

Accessibility Evaluation Tools

Graham L. Pierce

User Experience Researcher, MSU Usability/Accessibility Research and Consulting

Project Manager, State of the State Survey, MSU Institute for Public Policy and Social Research

Digital Communications and Networking Coordinator, MSU-EDA University Center for Regional Economic Innovation, MSU Center for Community and Economic Development

Vice Chair, MSU Accommodating Technology Community

glpierce@msu.edu | <https://www.msu.edu/~glpierce/>

MSU Making Learning Accessible Conference

MSU Union

November 13, 2015

Links to Tools

- <http://usability.msu.edu/>
 - [Resources](#) > [Tools](#)
- <http://webaccess.msu.edu/>
 - [Help & Resources](#) > [Evaluation and Validation](#)

Automated Scanners

Automated Scanners

"Can't I
just hit a
button?"

Automated Scanners

No.

Automated Scanners

Sorry!



Automated Scanners

Evaluating
accessibility
requires human
judgment.

WCAG 2.0

43

**A/AA Success Criteria,
Conformance Requirements**

WCAG 2.0

42

Require Human Judgment

The Exception

SC 4.1.1
(Parsing)

What Can Automated Tools Do?

Tell you if things
are missing*

What Else Can They Do?

Warn you that
something **might**
be wrong

What Else Can They Do?

Process
Management

What Can't They Do?

Tell you that
anything is right
(other than Parsing)

Common Automated Scanners

- FAE
 - <http://fae20.cita.illinois.edu/>
 - Does not use official WCAG 2.0 rules
 - Many “violations” are perfectly acceptable!
 - Only works with HTML5 + WAI-ARIA
- WAVE
 - <http://wave.webaim.org/>
 - Graphical overlay
- AChecker
 - <http://achecker.ca/checker/>
 - Text output

Validators = Good

- Use for **SC 4.1.1 (Parsing)**
- W3C Markup Validation Service (HTML)
 - <http://validator.w3.org/>
- W3C CSS Validation Service
 - <http://jigsaw.w3.org/css-validator/>

Toolbars and Plugins

Web Developer Toolbar

- Firefox

- <https://addons.mozilla.org/en-US/firefox/addon/web-developer/>

- Chrome

- <https://chrome.google.com/webstore/detail/web-developer/bfbameneiokkgbdmiekhjnmfkcnldhbm>

- Useful Features

- CSS > Display ARIA Roles, Display Style Information
 - Forms > Display Form Details, View Form Information
 - Images > Display Alt Attributes
 - Outline > Outline Headings
 - Tools > Validate CSS, Validate HTML
 - View Source > View Generated Source

Accessibility Evaluator for Firefox

- Firefox
 - <https://addons.mozilla.org/en-US/firefox/addon/5809>
- Useful Features
 - Navigation > Title
 - Navigation > Headings
 - Navigation > Language Changes

Juicy Studio Accessibility Toolbar

- Firefox
 - <https://addons.mozilla.org/en-US/firefox/addon/juicy-studio-accessibility-too/>
- Useful Features
 - Live Regions
 - ARIA > Document Landmarks
 - ARIA > Roles
 - ARIA > Roles and Properties

Firefox/Chrome Developer Tools

- Live Code Editing
- Inspector

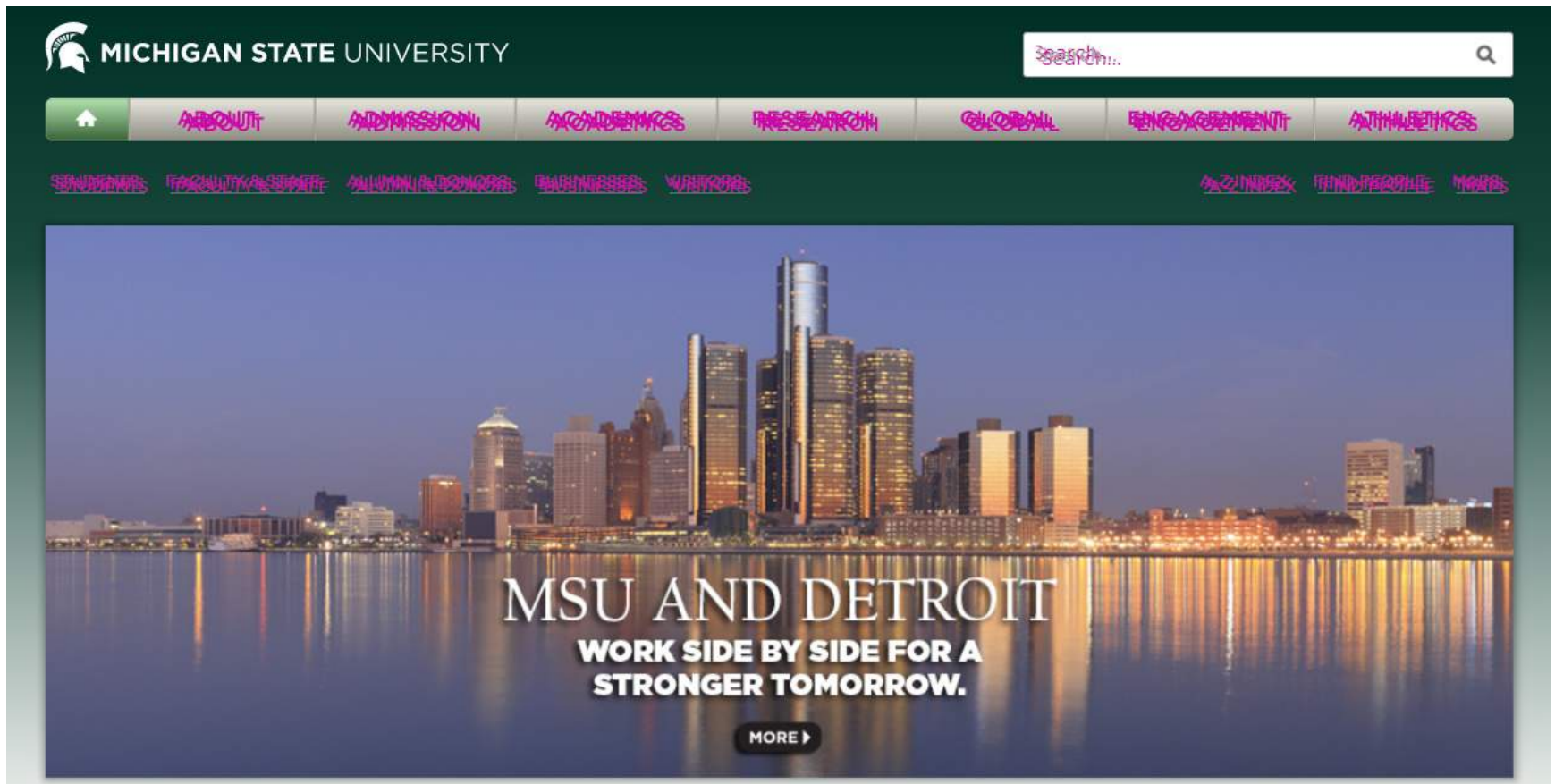
Keyboard Focus

```
:focus {border: 2px solid  
#CC0AAA !important;}
```

Text vs. Images of Text

```
* {color:#CC0AAA !important;  
  text-shadow:3px 2px #CC0AAA,  
  -3px -2px #CC0AAA !important;}
```

Text vs. Images of Text




Text vs. Images of Text

MSUVIEW

MSU Spartans

Michigan State Spartans
Bowl game, new
admission, new
time, more MSU
Spartans.



MSUTODAY

Down, MSU, local foundation's open from
MSU State Center.

MSU hires Office of Institutional Equity
director, Title IX coordinator.

Spokane, Idaho show, continuing
Spokane Stadium.

EVENTS

NOVEMBER 10


Down, MSU, local foundation's open from
MSU State Center.
7:30 pm.


MSU TALK

@MSUTalk: One of my favorite shots from this weekend in East Lansing, #RedCedar #Photography #GoGreen // @...

EMPOWER EXTRAORDINARY







THE CAMPAIGN for MICHIGAN STATE UNIVERSITY
SURPASSES \$1 BILLION MILESTONE






MI SPARTAN IMPACT

Explore how MSU is making a
difference and moving
Michigan forward through
research, outreach programs,
and partnerships.



SUPPORT MSU

SUBSCRIBE TO MSU TODAY



Budget and Performance
Transparency Reporting

MICHIGAN STATE UNIVERSITY

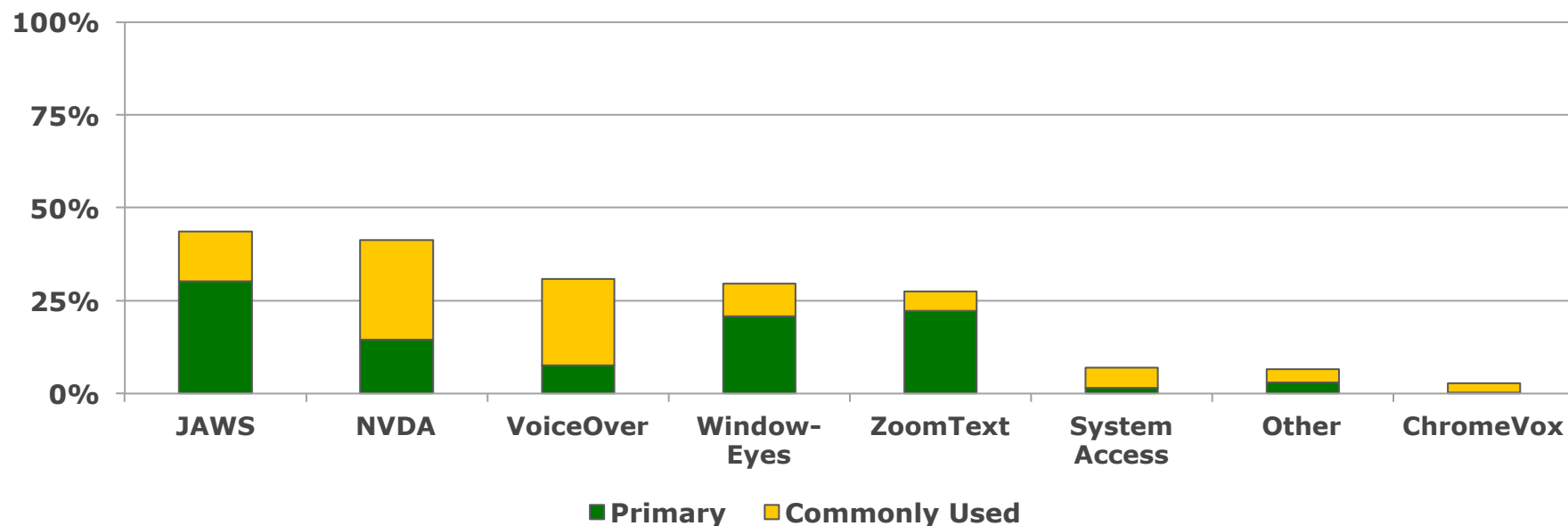
Contact Information | Site Map | Privacy Statement | Site Accessibility
Call MSU (517) 355-1855 | Visit msu.edu | MSU is an affirmative action, equal opportunity employer.
SPARKS WILL | @MichiganStateUniversity

Screen Readers

WebAIM Usage Statistics

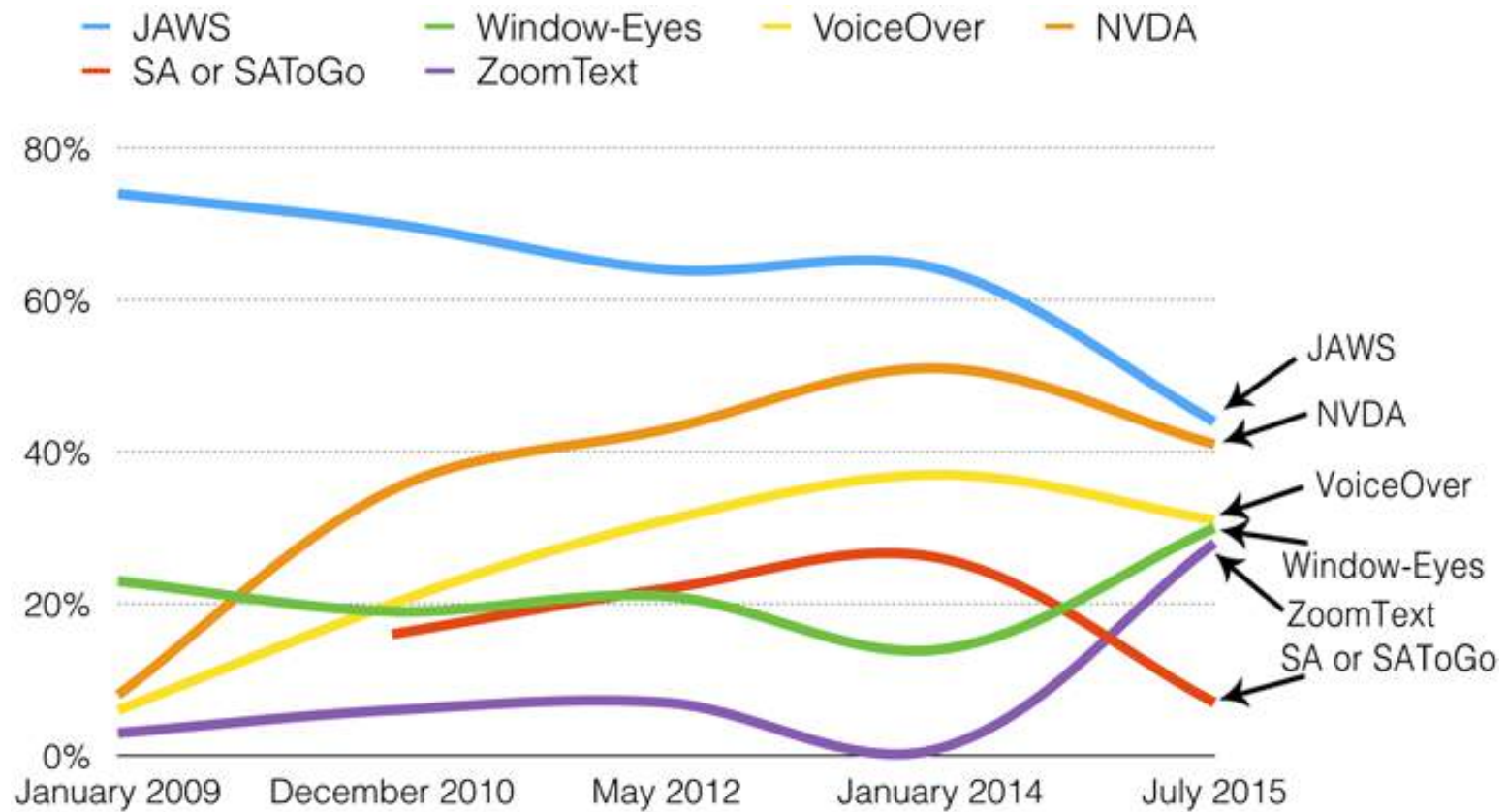
- <http://webaim.org/projects/screenreadersurvey6/>
 - Look for updated version!

Desktop Screen Reader Usage (7/2015)

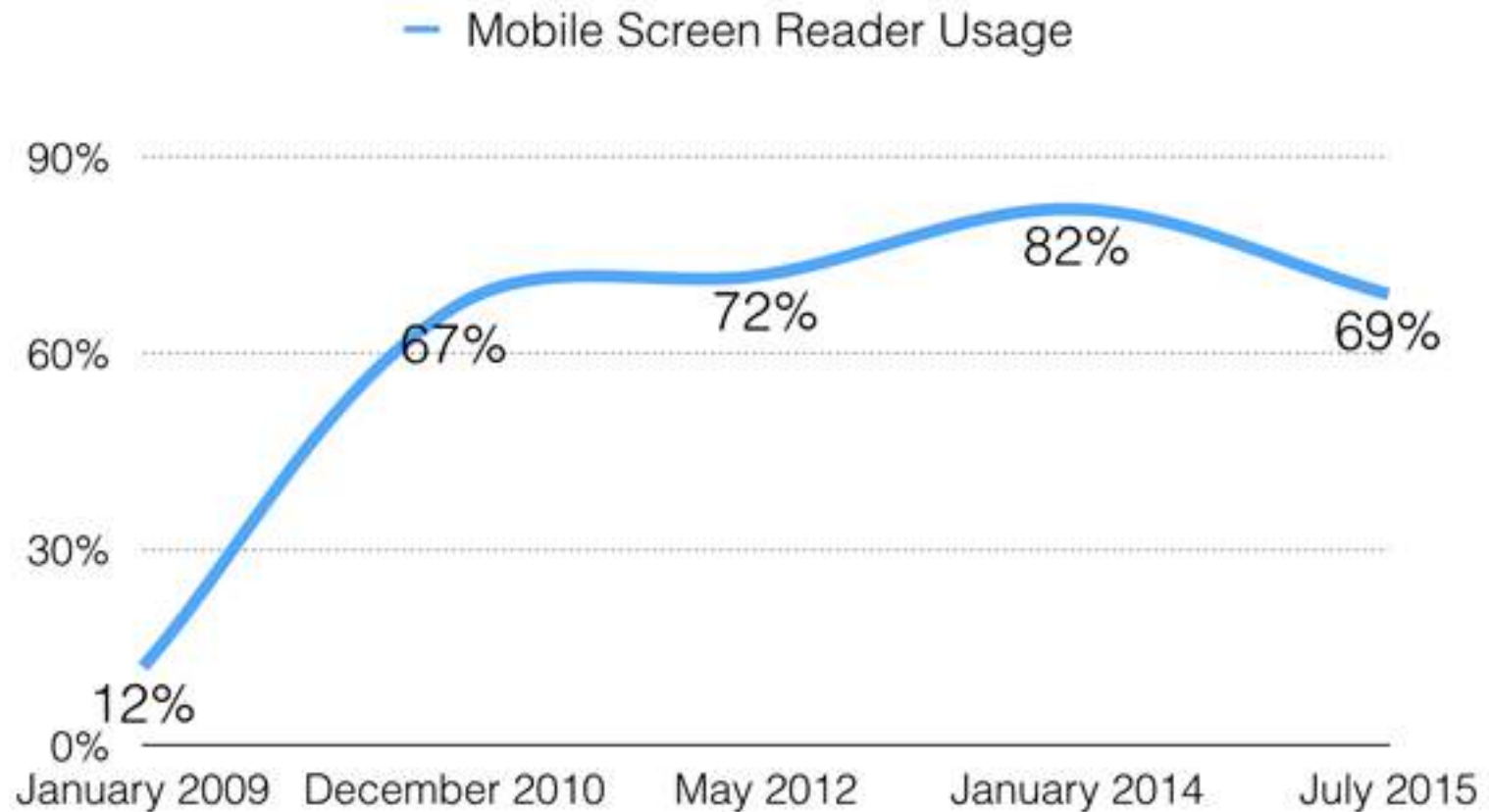


Screen Reader	Primary	Commonly Used
JAWS	30%	44%
NVDA	15%	41%
VoiceOver	8%	31%
Window-Eyes	21%	30%
ZoomText	22%	28%
System Access	2%	7%
Other	3%	7%
ChromeVox	0%	3%

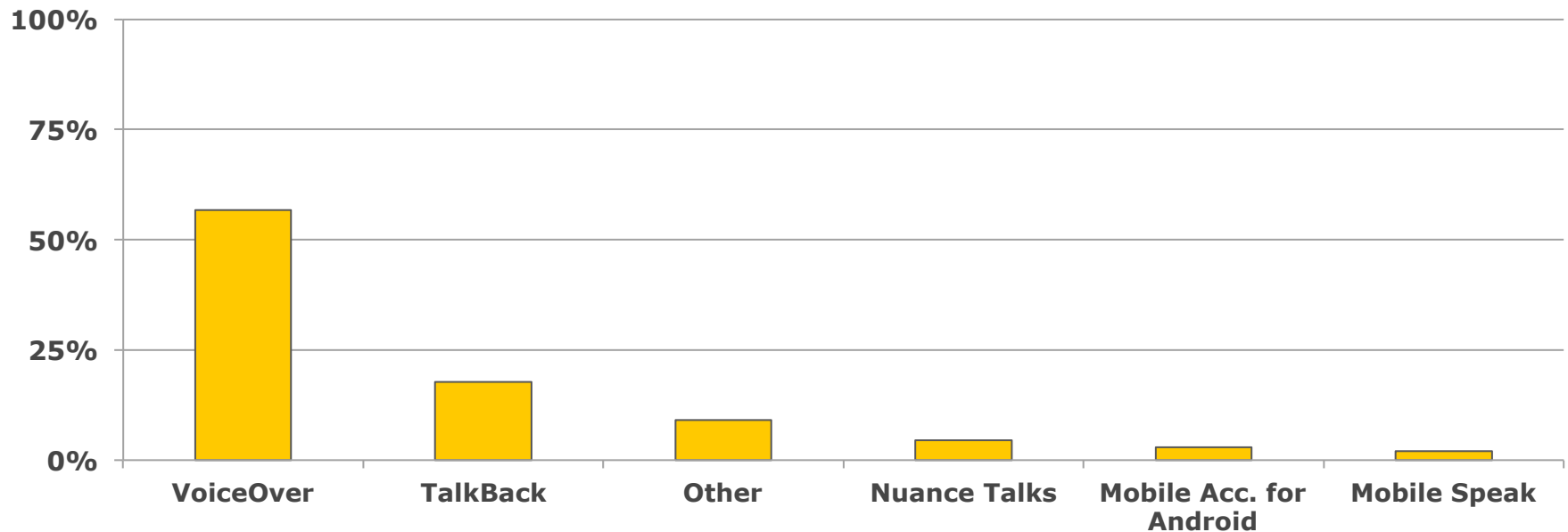
Desktop Screen Reader Trends



Mobile Screen Reader Trend



Mobile Screen Reader Usage (7/2015)



Screen Reader	Commonly Used
VoiceOver	57%
TalkBack	18%
Other	9%
Nuance Talks	5%
Mobile Acc. for Android	3%
Mobile Speak	2%

JAWS

- <http://www.freedomscientific.com/Products/Blindness/JAWS>
- Windows-only
- Desktop-only
- **Pros**
 - Largest desktop market share
- **Cons**
 - Cost
 - \$900 (Free Trial Version shuts off after 40 min)
 - Free in computer labs on campus
 - Resource hog
 - Interferes with other software

NVDA

- <http://www.nvaccess.org/>
- Windows-only
- Desktop-only
- **Pros**
 - Free, open source (donate!)
 - Portable install & direct run from installer
 - Lightweight
 - Doesn't interfere with other software
- **Cons**
 - Usage share smaller than JAWS
- Preferences > Synthesizer... > Microsoft Speech API

VoiceOver

- Apple-only
- **Pros**
 - Free (built into iOS, OS X)
 - **Desktop and mobile**
 - Largest mobile market share
- **Cons**
 - Apple-only
 - Smaller desktop market share

Google TalkBack

- Android-only
- **Pros**
 - Free
 - Mobile
- **Cons**
 - Small market share

Color Testing

Colour Contrast Analyser

- <http://www.paciellogroup.com/resources/contrastanalyser/>
- Free
- Windows and Mac
- Desktop-only
- No installation (just run exe)
- Doesn't work on second monitor
- Color blindness contrast (F6)



Colour Contrast Analyser

The screenshot shows the 'Colour Contrast Analyser' application window. It has a menu bar with 'Options', 'Image', and 'Help'. The main area is divided into several sections: 'Foreground' and 'Background' color selection, an 'Algorithm' section with radio buttons for 'Colour brightness/difference' and 'Luminosity' (selected), a checkbox for 'Show contrast result for colour blindness', and a 'Result - Luminosity' section. The 'Result' section shows a 'Contrast ratio: 21.0:1' and a 'Display details' checkbox. Below this, there are two columns: 'Text' and 'Large text'. Each column has two rows of results, both marked with green checkmarks and 'Pass' status for AA and AAA standards.



Colour Contrast Analyser

Options Image Help

Foreground

Colour select:  Hex: #000000 

Background

Colour select:  Hex: #FFFFFF 





Algorithm

☐ Colour brightness/difference ☒ Luminosity

☐ Show contrast result for colour blindness

Result - Luminosity


Contrast ratio: 21.0:1 ☐ Display details


Text	Large text
 Pass (AA)	 Pass (AA)
 Pass (AAA)	 Pass (AAA)

HELPING STUDENTS LEARN GENOMICS AND EVOLUTION

Colour Contrast Analyser

Options Image Help

Foreground
Colour select:  Hex: #000000

Background
Colour select:  Hex: #FFFFFF

Algorithm
☐ Colour brightness/difference ☒ Luminosity

☐ Show contrast result for colour blindness

Result - Luminosity
Contrast ratio: 21.0:1 ☐ Display details

Text

<input checked="" type="checkbox"/> Pass (AA)	<input checked="" type="checkbox"/> Pass (AA)
<input checked="" type="checkbox"/> Pass (AAA)	<input checked="" type="checkbox"/> Pass (AAA)

F11 to pick foreground colour.

SCIENCE & TECHNOLOGY

WHY THIS MATTERS:

Data can help guide legal decisions. Better decisions are made when using a combination of analytics and human expertise. More informed decision making will help reduce legal fees and make law more efficient and accessible.



All in this category

Combining forensic art and technology to catch criminals

Hand-drawn forensic sketches based on witness descriptions are a traditional yet time-consuming method used to catch criminals. But in some cases, authorities don't have the luxury of time. A new automated sketch recognition system developed at MSU is changing this race against the clock.



Nov. 11, 2014

Usage Example

Colour Contrast Analyser

Options Image Help

Foreground
Colour select: Hex: #000000

Background
Colour select: Hex: #FFFFFF

Algorithm
☐ Colour brightness/difference ☒ Luminosity

☐ Show contrast result for colour blindness

Result - Luminosity
Contrast ratio: 21.0:1 ☐ Display details

Text

<input checked="" type="checkbox"/> Pass (AA)	<input checked="" type="checkbox"/> Pass (AA)
<input checked="" type="checkbox"/> Pass (AAA)	<input checked="" type="checkbox"/> Pass (AAA)

Students learn AND

SCIENCE & TECHNOLOGY

WHY THIS MATTERS:
Data can help guide legal decisions. Better decisions are made when using a combination of analytics and human expertise. More informed decision making will help reduce legal fees and make law more efficient and accessible.

All in this category

Combining forensic art and technology to catch criminals

Hand-drawn forensic sketches based on witness descriptions are a traditional yet time-consuming method used to catch criminals. But in some cases, authorities don't have the luxury of time. A new automated sketch recognition system developed at MSU is changing this race against the clock.

Nov. 11, 2014

Select foreground (text) color

Colour Contrast Analyser

Options Image Help

Foreground
 Colour select: Hex: #E8FFEB

Background
 Colour select: Hex: #FFFFFF

Algorithm
☐ Colour brightness/difference ☒ Luminosity

☐ Show contrast result for colour blindness

Result - Luminosity
 Contrast ratio: 1.1:1 ☐ Display details

Text
 X
 X

Large text
 X
 X

SCIENCE & TECHNOLOGY

WHY THIS MATTERS:
 Data can help guide legal decisions. Better decisions are made when using a combination of analytics and human expertise. More informed decision making will help reduce legal fees and make law more efficient and accessible.

All in this category

Combining forensic art and technology to catch criminals
 Hand-drawn forensic sketches based on witness descriptions are a traditional yet time-consuming method used to catch criminals. But in some cases, authorities don't have the luxury of time. A new automated sketch recognition system developed at MSU is changing this race against the clock.

Nov. 11, 2014

Select background color that's darkest/lightest (i.e., worst)

HELPING STUDENTS LEARN GENOMICS AND EVOLUTION

Colour Contrast Analyser

Options Image Help

Foreground
Colour select: Hex: #E8FFEB

Background
Colour select: Hex: #B8CDC6

Algorithm
☐ Colour brightness/difference ☒ Luminosity

☐ Show contrast result for colour blindness

Result - Luminosity
Contrast ratio: 1.6:1 ☐ Display details

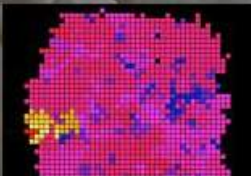
Text

<input checked="" type="checkbox"/> Fail (AA)	<input checked="" type="checkbox"/> Fail (AA)
<input checked="" type="checkbox"/> Fail (AAA)	<input checked="" type="checkbox"/> Fail (AAA)

SCIENCE & TECHNOLOGY

WHY THIS MATTERS:

Data can help guide legal decisions. Better decisions are made when using a combination of analytics and human expertise. More informed decision making will help reduce legal fees and make law more efficient and accessible.



All in this category

Combining forensic art and technology to catch criminals

Hand-drawn forensic sketches based on witness descriptions are a traditional yet time-consuming method used to catch criminals. But in some cases, authorities don't have the luxury of time. A new automated sketch recognition system developed at MSU is changing this race against the clock.



Nov. 11, 2014

Result: Fail!

Colour Contrast Analyser

Options Image Help

Foreground
Colour select: [dropdown] Hex: #E8FFEB

Background
Colour select: [dropdown] Hex: #B8CDC6

Algorithm
☐ Colour brightness/difference ☒ Luminosity

☐ Show contrast result for colour blindness

Result - Luminosity
Contrast ratio: 1.6:1 ☐ Display details

Text
Fail (AA)
Fail (AAA)

Large text
Fail (AA)
Fail (AAA)

STUDENTS LEARN AND

SCIENCE & TECHNOLOGY

WHY THIS MATTERS:
Data can help guide legal decisions. Better decisions are made when using a combination of analytics and human expertise. More informed decision making will help reduce legal fees and make law more efficient and accessible.

All in this category

Combining forensic art and technology to catch criminals

Hand-drawn forensic sketches based on witness descriptions are a traditional yet time-consuming method used to catch criminals. But in some cases, authorities don't have the luxury of time. A new automated sketch recognition system developed at MSU is changing this race against the clock.

Nov. 11, 2014

What about the shadowed text?

Colour Contrast Analyser

Options Image Help

Foreground

Colour select: Hex: #FFFFFF

Background

Colour select: Hex: #B8CDC6

Algorithm

☐ Colour brightness/difference ☒ Luminosity

☐ Show contrast result for colour blindness

Result - Luminosity

Contrast ratio: 1.7:1 ☐ Display details

Text

Fail (AA)

Fail (AAA)

Large text

Fail (AA)

Fail (AAA)

SCIENCE & TECHNOLOGY

WHY THIS MATTERS:

Data can help guide legal decisions. Better decisions are made when using a combination of analytics and human expertise. More informed decision making will help reduce legal fees and make law more efficient and accessible.

All in this category

Combining forensic art and technology to catch criminals

Hand-drawn forensic sketches based on witness descriptions are a traditional yet time-consuming method used to catch criminals. But in some cases, authorities don't have the luxury of time. A new automated sketch recognition system developed at MSU is changing this race against the clock.

Nov. 11, 2014

What about the shadowed text?

HELPING STUDENTS LEARN GENOMICS AND EVOLUTION

Colour Contrast Analyser

Options Image Help

Foreground
Colour select: Hex: #FFFFFF

Background
Colour select: Hex: #96A5A0

Algorithm
☐ Colour brightness/difference ☒ Luminosity

☐ Show contrast result for colour blindness

Result - Luminosity
Contrast ratio: 2.6:1 ☐ Display details

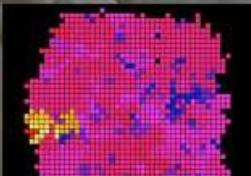
Text

Fail (AA)	Fail (AA)
Fail (AAA)	Fail (AAA)

SCIENCE & TECHNOLOGY

WHY THIS MATTERS:

Data can help guide legal decisions. Better decisions are made when using a combination of analytics and human expertise. More informed decision making will help reduce legal fees and make law more efficient and accessible.



All in this category

Combining forensic art and technology to catch criminals

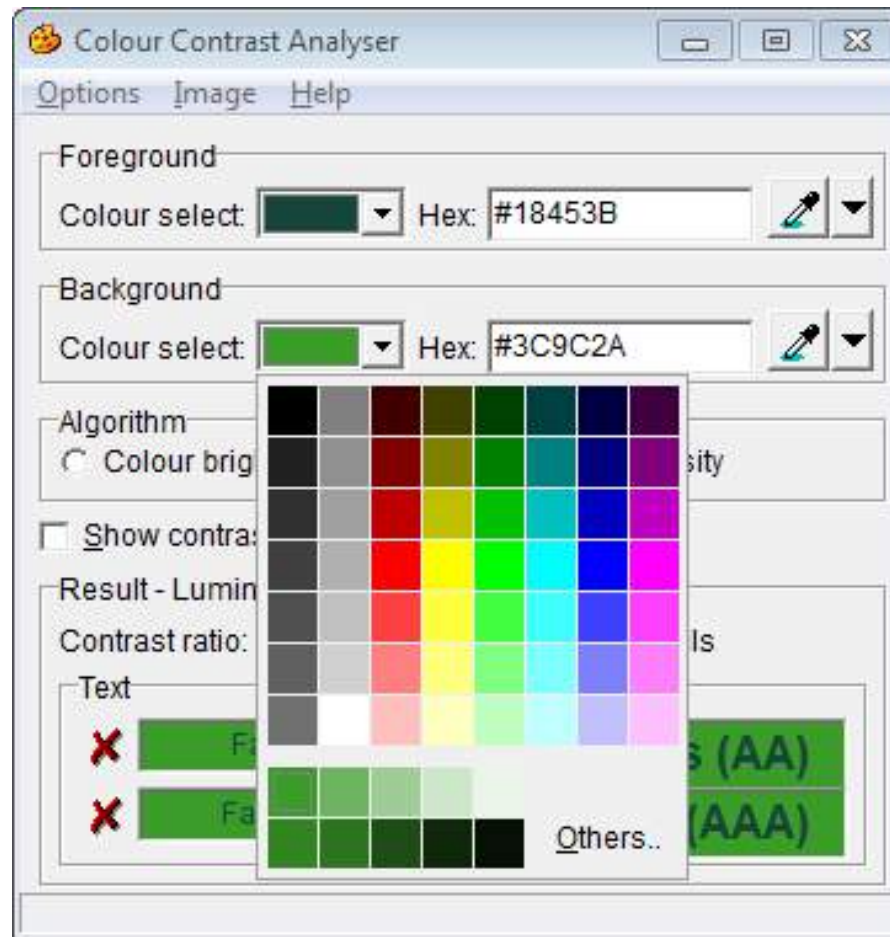
Hand-drawn forensic sketches based on witness descriptions are a traditional yet time-consuming method used to catch criminals. But in some cases, authorities don't have the luxury of time. A new automated sketch recognition system developed at MSU is changing this race against the clock.



Nov. 11, 2014

Nope!

Quick Color Fixes



Color Blindness Simulators

- Colorblind Web Page Filter
 - <http://colorfilter.wickline.org/>
- Coblis
 - <http://www.color-blindness.com/coblis-color-blindness-simulator/>

Top 3 Tools

Top 3 Tools

1. Your Brain
2. Your Eyes
3. Your Ears

Contact Information

Graham L. Pierce

University Outreach and Engagement
Michigan State University

Kellogg Center
219 S. Harrison Road, Room 95
East Lansing, MI 48824

Email: glpierce@msu.edu

Web: <http://www.msu.edu/~glpierce/>

Phone/Fax: 517-884-0364