The iPad as a Low Vision Tool

David Lewerenz, OD, FAAO
AOA, Philadelphia - June 28, 2014

Disclosure
I am not in a position to profit in any way from the sale of any service or product discussed in this presentation.

Overview
- Brief history / Introduction to iPad
- Features for the visually impaired right out of the box
- Accessibility features
- Apps for the visually impaired patient
- Apps for the low vision rehabilitation clinician

The iPad As A Low Vision Device
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Brief History / Introduction to iPad
- Unveiled January 27, 2010
  - Runs iOS operating system, as does iPhone, iPod touch
- Early concerns
  - Lack of Adobe Flash player
  - Lack of common wired connections
  - Closed/proprietary iOS
  - Name

Brief History / Introduction to iPad
- Success of the iPad
  - 300,000 sold the first day available
  - 1 million sold in the first month
  - 3 million in 80 days
  - 75% market share of all tablet sales by the end of 2010
  - Over 200 million sold
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### iPad Models

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<td>Lightning</td>
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### The iPad Mini
- Released Nov. 2, 2012
- Display 7.9” (iPad = 9.7”)
- Features similar to iPad 2 except
  - 4th Gen. camera
  - Siri capable
  - Lightning connector
- 2nd generation
  - Released 11/12/13
  - Features similar to iPad Air

### Brief History / Introduction to iPad
- External buttons
  - On-off
  - Home
  - Volume
  - Side switch
    - Rotation lock
    - Mute

### The iPad As A Low Vision Device
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  - Apps for the visually impaired patient
  - Apps for the low vision rehabilitation clinician

### Features for the Visually Impaired Right Out of the Box
- Enlarging print with finger gestures
- Changing font sizes and types
- Siri – the intelligent personal assistant

### Enlarging Print with Finger Gestures
- "Pinching" and "Spreading" works in
  - iWork suite – Pages, Numbers, Keynote
  - Mail
  - Web pages
  - Photos
  - Many apps
- Does not work in
  - Home screen
  - Settings
  - iBooks
  - Notes
  - Contacts
  - Calendar
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Enlarging Print with Finger Gestures
- Entire page available for magnification, even the portion not visible on the screen
- Amount of magnification is ~3X - 5X, examples
  - Pages default 12 point font 1.0M → 3.0M
  - Mail on default font 1.2M → 5.5M

Changing Font Size and Type
- The font size and type can be adjusted in iBooks, iWorks suite within the application
  - Pages
    - Minimum 10 pt = 0.7M
    - Default 11 pt = 0.8M
    - Maximum 288 pt = 24M
  - iBooks (average of three I tested)
    - Minimum 1.0 M
    - Maximum 7.2M
- Notes, Mail, Messages
  - Font size controlled in Accessibility Settings, covered later

Siri
- Voice activated "intelligent personal assistant"
- Available beginning with 3rd Generation iPad and Mini
- To launch press "Home" button for 1-2 sec.
- What can it do? Examples
  - Ask for information in your Contacts list
  - Take a note
  - Set an alarm
  - Search the web for an answer to a question
- Available in 10 languages plus country-specific for some; can select male or female voice

Enlarging Photos with Finger Gestures
- Can view with camera (distance or near) and use spread function to magnify (only in photo mode, not video mode)
- Can magnify a photo already taken
- A video magnifier app (discussed later) would be more practical

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Accessibility Features
- Zoom – Enlarges display with finger taps
- Text Options – Change text to larger font; change contrast options
- Invert colors – To improve contrast, reduce glare
- VoiceOver – Voice description of screen content
- Speak Selection
- Speak Auto-text
- Triple Click Home and Other

Zoom
- Enabled through Settings / General / Accessibility
- Use finger tapping to enlarge what’s on the screen
  - Double tap/release with 3 fingers enlarges or returns to normal
  - Double tap/hold, then up or down to adjust magnification
  - Single tap (3 fingers)/hold to navigate
    - Single tap (1 finger)/hold only navigates horizontally or vertically, depending on the app
    - Magnifies up to 5X

Zoom
- Compared to "spread" gesture
  - Zoom will magnify only what was visible on the screen when tapped – as though it took a screen shot that is magnified
  - "Spread" finger gesture magnifies entire page, even the part not visible before magnification
  - Zoom works in Settings, "Spread" does not
- Able to use "spread" gesture and Zoom together
  - Maximum = 15-20X (very limited field)

Larger Text
- "Dynamic Type" is new with iOS 7
- Enabled through Settings / General / Accessibility
  - Select "Off" (~1.25M) or 3.0M on largest setting
- Supposed to work in
  - Contacts – No
  - Calendars – No
  - Messages – Yes
  - Notes – Yes
  - Mail – Yes
  - Also - Does not work is Settings

Text Contrast
- "Bold Text" works (minimally) across apps to increase boldness of the font
- "Increase Contrast", in my analysis, doesn’t
- Access both through Settings / General / Accessibility

Invert Colors
- Enabled through Settings / General / Accessibility
- Inverts colors on everything
- Some will find it helps with contrast
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VoiceOver
- A built-in iPad screen reader
- Finger tapping convention is changed – add 1
  - Single tap → double tap, Double tap → triple tap, etc.
    - Double tap does not have to be on the item
    - Necessary because single tap identifies an item and cues VoiceOver to speak its identity, double tap to select it
  - Other options include (among many!)
    - Flick right or left to move to next or previous item
    - Flick up with two fingers to speak entire page
    - Double tap with one finger and hold to temporarily revert to standard finger gestures

Language
- Can select one of 35 languages and dialects
- Speed and pitch of voice can be controlled
- Can enable pitch change to begin list with high pitch, end with low

Rotor
- Controls what up and down flicks do in VoiceOver
- Rotate two fingers on screen to activate
- Many options available

Bluetooth Braille device can be used with VoiceOver to provide input or output

Speak Selection / Speak Auto-text
- Any text on the iPad can be spoken using Speak Selection without using VoiceOver or changing finger gestures
  - Speed can be controlled in Settings
  - Text can be highlighted as it’s read
  - Select a passage of text and select “Speak” from the other options, such as copy, cut paste
  - User must be able to see and select the text to utilize Speak Selection
- Speak Auto-text speaks the text corrections and suggestions iPad makes when you type
- Both enabled in Settings / General / Accessibility

Speak Auto-text
- Text speaks the text corrections and suggestions iPad makes when you type
- Selected in Settings / General / Accessibility

Triple-click Home
- Quickly tapping the Home button three times provides a short menu from which you can select the Accessibility option you want to have active
- Adjust the settings you want to have available in Settings / General / Accessibility
- If you enable VoiceOver, the VoiceOver finger gestures are activated

Other Accessibility Features
- "Reduce Motion" keeps icons from moving when screen is changed
  - For people who get nauseous from screen movement
- If you have a "made-for-iPhone" hearing aid you can use an iPad (4th generation or later or any iPad Mini) to
  - Check hearing aid status, such as battery strength
  - Stream audio to the hearing aid
  - Use the iPad as a remote microphone for the hearing aid
- "Guided Access" can limit iPad to certain apps
  - Might be useful if a family iPad is shared
- "Switch Control" can make it easier to locate and select switches and controls on the display
- "AssistiveTouch" is helpful for those who have a difficult time touching the screen to control the iPad
  - Can use an assistive device, such as a joystick
  - Can design your own finger gestures
- Enabled in Settings / General / Accessibility
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### Apps for the Vis. Impaired Patient
- Magnification for reading
- Large type browser
- Scrolling text
- Calculators – large type and talking
- Voice readers
- Money identification
- Mobility
- Color identification
- Games
- Image recognition
- Visual stimulation / development

### Apps for the Visually Impaired
- In general (not always true)
  - Accessibility options and iPad features are used for content internal to the iPad
  - Apps needed for content external to iPad
- Some apps are designed for low vision patients, some for blind
- Often, free apps are less full featured, and subject the user to advertisements
- Not always a good correlation between cost and quality

### Video Magnification
- There are many apps available that can assist one in using the iPad as a CCTV
- Features to watch for
  - Change text/background colors
  - Use of both front and rear facing cameras
  - Where to find “frozen” (captured) images
  - Control buttons must be accessible
- To activate autofocus, it helps to jiggle the iPad
- Some use light – only works on iPhone

### Video Magnification
- My pick for best free app is *Big Magnify*
  - Front and rear facing camera
  - Full color mode only
  - Decent freeze function, magnification function works
  - No magnifier ring, ads are out of the way
- Avoid *Magnifier & Magnifier Free* (ring), *Ultra Magnifier* (ads)
- My pick for best inexpensive app is *Better Vision* ($5.99)
  - Front facing camera only
  - Six well designed text/background color modes
  - Decent freeze function – color mode change possible
  - Excellent large, high contrast control buttons
- Honorable mention: *Vision Assist* ($5.99)
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Video Magnification

Example of the navigation picture within-a-picture available with Lumin ($1.99). It’s recommended by the Braille Institute, but has very small control buttons.

Video Magnifier Stands

Is EyeSight ($29.99) worth the price?
- Finger gestures control image capture and magnification
- Setting button is small
- Six very well designed color modes
- Color mode changed with finger tap – but easy to change color when you don’t want to
- Hard to get clear "frozen" image because 2-finger double tap moves the iPad and causes blur
- "Frozen" images only available in iPad "Photos"
- My assessment – not worth the money

Having a good stand can be as important as having the right app.

Video Magnification

SuperVision+
- Developed at Schepens
- Features "image stabilization" – minimal?
- Option to only stabilize vertically, allowing horizontal reading movement
- Control buttons are small

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Video Magnification

Justand $89

Examples of iPad stands from ProComputing Products that can be used for video magnification.

Justand V2 $99

Large Print Browser

BigBrowser (free) by the Braille Institute provides a large type print interface and keyboard (6.2M vs. 2.0M) on which to search the internet

Display is regular sized
Google once you select “Go”

Scroll 'n Roll ($0.99)
- Display document text as RSVP (marquee) scrolling print
- Text size and color, background color, speed, font, can all be changed

MD evReader (free)
- Similar features as Scroll 'n Roll plus a fixation target for those with central scotoma

Image of scrolling text from Scroll 'n Roll
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## Large Text Calculators
- **Calculator** (free)
- **Big Calc** (free)

## Talking Calculators
- **Talking calculator HD+** (free)
- **TalkCalc** ($0.99)
- **Talking Calculator** ($1.99)
- **Talking Scientific Calculator** ($4.99)

## Voice Readers
- **Voice Dream**
  - More full function text-to-speech program than VoiceOver
  - More control and options
  - Many voices available
  - $9.99
  - Voice Dream Lite is free, full function version, but requires you to hit the "Play" button every few sentences (300 characters)
  - Others include NaturalReader ($9.99), Text Aloud ($4.99), Voice Reader Text ($2.99), Voice Magnet ($1.99), Speak it! ($1.99)

## Voice Reading of Publications
- **Earl**
  - Voice reader for newspapers, magazines, websites and books (Project Gutenberg)
  - Several synthesized voices and settings
  - 15 minutes of content per day is free and has ads
  - Unlimited access for $9.99 / month or $99.99 / year
  - Controlled with combination of simple finger gestures and/or speech commands

- **AIRS-LA** (free)
  - A reading service provided by the Audio Internet Reading Service of Los Angeles
  - Read by human volunteers
  - Archived podcasts available of many articles
  - Search for articles is visual

**Earl vs. AIRS-LA**
- Earl has more recent/varied content and more content
- Earl has non-visual controls that are easy to learn
- AIRS-LA is free and features a human voice

## Voice Reading of Publications
- **EyeNote** (free)
  - US Bureau of Engraving and Printing
  - New version identifies currency immediately in video mode – no need to take a photo
  - US currency only
  - Privacy mode available
  - Only works on iPhone, iPod Touch and iPad 2?

- **LookTel Money Reader** ($9.99)
  - iPhone (5, 4S, 4, 3GS), iPod Touch (4th), iPad (2 and 3)
  - Identifies currency immediately in video mode – no need to take a photo
  - All types of bills from many countries
  - [http://www.looktel.com/moneyreader](http://www.looktel.com/moneyreader)
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Apps for the Visually Impaired
- GPS for mobility (cell internet required)
  - The Seeing Eye by Sendero Group is the 1st fully accessible app $70/hr or $130/3 yrs
  - BlindSquare ($24)
  - Navigon - USA ($50), North America ($60)
  - Aridne GPS ($5.99)
- Color Identification
  - Color ID Free (free) and Color Identifier ($4.99) from GreenGar speak the names of colors captured by the iPad's camera
- Games
  - Accessible Mine Sweeper ($0.99) is one of many

Image Recognition
- Take a photo of an object - book cover, historical landmark, consumer product, etc.
  - A search will locate the object and provide information about it
  - Tap Tap See - requires activation of VoiceOver, $4.00 for 50 pictures, $7.00 for 100 pictures, $9.99 for 1 month unlimited use
  - Google Goggles for Android, iPhone 3Gs and 4
- QR and bar code readers

Visual Stimulation / Development
- iLoveFireworks Lite (free)
- fluidity HD (free, $2.99)
- Art Of Glow (free)
- My Talking Picture Board ($19.99) from the Western Pennsylvania School for Blind Children
  - Designed for CVI
- Infant Visual Stimulation ($2.99)

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Apps for the Vis. Rehab Clinician
- Testing charts – VA and contrast sensitivity
- Eccentric viewing training
- Light meter

Eye Charts
- Ridgevue (Dr. Mark Bullimore) offers several visual acuity and contrast sensitivity tests
  - Visual acuity ($4.99)
    - Bailey-Lovie – distance and near
    - Word visual acuity
    - HOTV – single line or single letter with crowding bars
    - Tumbling E
  - Contrast sensitivity ($39.99)
    - Letter test – similar to Pelli-Robson or Mars
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Eccentric Viewing
Because of the movable fixation target, MD evReader (free) can be used for eccentric viewing training

Light Meter
- LuxMeter Pro Advanced ($7.99)
  - Can calibrate
  - Uses front or back camera
  - Illuminance meter – measures in lux
  - Also displays color temperature
  - Helpful to take into home for assessment

Thanks for your attention!
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