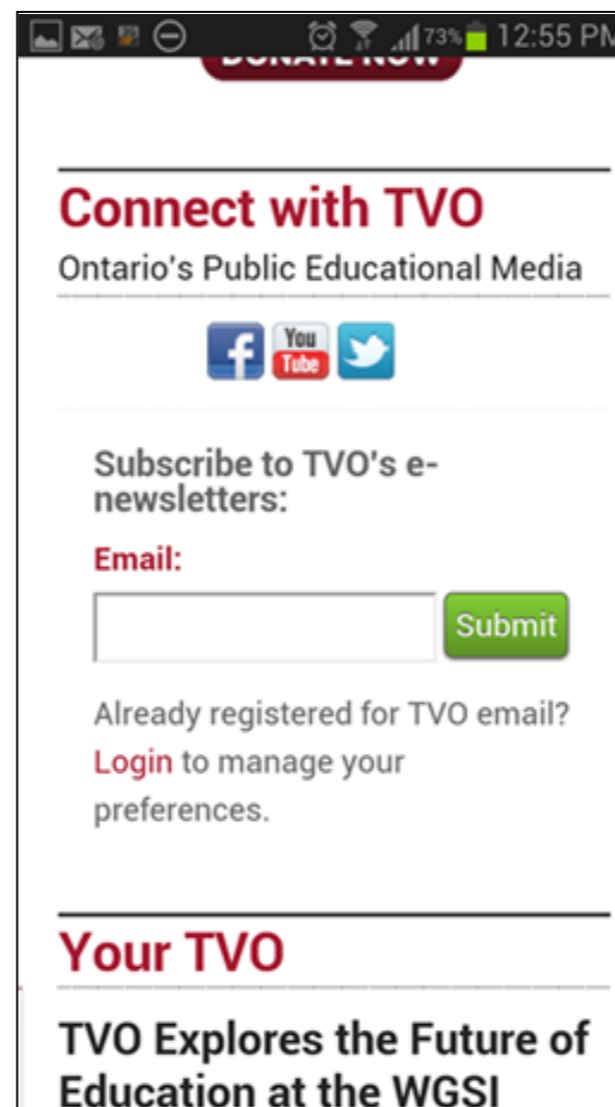
Built-in Feature: Vision

- **Screen magnifiers and high contrast modes.**

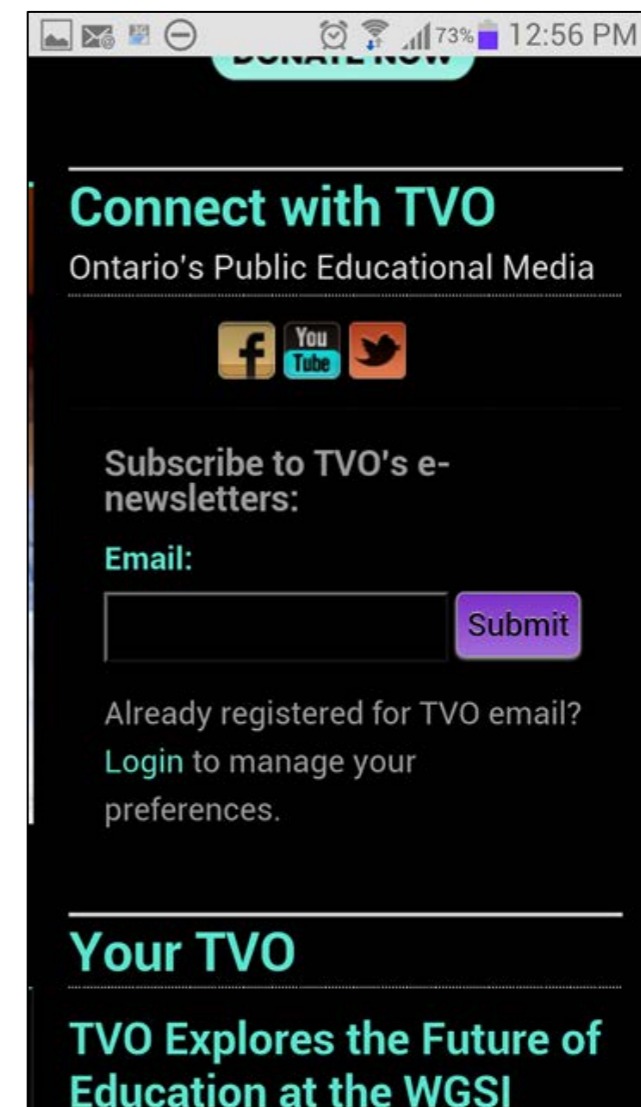
Original:



Zoomed:



Zoomed, high contrast:



Built-in Features: Vision

- **Screen readers** can read out all of the text on the screen.
 - Not to be confused with systems that read only certain text (e.g. menu items)



Built-in Features: Vision & Mobility

- **Voice Control** allows you to make certain actions by voice, e.g.:
 - call phone numbers
 - make Internet searches
 - compose text



1,063 feet (324 m)

Height of Eiffel Tower



[Eiffel Tower - Wikipedia, the free encyclopedia](#)

en.wikipedia.org/wiki/Eiffel_Tower

However, because of the addition, in 1957, of the antenna atop the **Eiffel Tower**, it is now **taller** than the ...

[Gustave Eiffel](#) - [Category:Eiffel Tower](#) -

[Eiffel Tower](#)

www.tour-eiffel.fr/

9h30 à 23h00 - 9h00 à 00h00 l'été. Cale Préparer sa visite. Cale Explorer la tour **Eiffel** ...



Built-in Features: Easy-to-Use

- Simplified and/or image-intensive user interfaces.



Other Built-in Features

- Volume settings
- Choice of alerts (audio, visual or vibrating)
- Tactile markers on keys
- Auto-answer and any-key answer
- Speakerphone
- Stylus support
- Etc. etc.



Mobile Accessibility

SUPPORT FOR PERIPHERALS

Support for Peripherals (Mainstream and Assistive)

Headsets:



Keyboards:



Mice:



Braille Displays:



Switches:



Hearing Aids:



Assistive Peripheral: Hearing Aids

- There are several ways mobile devices can be **Hearing Aid Compatible (HAC)**:
 - **Acoustically (via Microphone)**: Look for a microphone (M) rating of M3 (less clear) or M4 (more clear).
 - **Magnetically (via a Telecoil)**: If you have a hearing aid or cochlear implant with a “telecoil”, look for a telecoil (T) rating of T3 (less clear) or T4 (more clear).
 - **Bluetooth**: Hearing aids have just begun to appear that utilize communication via Bluetooth.

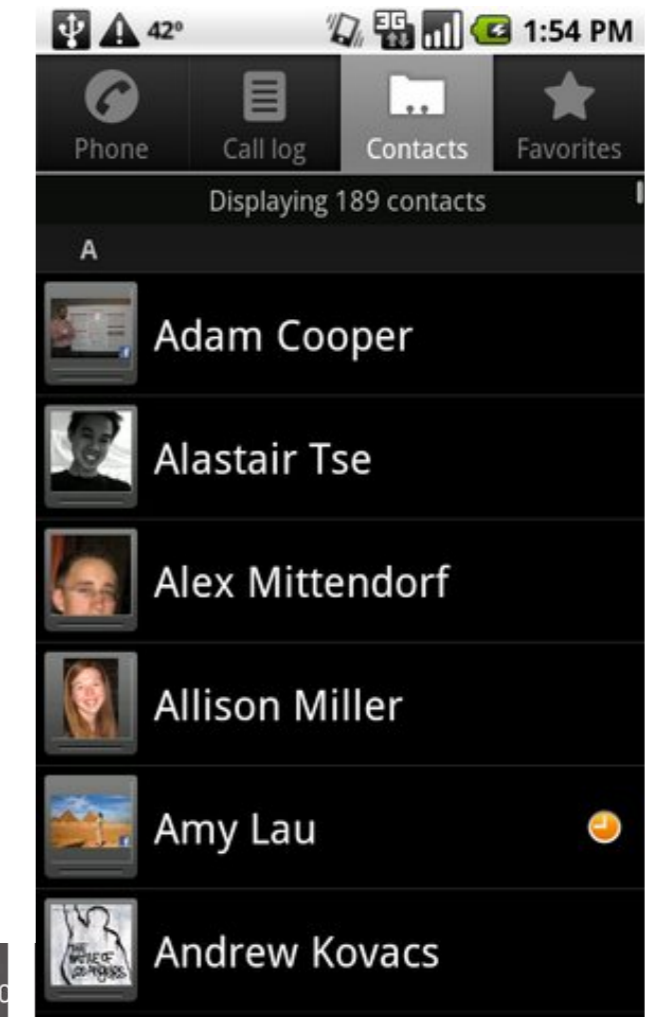


Mobile Accessibility

ACCESSIBILITY APPS

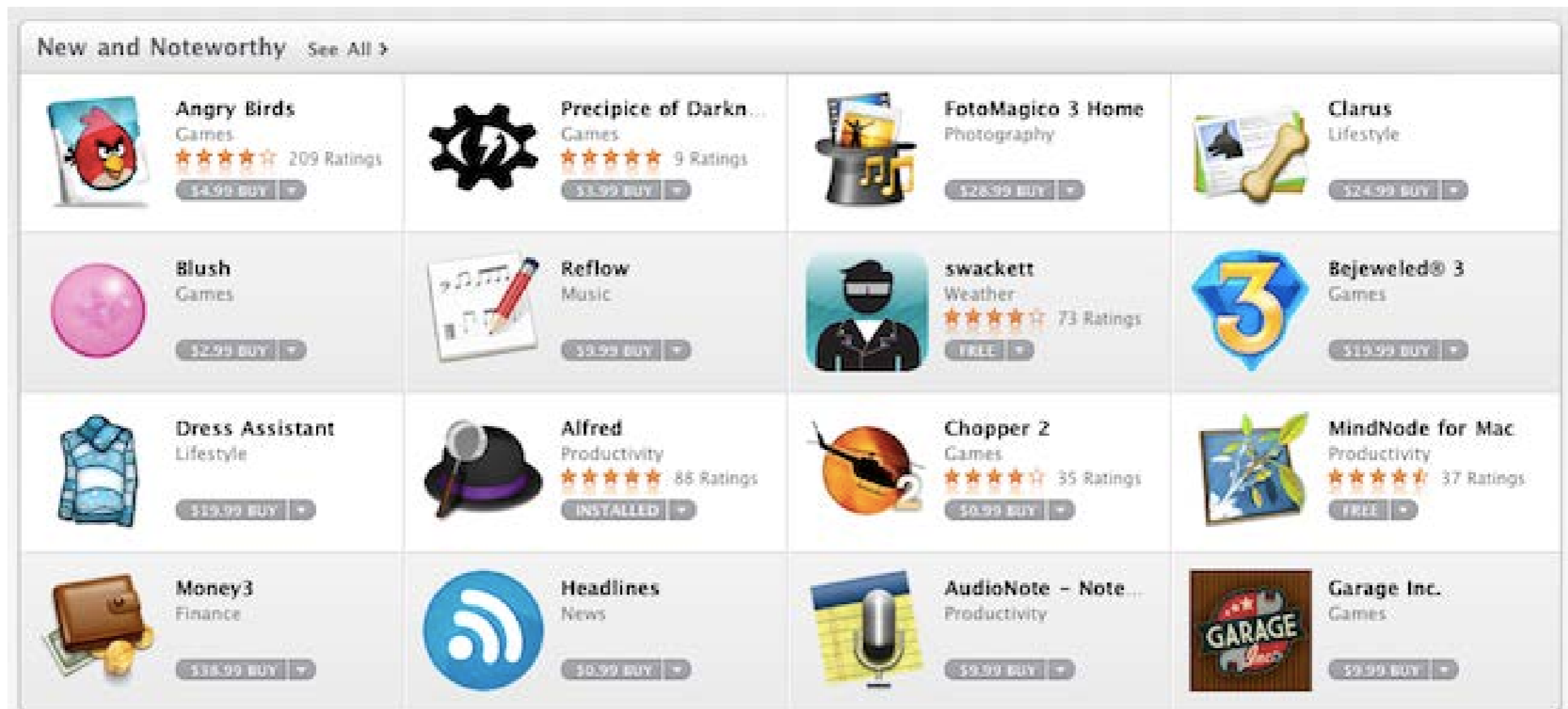
What are Apps?

- “**Apps**” are computer programs for smartphones.
- Some apps are built-in:
 - Phone
 - Text messaging (for “texting”)
 - Contact List
 - Camera
 - Photo Album
 - Calendar
 - Notes
 - Calculator
 - Email
 - Web browser



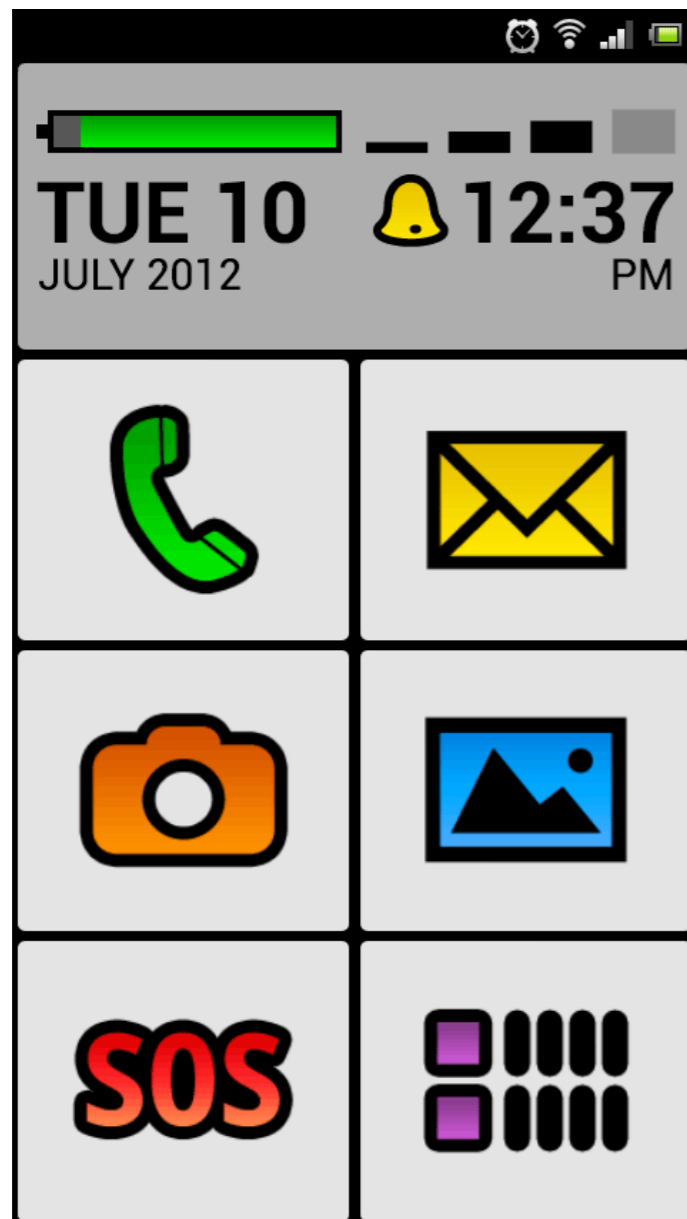
App Stores

- Many other apps (millions of them!) can be downloaded from **“App Stores”**
 - Links to the appropriate app store for your device will come pre-installed.



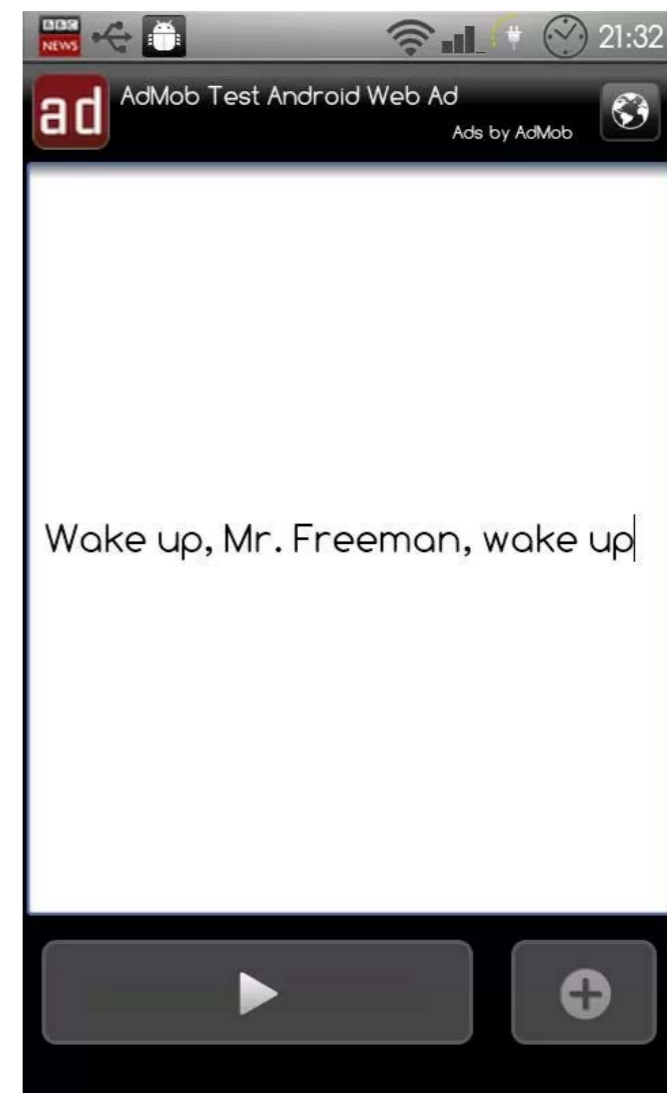
Accessibility Apps: Vision

- **Examples:** Big Launcher, Colour Detector



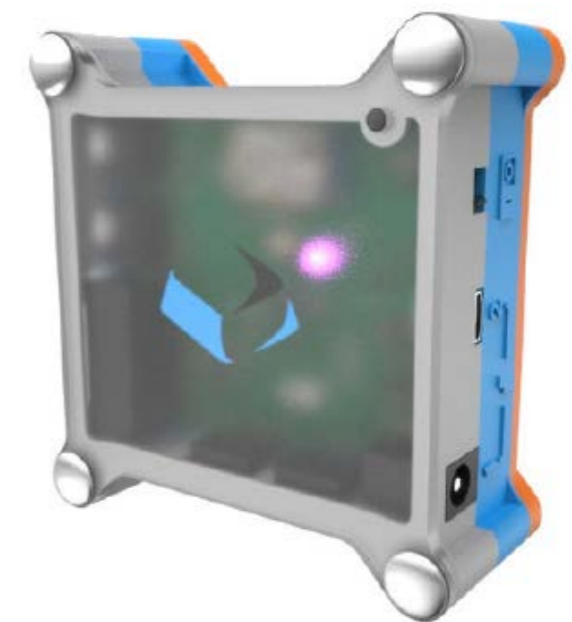
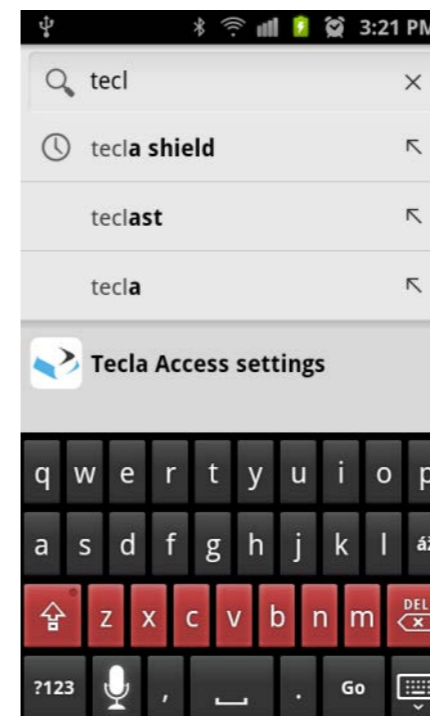
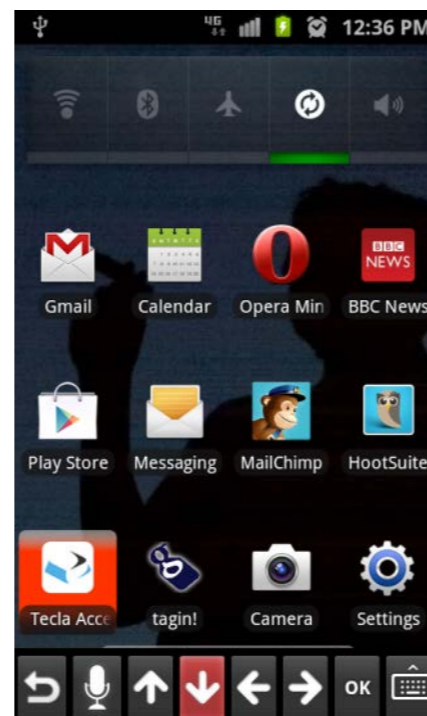
Accessibility Apps: Hearing

- **Examples:** FaceTime, Skype, Speak It



Accessibility Apps: Switch Access

- Access to mobile devices by people with severe mobility impairments via products such as Tecla Access* for Android and iOS.



***Disclosure:** Tecla Access is a joint effort between IDRC (where I work) and Komodo OpenLab.



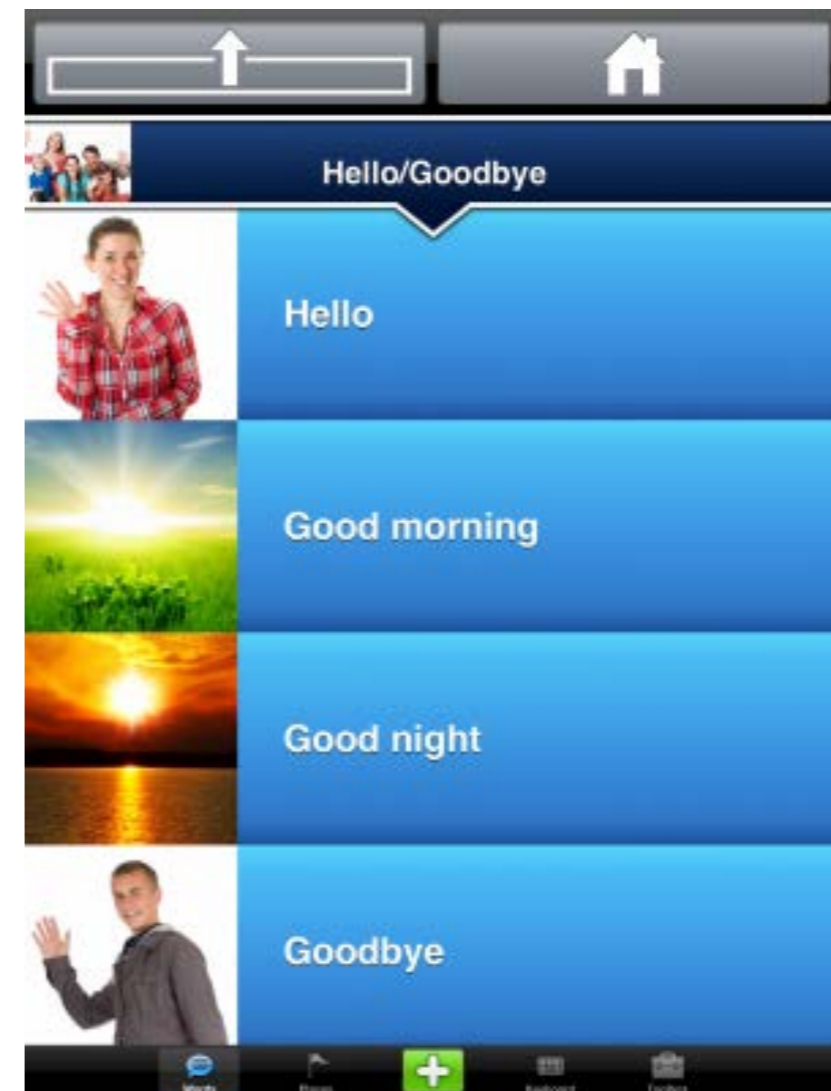
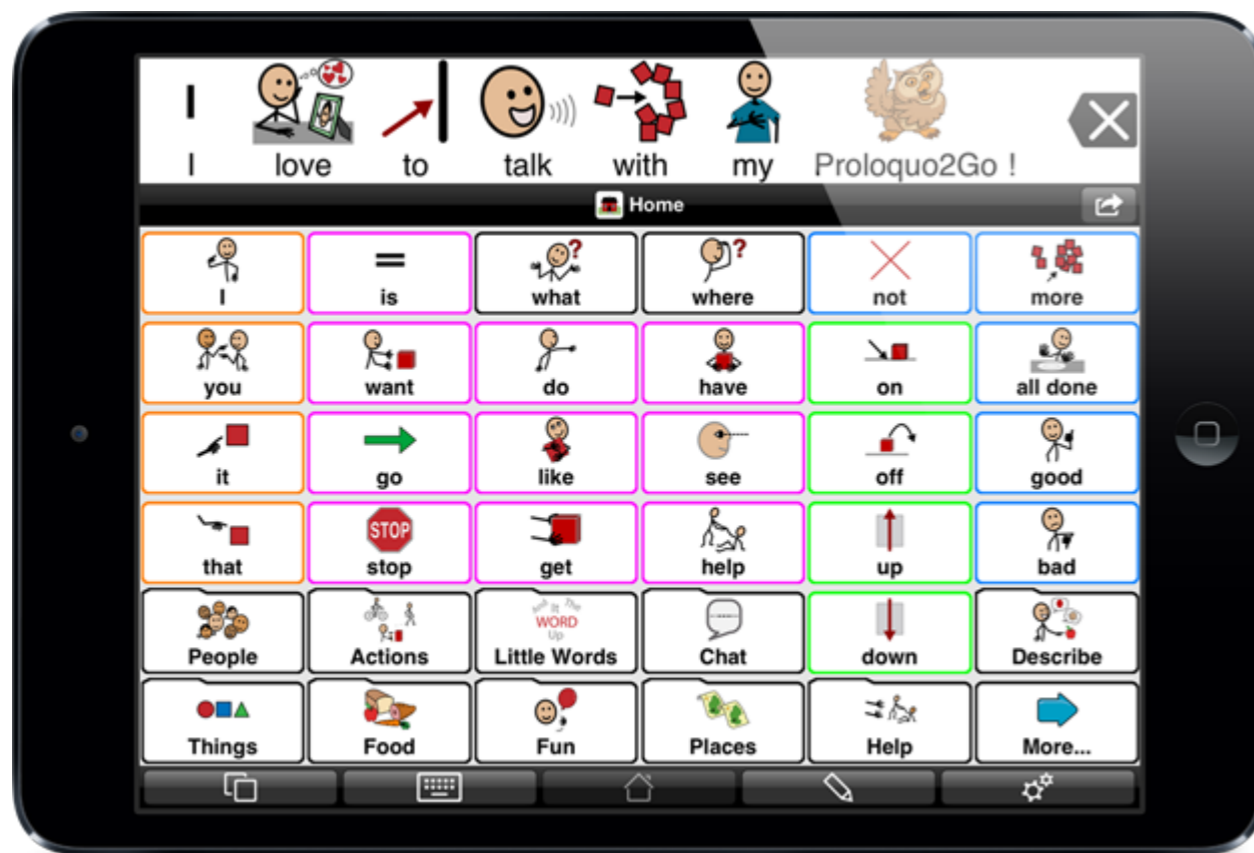
Accessibility Apps: Mobility

- **Examples:** Tecla Access (for Android), Planat



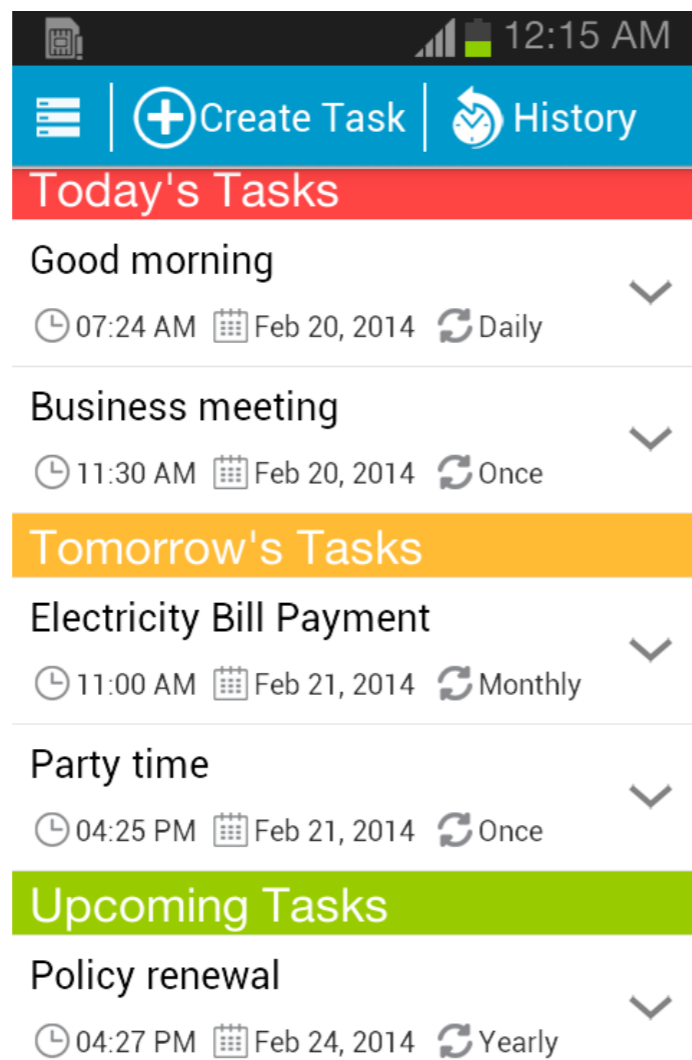
Accessibility Apps: Speech

- **Examples:** Proloquo2Go, MyVoice



Accessibility Apps: Memory

- **Examples:** To Do Reminder, PhotoMind



Introduction to Mobile Accessibility

DEVELOPING ACCESSIBLE APPS

Mobile App Architectures

- **Mobile web apps** are web pages, including interactive web content, that are optimized for display on mobile browsers (e.g. iOS Safari, Firefox for Android), typically regardless of mobile operating system.
- **Native apps** are software applications that are programmed specifically to run on a particular mobile operating system (e.g. iOS, Android, etc.). Native apps are installed by users from online app stores (e.g. iTunes, Google Play) and are launched directly from a device's apps list.
- **Hybrid apps** are native apps that are built using web technologies that are rendered via embedded browser widgets.

Recommended Mobile Accessibility Practices

- Many of the same requirements as for “desktop” web.
- Follow **WCAG 2.0** at Level A or AA.
 - This matches the AODA’s web content requirements.
- Consult the **BBC Mobile Accessibility Guidelines v1.0**
- Native apps must also follow **platform-specific guidance** provided by the various platform managers.
 - iOS, Android, BlackBerry OS, Windows Phone
- Test with users with disabilities.

WCAG 2.0

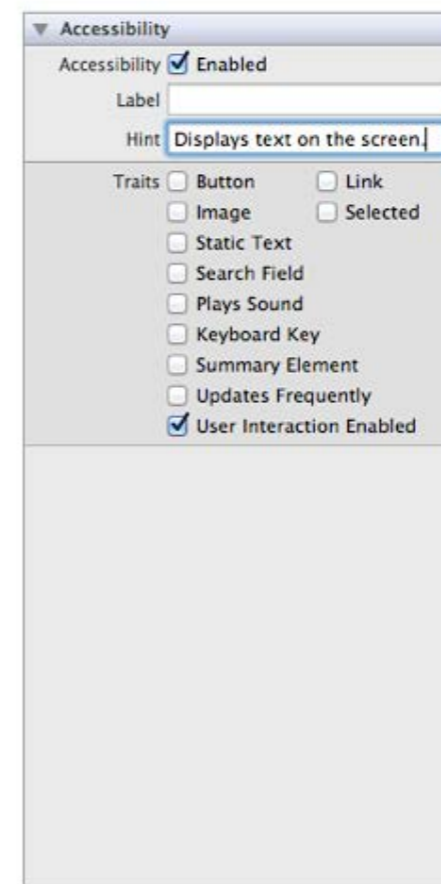
- **Principal 1: Perceivable** - Information and user interface components must be presentable to users in ways they can perceive. E.g.
 - Images are labelled with alt-text
 - Form fields are properly labelled
 - Videos have captions
- **Principle 2: Operable** - User interface components and navigation must be operable. E.g.
 - Operable with keyboards, switches, etc.
 - Adjustable timing
 - Visible focus

WCAG 2.0

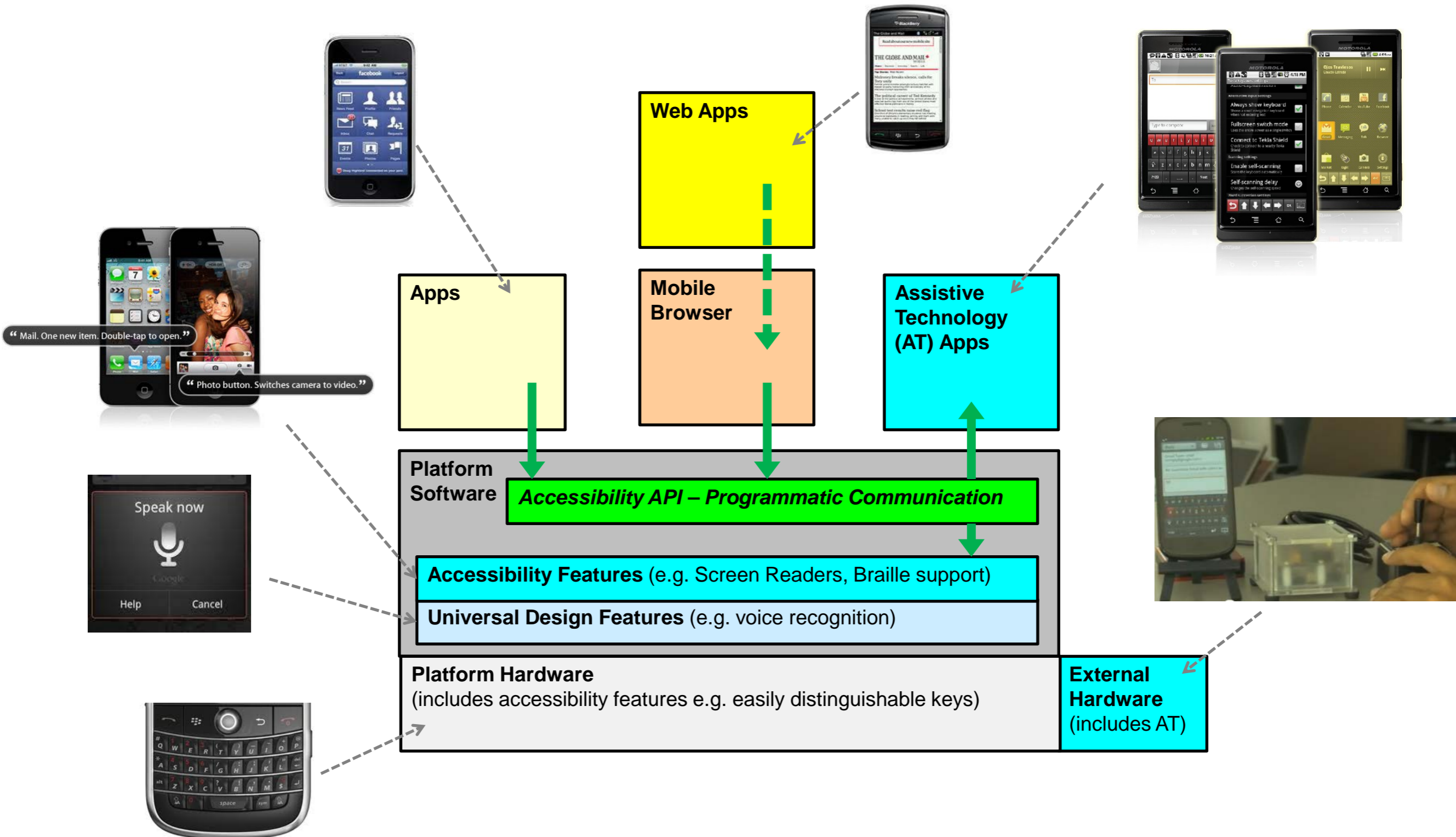
- **Principle 3: Understandable** - Information and the operation of user interface must be understandable. E.g.
 - Predictable user interface behavior
 - Headings and labels
 - Input assistance
- **Principle 4: Robust** - Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies. E.g.
 - Markup content is properly formed
 - Custom components properly communicate their name, role, state

Tools are Available

- There are developer tools available to help ensure accessibility (e.g. iOS Interface Builder)



Review: Mobile Accessibility Stack (Simplified)



Introduction to Mobile Accessibility

MOBILE ENABLEMENT

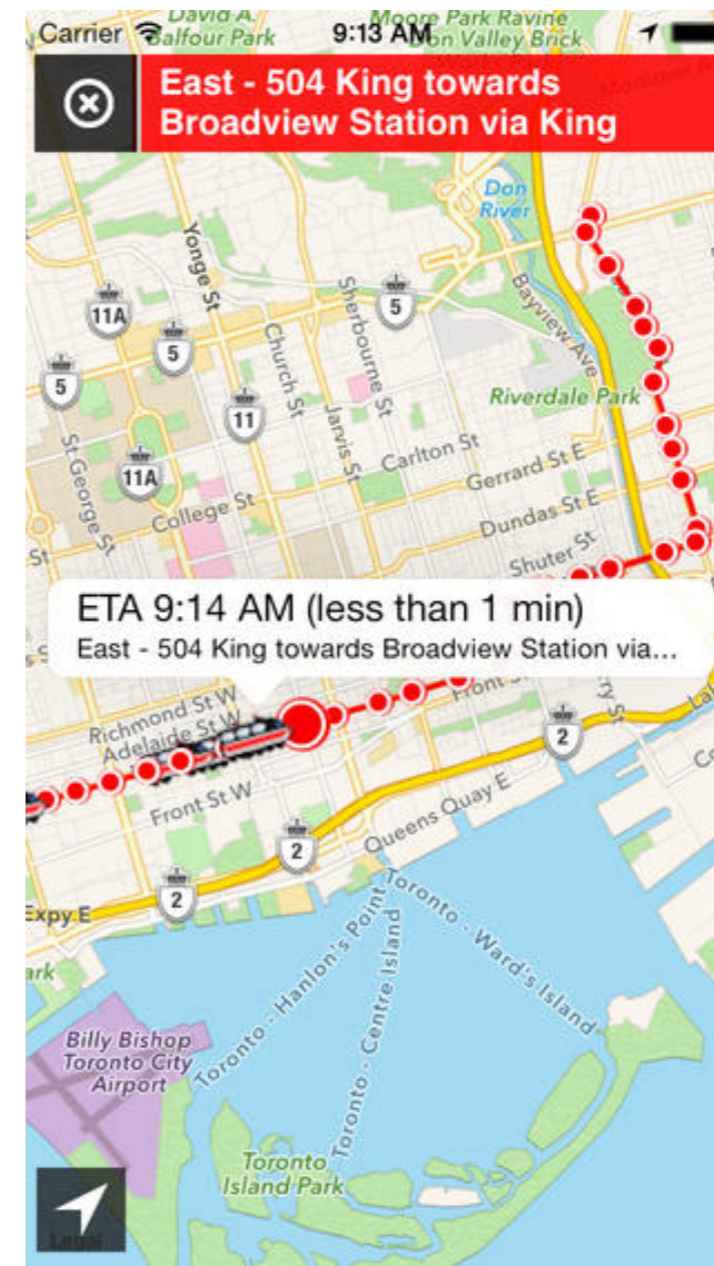
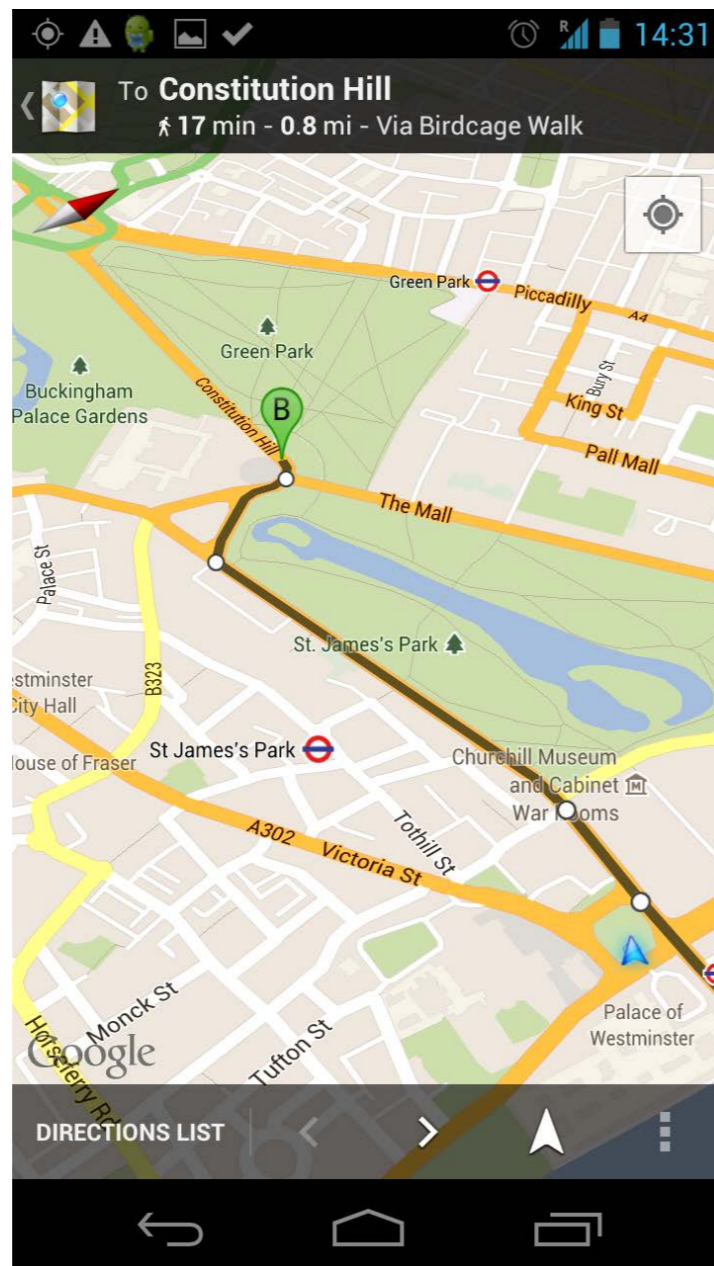
Mobile is Enabling

- Assuming that mobile development is undertaken properly and unnecessary accessibility barriers are not introduced, mobile becomes profoundly enabling...



Travel Apps

- **Examples:** Maps, directions, transit information, ...



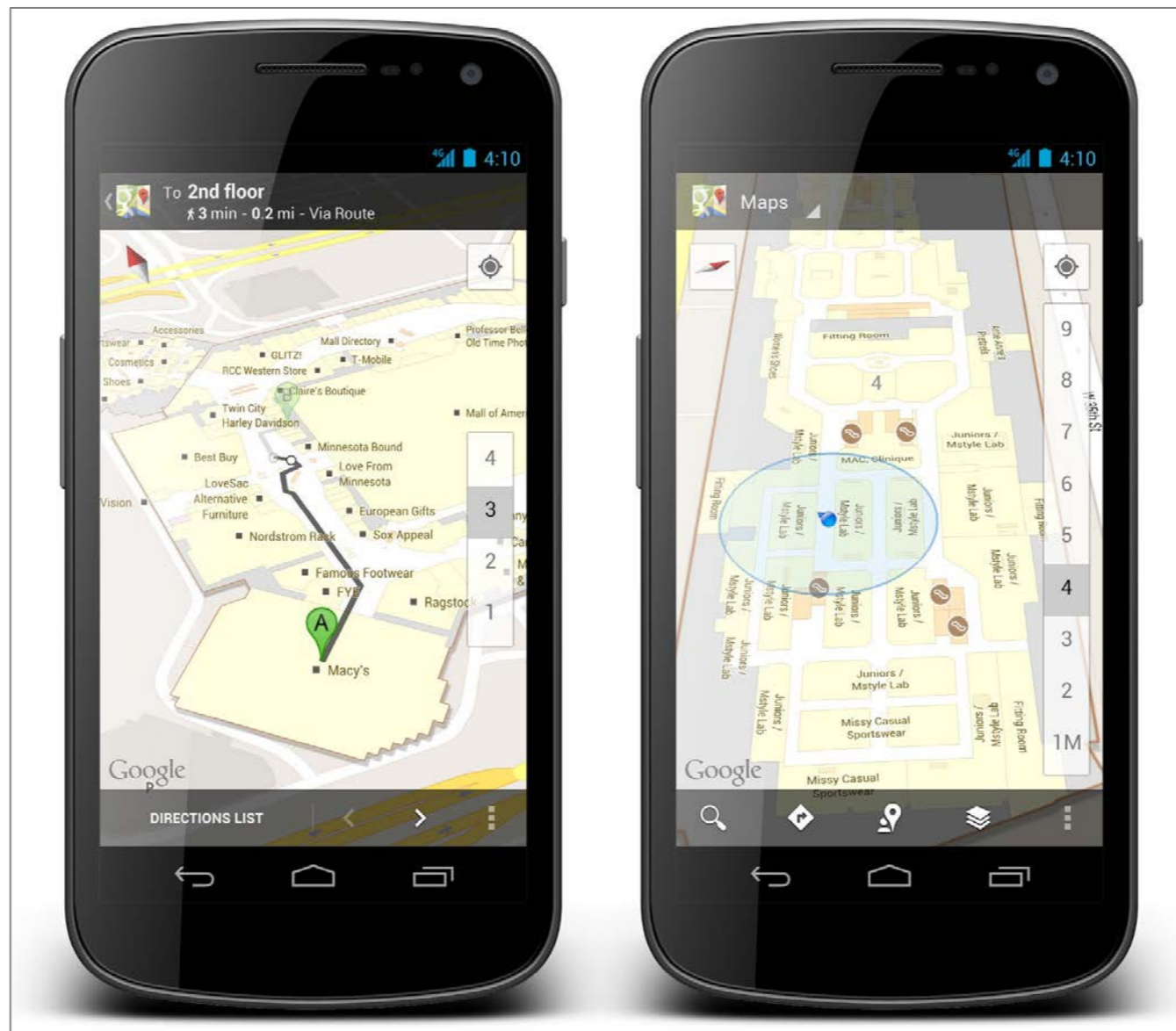
Travel Apps

- **Examples:** E-tickets, accessibility information, ...



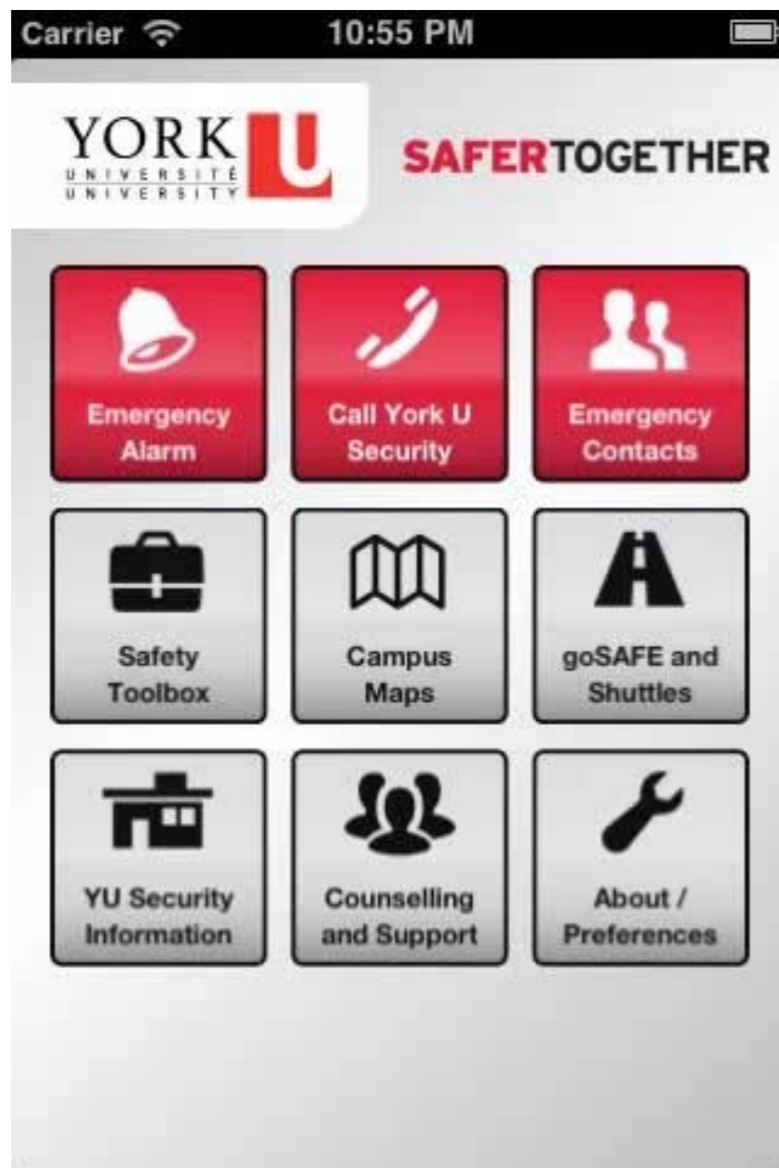
Mobile Wayfinding Apps

- Outdoor and indoor wayfinding features allow people to **navigate independently.**



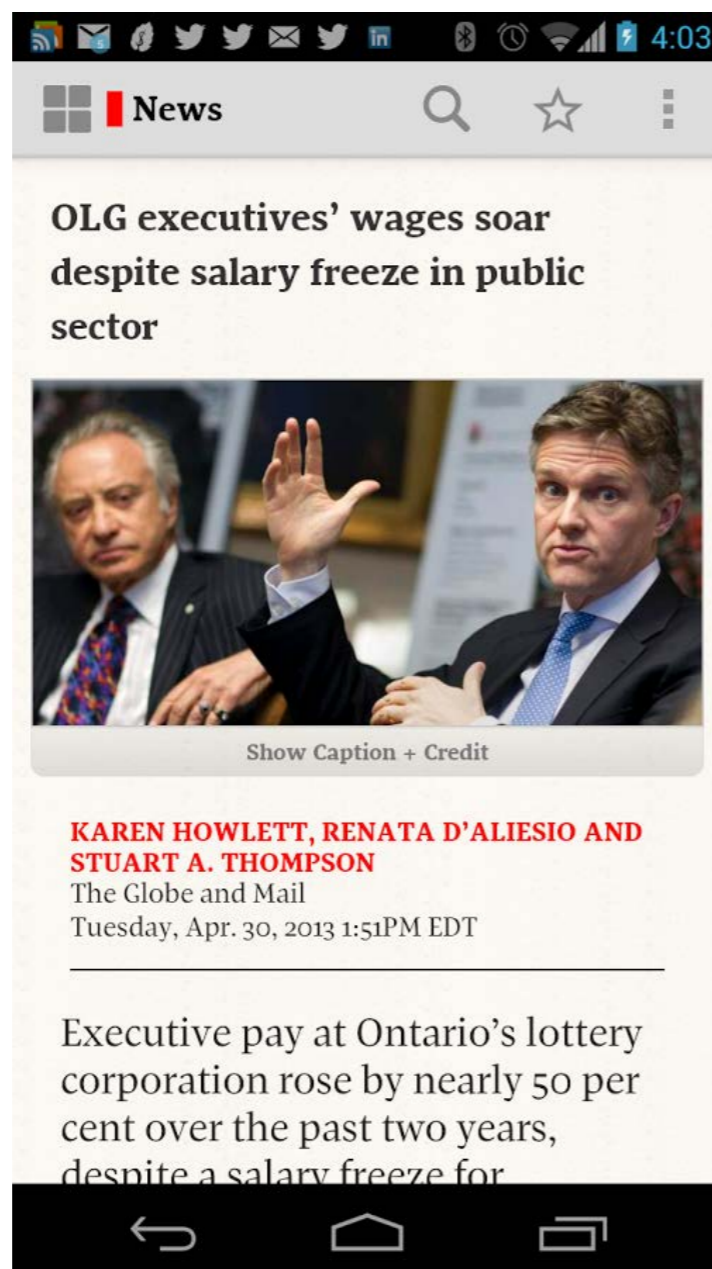
Safety Apps

- **Examples:** York U Safety, Guardly.



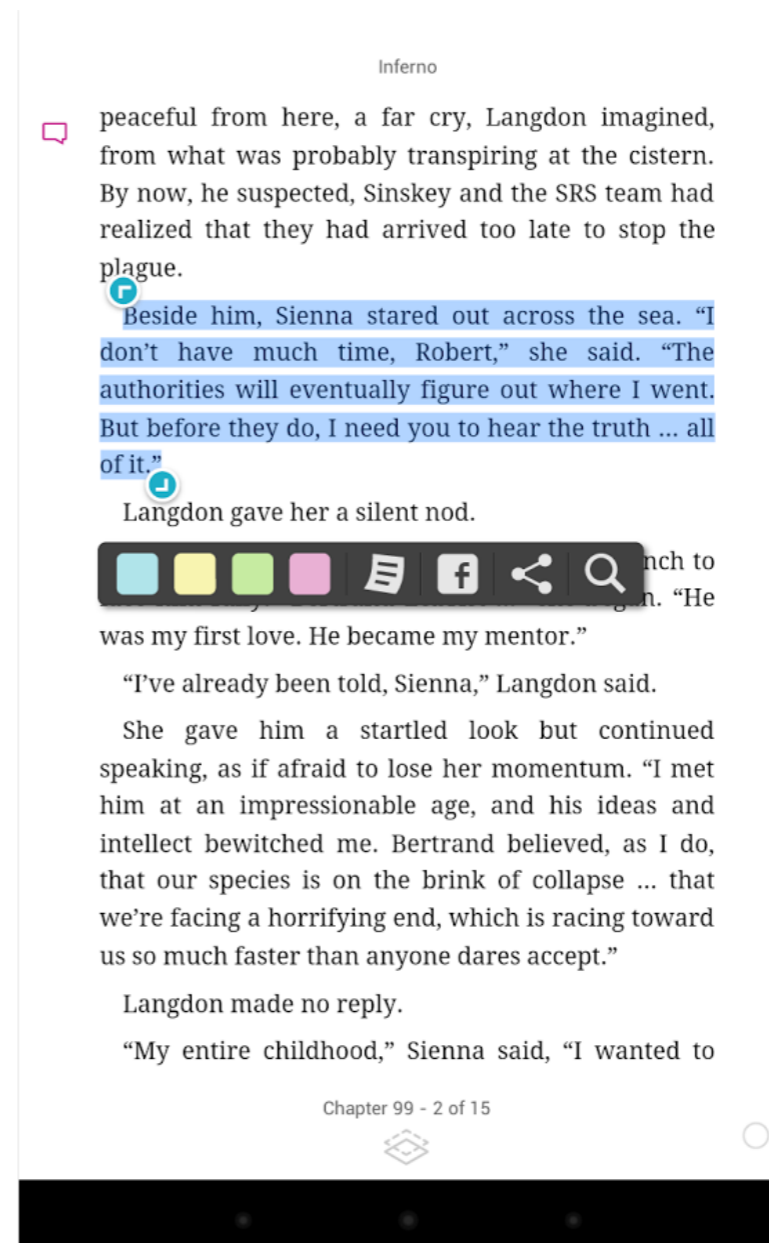
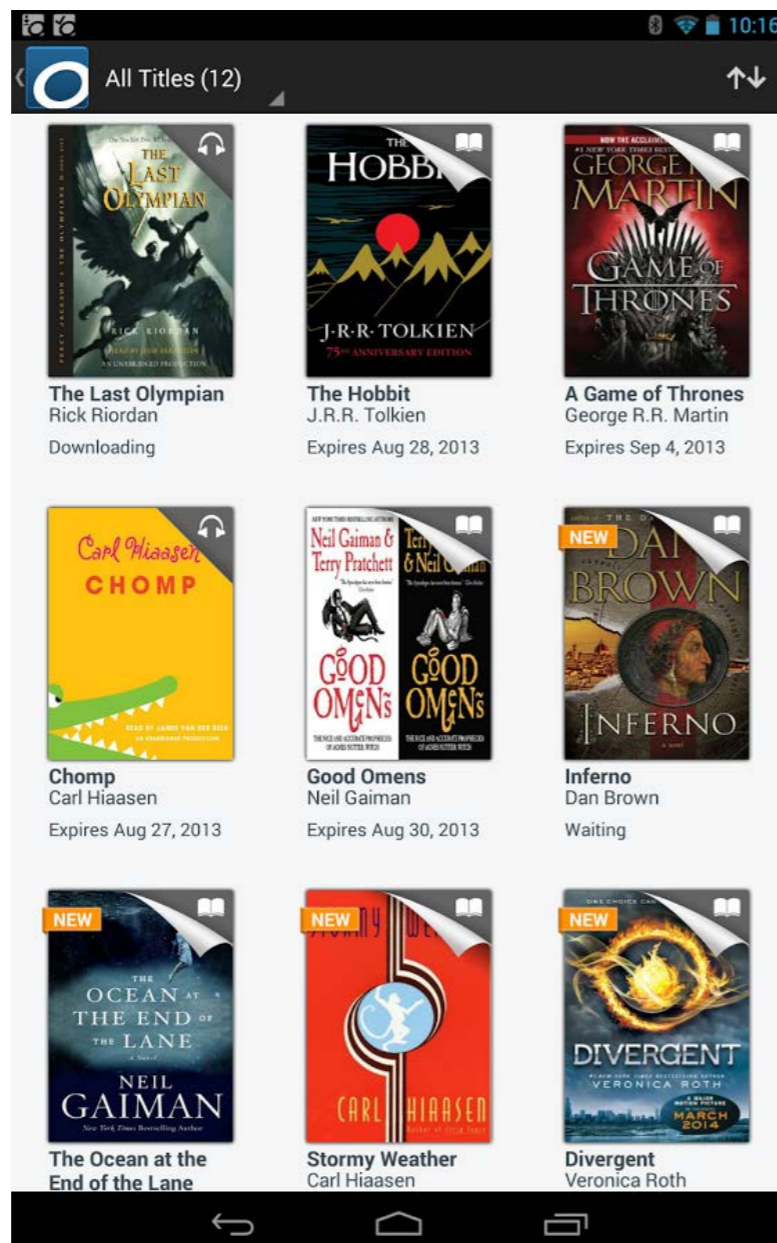
Information Apps

- **Examples: News, weather, ...**



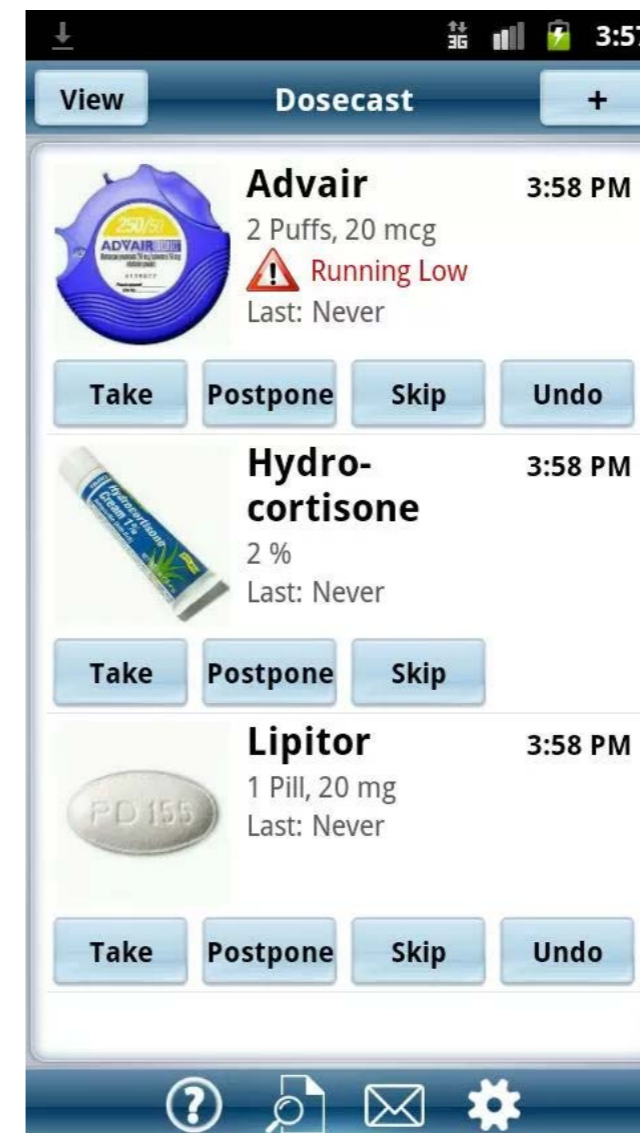
Reading Apps

- **Examples:** OverDrive (used by the Toronto Library), e-book readers, ...



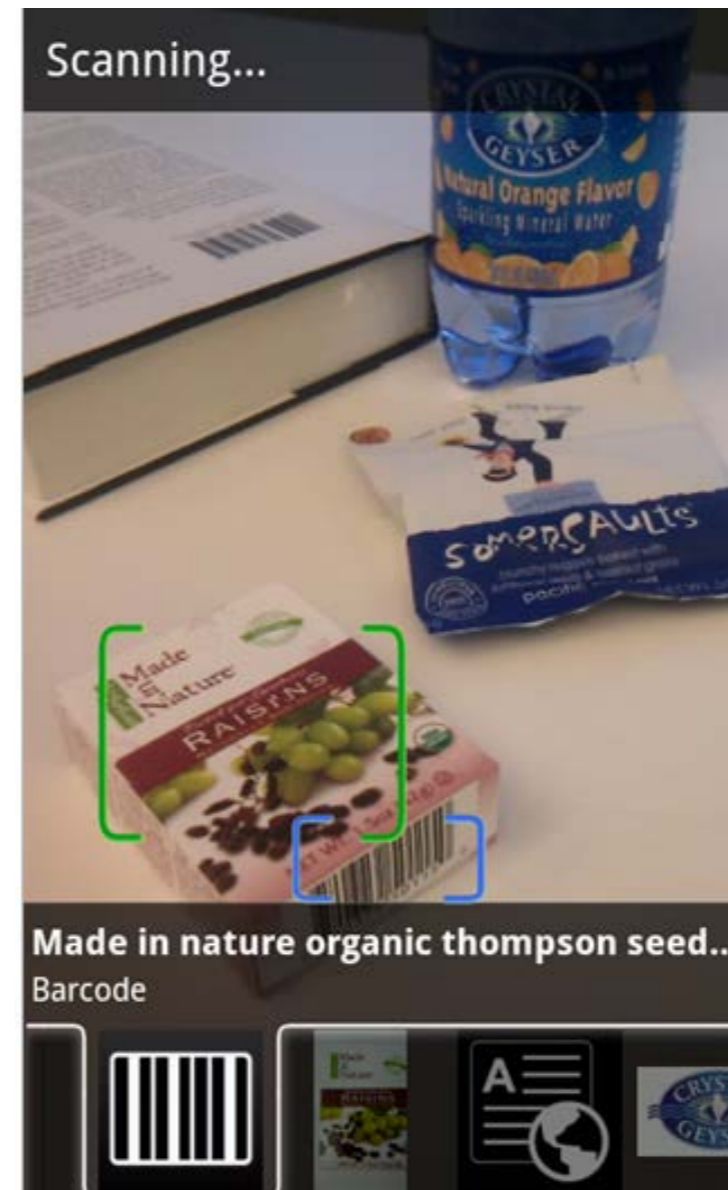
Medical Apps

- **Examples:** Medical information, medication tracking, ...



Camera Search Apps

- **Examples:** QR code readers, real world object search, ...



Social Apps

- **Examples:** Chat, video calls, social networking, ...



Mobile as a Kiosk Alternatives

- Accessible emails/SMS messages can be used to provide receipts and e-tickets that can be accessed by the customer according to their needs.



Conclusion

- There is really no aspect of campus life that is not being impacted by mobile technology.
- The shift to mobile is a very positive step for accessibility.
- Handset developers are (generally) making good progress on building-in accessibility.
- But developers of mobile apps and mobile websites need to do their part and **follow accessibility standards**.
 - Also, it is a best practice to include users with a variety of disabilities in user testing.
- When considering how best to use mobile technology to accommodate people with disabilities, consider whether there are mainstream usability benefits that might benefit everyone.

Thank You!



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<http://idrc.ocadu.ca>

Mobile Accessibility

MAJOR MOBILE PLATFORMS



Apple iOS

- **Examples:**

- iPhone, iPad

- **Pros:**

- ✓ The most apps!
- ✓ Excellent screen reader (Voiceover)
- ✓ Magnification, invert colours
- ✓ Excellent voice control (SIRI)
- ✓ External keyboard, Braille support
- ✓ Switch access (e.g. via Tecla)

- **Cons:**

- ✗ New models are more costly (but older versions are typically available).





Android

- **Examples:**

- Many! Samsung, Motorola, HTC, Sony, LG, etc.

- **Pros:**

- ✓ Many apps!
- ✓ Invert colours (magnification coming soon)
- ✓ Voice control
- ✓ Predictive text when typing
- ✓ Switch access (e.g. via Tecla)
- ✓ Typically less expensive than iOS

- **Cons:**

- ✗ Customization by re-sellers (Samsung, etc.) makes Android accessibility less predictable than iOS.
- ✗ Talkback screen reader is not quite as advanced as VoiceOver.





Blackberry OS10

- **Examples:**

- Blackberry Q-series (with physical keyboard)
- Blackberry Z-series (with onscreen keyboard)

- **Pros:**

- ✓ Magnification, invert colours
- ✓ Voice control
- ✓ Physical keyboard (Q-series)
- ✓ Predictive text when typing
- ✓ Less expensive than iOS

- **Cons:**

- ✗ Less apps than for Android and iOS.
- ✗ Screen reader not as advanced as VoiceOver.

