

By Marla Runyan



Seeing Is Believing!

The built-in accessibility features of iOS, along with thousands of apps, make iDevices an education equalizer for students with visual impairments.

In 1980, my parents bought me my first closed-circuit television (CCTV). This low-vision technology was essentially a monitor with a camera positioned directly underneath so that a person with a vision impairment, like myself, could place reading material under the camera and display an enlarged image of the text on the screen. A turn of the magnification knob would enlarge the text.

While this was—and still is—a valuable tool for many people with low vision, a desktop video magnifier is cumbersome to control if you are reading for long periods of time. And, like most accessibility tools, it carried a hefty price tag—\$2,000–\$4,000—which is still true today.

In 1987, I got my first computer. As I recall, it was something like a 286 DOS IBM clone. The price was about \$2,500. But I couldn't actually use this machine without special software and hardware that would enlarge the view so that I could see what I was typing. At that time, the only option for PC users was custom installation of a system called Vista (not to be confused with the Windows operating system). It also came with a mouse—long before a mouse was ever used with a PC—that controlled the zoom window. Those extras cost another \$2,000. Ultimately, my parents spent nearly \$5,000 so I could do basic word processing.

So let's do the math: I went off to college with an enormous IBM clone, a Vista enlargement system so I could access my enormous IBM clone, and a CCTV that had a screen no larger than an iPad. The total cost was nearly



\$7,500. And yet, when I arrived on campus, I still could not read my textbooks well enough to keep up or see the board in my classes. I had to hire readers and note takers to help with that.

Leveling the Playing Field

Accessibility has always been expensive. The extra cost that a person who is visually impaired must incur to access mainstream technology is known as “the blindness tax.” Screen magnification software and screen readers fall into this category. And the cost increases with each update of the computer's operating system.

But things are beginning to change. Today, I can check my email, read and send a text message, map a restaurant, peruse an attached document, update my status on Facebook, play music, read a book,

take a photo, send a photo, browse the web, and much more—all from the palm of my hand for no more than \$300, thanks to my iPhone.

Most would agree that iOS technology is downright cool. But it's more than cool for a person with a visual impairment—it's accessibility built right in.

At first glance, an iOS device, such as an iPhone or iPad, doesn't appear to be an appropriate tool for the blind. It has only a few physical buttons, and it seems to make sense only for someone with full sight. However, features such as Zoom and VoiceOver and compatibility with braille displays have made iDevices accessible right out of the box to people who are blind or visually impaired.

Using iDevices in the Classroom

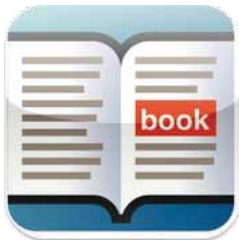


This technology has quickly made its way into our classrooms as a highly motivating, sleek, and portable learning tool. But as a teacher of students with visual impairments (TVI), I believe iOS technology has potential

for my students beyond the learning of core academics. An iOS device can provide timely access to curriculum, enable productivity in a portable manner, facilitate social networking and daily living skills, support orientation

and mobility skills, and even bridge the gap between braille and print. Here are a few of the features that bring the world into better focus for low-vision and blind students.

Read2Go and Bookshare



For students with low vision, iDevices can bring the world up close and into view and make reading

much less cumbersome. Typically, a student with low vision may require a variety of tools and adaptations to access print. These may include globe or handheld magnifiers, desktop video magnifiers (also called CCTVs), and large print. Low-vision readers typically use a combination of tools, but they often limit efficiency and sustainability.

Read2Go, the Bookshare app, provides thousands of books, including textbooks, in accessible formats to

students with visual impairments. Users can control font size, color and contrast settings, and speech output. Bookshare was created in response to the U.S. Individuals with Disabilities Education Act (IDEA), which mandates that schools provide timely access to instructional educational materials for students with visual impairments.

Memberships and book downloads are free to eligible students. Read2Go, the mobile app, is fully compatible with VoiceOver, enabling a blind student access to books on her braille display. Visually impaired students can browse books in Read2Go and download them instantly.



Braille Display

Within VoiceOver, a braille display—essentially a braille keyboard—can be paired with an iDevice using Bluetooth connectivity. Refreshable braille displays vary in size but are typically smaller than a standard keyboard and include a line of mechanical braille text that refreshes as the user moves the VoiceOver cursor across the screen.

When using a braille display with the six braille input keys, users can type in contracted braille, and text appears on the screen as it would for any user. (Braille contractions are braille

characters or letters that represent words or parts of words.) In general, any content that is captured and spoken aloud by VoiceOver can be read in braille on a braille display.

A student can mute VoiceOver in the classroom so she doesn't disturb others and can control the device using the braille display instead. Using the school's Wi-Fi access, the student can also complete a written assignment and email it to her teacher. Likewise, a teacher can email a Word document to the student, who can

open it in Mail or Pages and read it on the braille display. The student and teacher may also exchange documents through shared folders in Dropbox.

There are limitations to using VoiceOver and braille input. Not all third-party apps are VoiceOver accessible. This is frustrating because the iTunes store doesn't indicate which are compatible and which are not. Additionally, braille input is not always fluid. The user cannot "check" her braille until after she has finished typing the entire word. And, if the



VoiceOver

This is the built-in screen reader for iDevices. Users can activate it by triple-clicking the Home button (the triple-click feature can be customized in Settings). To choose content to be read aloud, users can type braille or QWERTY keyboard commands or make on-screen gestures, such as a single finger swipe to move the VoiceOver cursor across the screen and a double-tap to make selections. It takes some practice, that's for sure, and it may even annoy you if you are not visually impaired. But for blind users, VoiceOver has made navigating the device and accessing iBooks, Pages, Notes, Mail, and hundreds of other apps possible. In addition, VoiceOver enables the use of a braille display via Bluetooth connectivity.

Zoom

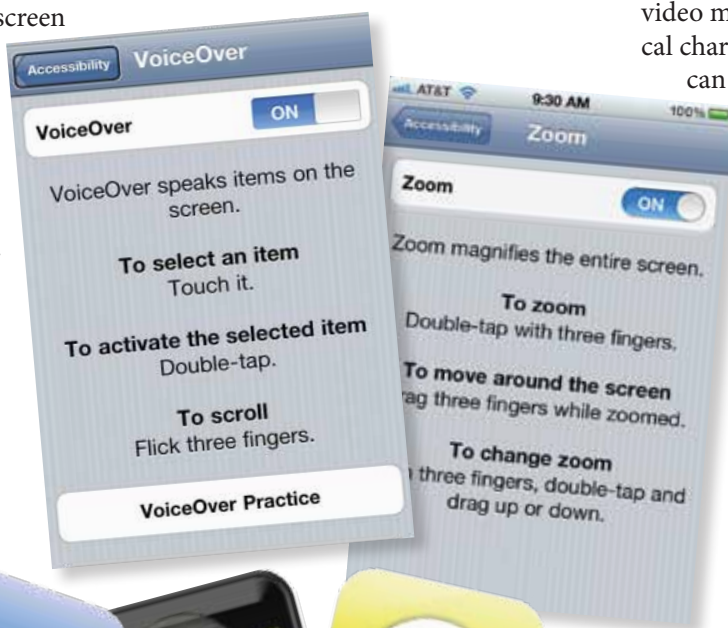
This is the built-in screen magnifier on iDevices. Once a user turns it on in Settings, she taps twice with three fingers to activate the zoom window and drags three fingers across the screen to move the zoom window. She can control the zoom level by double-tapping and then dragging three fingers up or down.

Camera and Magnification Apps

A student with low vision who cannot see the whiteboard or read his worksheets can use the camera on his iDevice, along with third-party apps, such as EyeSight, Spectacles, Bigger and Brighter, and iMagnifier, to transform the iDevice into an inexpensive video magnifier. And numerous optical character recognition (OCR) apps can capture print and convert the image to a text file.

Prizmo is an OCR app that makes print accessible to a blind student by taking a picture of a page of text and extracting it from the image so it can be read aloud with VoiceOver.

Additional accessibility features that run universally on iDevices include Invert Colors, Large Text, and Speak Selection.



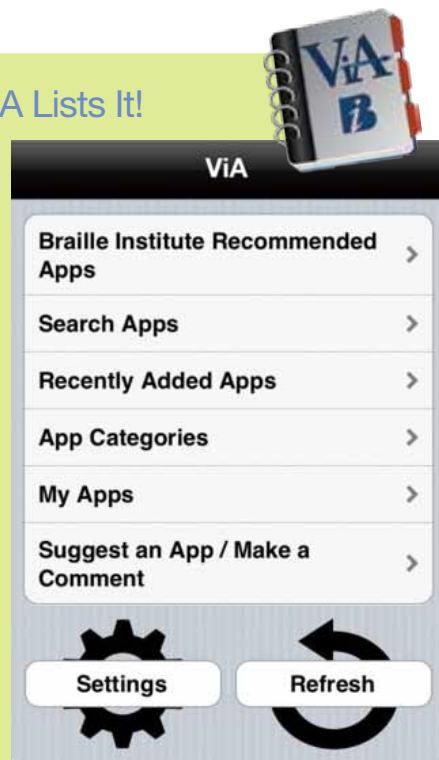
user hesitates after typing a single letter, a braille contraction may be inserted automatically. Finally, when editing words, the user must turn the contractions off to insert individual letters, but this can happen with a single keystroke.

That said, an iDevice with braille input allows a visually impaired student to create texts that both the student and teacher can read. In the classroom, the teacher can see what the student is typing and is not reliant on the TVI or brailist to translate between the two literacy mediums.

If There's an App for That, ViA Lists It!

The Braille Institute has created ViA (Visually Impaired Apps), a resource for the visually impaired who want to see what's available—and accessible—in the world of mobile apps for iDevices. Apps listed on ViA are sorted by category, price, and iTunes App Store ratings to help visually impaired users easily find a cross-section of useful apps.

Blind or low-vision users can search categories such as accessibility, entertainment, health, K–12 education, navigation, news, productivity, reading, magnification, and social networking. In the forum, users can also suggest and discuss apps they find useful, track new apps that fall into categories that interest them, and develop an interactive community of visually impaired app users. Learn more at brailleinstitute.org/MobileApps/ViA.aspx.



Expanded Core Curriculum

How do high school students communicate these days? Do they call each other on the phone? No. They text, tweet, and post on Facebook. If students with visual impairments can't network with their peers in this manner, they are left out of the social loop. iOS devices can support students with vision impairments in the areas of social communication, daily living skills, and orientation and mobility. These are domains of the Expanded Core Curriculum (ECC) for students with vision impairments.

iMessages, Twitter, and the Facebook app are compatible with VoiceOver and braille displays. Additionally, apps such as LookTel Money Reader enable a blind student to identify paper money. Finally, GPS apps, such as Sendero Look Around and Navigon, support orientation and mobility skills when students are out in the community.

Built-In Accessibility Features

Feature	Description
VoiceOver	Speaks content on the screen. Can be controlled with on-screen gestures, Bluetooth QWERTY keyboard, or braille device. Enables compatibility with braille displays.
Zoom	Enlarges items on the screen. Users activate Zoom by tapping twice with three fingers and dragging their fingers up or down to control zoom level.
Invert Colors	Reverses contrast to show white or yellow text on black background.
Large Text	Increases font size in Mail, iMessages, and Notes up to 56 point.
Speak Selection	Reads text aloud when the user highlights it on the screen and then touches Speak.
Siri and Dictation	Launches apps, makes an appointment, writes a note, or creates a document by voice command.

An iOS device can provide timely access to curriculum, enable productivity in a portable manner, facilitate social networking and daily living skills, support orientation and mobility skills, and even bridge the gap between braille and print.



Improvements to Accessibility

With the release of iOS 6 in September 2012, the built-in accessibility features have improved at no additional cost to the user. Enhancements to vision accessibility features include the ability to run Zoom and VoiceOver simultaneously; access via braille display to Item Chooser, which presents elements on the screen as a list, allowing users to quickly navigate through them; and the compatibility of VoiceOver with Maps. And Siri—Apple's voice-recognition feature—is available for the iPad 3 and the newest iPad with retina display.

Using Siri, a student can now launch apps, write a note, or search the web through voice command (Wi-Fi access is required).

Is it perfect? No. But when you consider that iOS technology has been around for only a handful of years, you can't argue against its potential. And you can't beat the price. Until now, "blind technology," or expensive third-party software, has been the

only option for computer access and basic word processing for the visually impaired. Electronic braille note takers, for example, are a valued tool for many blind adults and students, but at a cost of around \$6,000 per device.

Wi-Fi for Students Is a Must

In my state of Oregon, students with visual impairments are gaining access to iOS technology with the support of the Blind and Visually Impaired Students Fund in cooperation with the Oregon Department of Education.

As a TVI in the public school system, I believe my greatest challenge in unlocking the full potential of iOS technology is Wi-Fi access. Every district has its own policy regarding the use of smartphones or tablets on their campuses. But often, Wi-Fi access—especially on devices that are not owned by the district—is either not available or not allowed for students. Without Wi-Fi, a student's work is contained

within the device until she can either email it to her teacher or print to an Air Print-compatible printer requiring shared networking. Also, Siri and Dictation cannot run without Wi-Fi.

It is my hope that school leaders will realize that built-in accessibility has blurred the line between mainstream technology and assistive technology. When mainstream technology is able to provide access and productivity to students with special needs, districts may need to re-examine policies that ultimately disable this access. The technology is here, but its potential is limited without school district support.



Marla Runyan is a teacher of students with visual impairments for Lane Regional Programs in Eugene, Oregon, USA. She credits technology for helping her to become more independent, efficient, and productive. In 2000, she became the first legally blind American to compete in the Olympic Games. She competed in her second Olympics in 2004.

VOTE!

ISTE Board Elections March 12–April 12



Visit iste.org/elections

Collaborate with tools from the Edge



TeachersFirst

FREE
Ad-Free

Teacher-reviewed resources
you can use safely, within school policies



Thinking Teachers Teaching Thinkers

www.teachersfirst.com/edge



For teachers. For families. For excellence.

