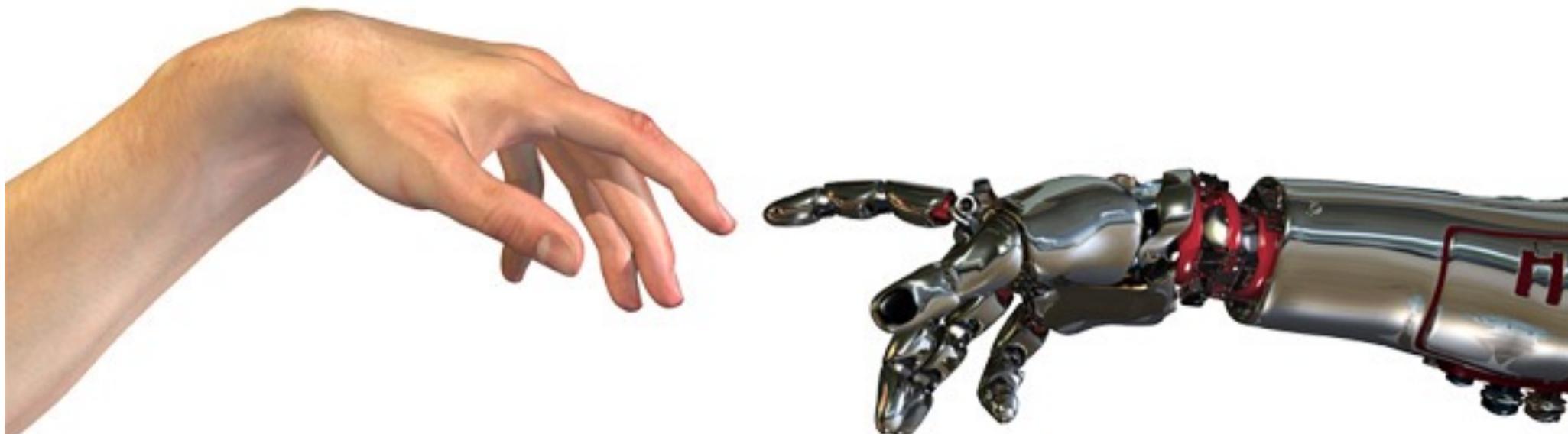


HUMAN-COMPUTER INTERACTION

UNIVERSAL PRINCIPLES OF HUMAN-COMPUTER INTERACTION DESIGN



OBJECTIVES

- 1.) Accessibility (cont.),
- 2.) Aesthetic-Usability,
- 3.) Accelerators



IF YOU ARE... SAY, A WEB DEVELOPER --

4 QUESTIONS TO ASK YOURSELF

1. **Visual** (e.g., color blindness)
2. **Motor/mobility** (e.g., wheelchair-user concerns)
3. **Auditory** (hearing difficulties)
4. **Seizures** (especially photosensitive epilepsy)
5. **Learning/cognitive** (e.g., dyslexia)

- To understand these principles, ask yourself a series of questions when designing:
 1. **Perceivable:** Can I consume content on my site in different ways? (Having closed captions for a video, for example)
 2. **Operable:** Can the site function without confusion and without the use of a mouse or complex interactions?
 3. **Understandable:** Can a user understand how the user interface of the site functions and the information on the site?
 4. **Robust:** Can different assistive devices (screen readers, for example) understand the website?



STANDARDS

- But how to create and integrate specific rules and practices which would be a guide to design product in accessible approach?
- Guys/gals from W3C already did it and provide web community with guidelines, standards, and techniques, such as the Web Content Accessibility Guidelines (WCAG), which is the international standard ISO/IEC 40500.

Link to standards-<https://www.w3.org/WAI/standards-guidelines/wcag/>



EXAMPLES OF WEB ACCESSIBILITY*

- Alternative Text for Images

*Did you know? Vision problems are more pervasive than most of us realize. Upwards of 285 million people worldwide are visually impaired.



- Keyboard input - some people cannot use a mouse, consider *assistive technologies*



EXAMPLES OF WEB ACCESSIBILITY

▪ Increase text Visibility - Proper Contrast Ratio

For each set of text within your app, the *color contrast* – or difference in perceived brightness between the color of the text and the color of the background behind the text – is recommended to be above a specific threshold. The exact threshold depends on the text's font size and whether the text appears in bold:

- If the text is smaller than 18pt, or if the text is bold and smaller than 14pt, the color contrast ratio should be at least 4.5:1.
- For all other text, the color contrast ratio should be at least 3.0:1.

The following image shows two examples of text-to-background color contrast:



Figure 1. Lower than recommended (left) and sufficient (right) color contrast



Examples of hard vs. easy to read type on images

WCAG 2.0 requires a **contrast ratio** of at least 4.5:1.

To check the text-to-background color contrast in your app, use an online color contrast checker or the [Accessibility Scanner](#) app.

EXTENSION - SIMULATOR

We analyzed 6,554 websites for accessibility 🎉 [Read the report >](#)

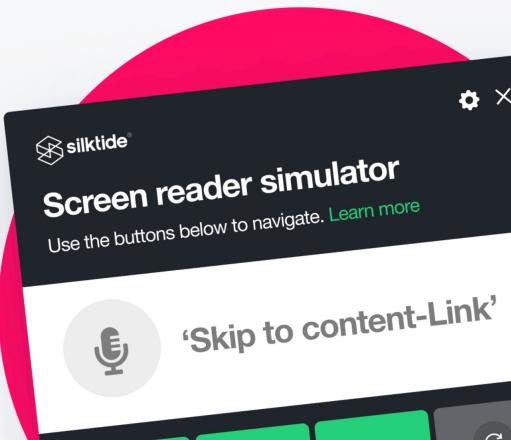
Careers Support Login Contact

 Silktide Solutions > Platform Accessibility Resources > Case studies Request demo >

Disability simulator for the web

Experience your website with a range of simulated disabilities, including color blindness and dyslexia, with our free toolbar for Google Chrome.

[Add to Chrome >](#)



chrome web store

HOME EXTENSIONS CHROME WEBSITE ACCESSIBILITY SIMULATOR



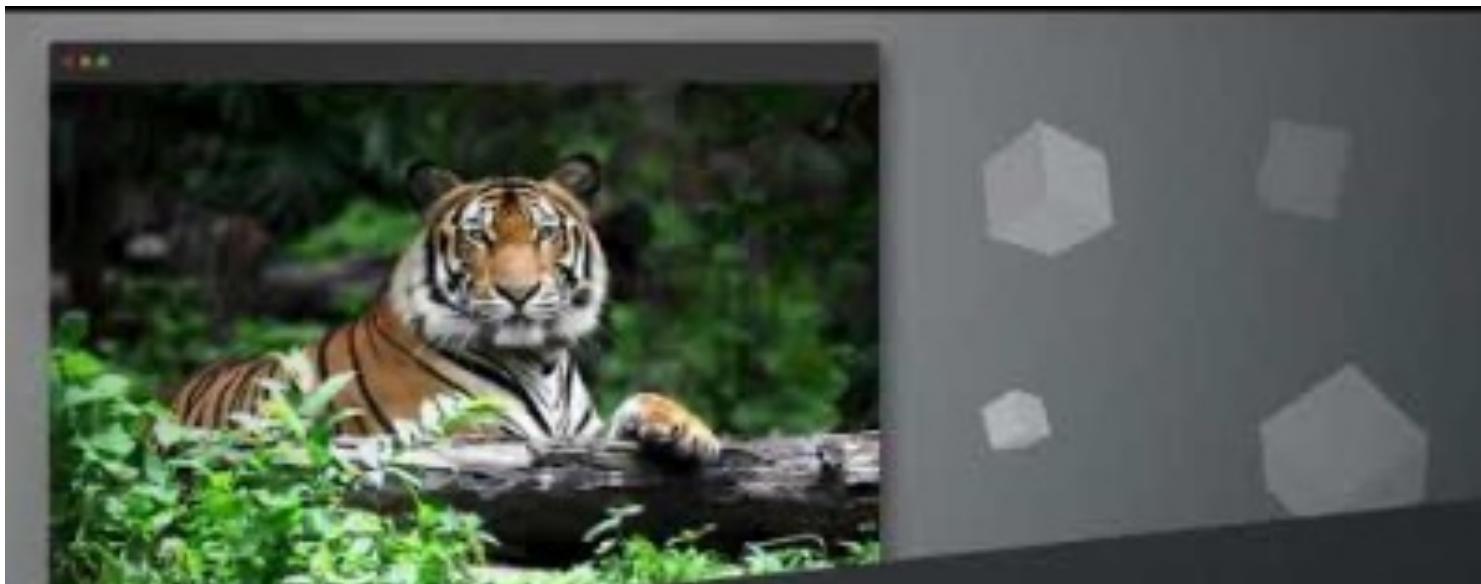
Silktide - website accessibility simulator

Offered by: Silktide

★★★★★ 15 | [Accessibility](#) |  9,000+ users

 Runs offline

<https://chrome.google.com/webstore/detail/silktide-website-accessibility/okcpimdfkpkjcbihbmhppldhiebhaf?hl=en-US>



BROWSE WEBSITES FROM
A **DISABLED USER'S PERSPECTIVE**

6

ACCESSIBILITY TOOLS AT YOUR DISPOSAL

WebAIM was a first contrast checker according to WCAG guides. Here you can choose text color and background color and get Contrast Ratio score:

The screenshot shows the WebAIM contrast checker interface. It includes two color selection boxes: 'Foreground Color' (#0000FF) and 'Background Color' (#FFFFFF). A 'Contrast Ratio' box displays '8.59:1'. Below these are sections for 'Normal Text' and 'Large Text', each showing a text example ('The five boxing wizards jump quickly.') and WCAG AA/AAA compliance status ('Pass').

<https://webaim.org/resources/contrastchecker/>

<https://support.microsoft.com/en-us/office/improve-accessibility-with-the-accessibility-checker-a16f6de0-2f39-4a2b-8bd8-5ad801426c7f>

The screenshot shows the Microsoft Accessibility Checker tool. It features a ribbon with tabs like Home, Insert, Design, Layout, References, Mailings, Review, View, and Developer. A section titled 'Improve accessibility with the Accessibility Checker' provides instructions for using the ribbon to check accessibility.



Android Accessibility Suite

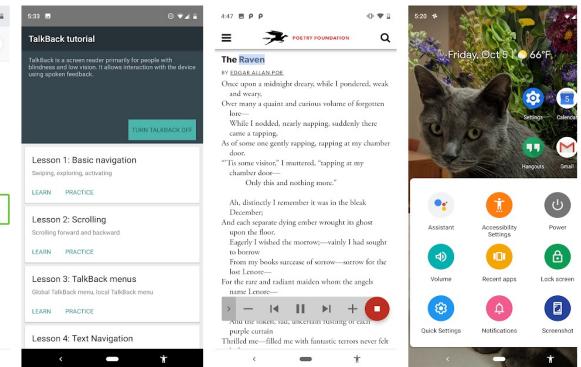
Google LLC Tools

Everyone

You don't have any devices.

Add to Wishlist

Install



<https://play.google.com/store/apps/details?id=com.google.android.apps.accessibility.auditor&hl=en>

Accessibility Scanner is a tool that suggests accessibility improvements for Android apps

CHECKERS/SCANNERS



MORE ACCESSIBILITY TOOLS AT YOUR DISPOSAL



MATERIAL DESIGN



Build beautiful products, faster.

Material is a design system – backed by open-source code – that helps teams build high-quality digital experiences.

- Color tool within Google's Material Design color palette helps designers to choose the right color for his/her interface and check legibility to use it with black/white/custom text.

- A cool feature that you can see what minimal opacity of selected color you can pick.

Primary #673ab7	Aa Large Text	Aa Normal Text
White Text	min 50% opacity	min 71% opacity
Black Text	NOT LEGIBLE	NOT LEGIBLE
P – Light #9a67ea	Aa Large Text	Aa Normal Text
White Text	min 80% opacity	NOT LEGIBLE
Black Text	min 56% opacity	min 79% opacity
P – Dark #320b86	Aa Large Text	Aa Normal Text
White Text	min 38% opacity	min 52% opacity
Black Text	NOT LEGIBLE	NOT LEGIBLE



Personas for Accessible UX

Posted on January 15, 2014 by Whitney Quesenberry | 4 comments

This page has a quick introduction to the personas we created for this book. The full version of the personas with more details about them and their stories will be posted over the next few weeks.

Trevor



High school student with autism
Likes games and computer worlds
Poor reading skills and poor social skills; difficulty with visual comprehension

[Meet Trevor](#)

Emily



Goes to college and works in a community center
Has cerebral palsy and uses a computer for communication
Uses a scooter for mobility and has minimal use of her hands

[Meet Emily](#)



TEST YOUR APP'S ACCESSIBILITY

- Testing for accessibility lets you experience your app from the perspective of your users and find usability issues that you might otherwise miss.
 - Accessibility testing can reveal opportunities to make your app more powerful and versatile for **all your users**, including those with disabilities.
1. **Manual testing:** Interact with your app using accessibility services.
 2. **Testing with analysis tools:** Use tools (e.g., scanners/checkers to discover opportunities to improve your app's accessibility.
 3. **Automated testing:** Turn on accessibility testing in e.g., Espresso (<https://developer.android.com/training/testing/espresso/accessibility-checking>) and Robolectric (<http://robolectric.org/javadoc/3.1/org/robolectric/util/AccessibilityUtil.html>).
 4. **User testing:** Get feedback from real people who interact with your app. “Real people” = those with disabilities.



WHY BEAUTIFUL-LOOKING PRODUCTS ARE PREFERRED OVER USABLE-BUT-NOT-BEAUTIFUL ONES.

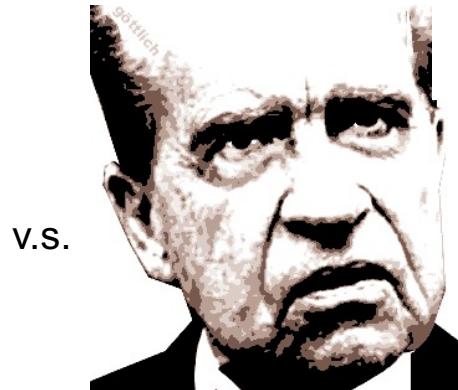


VS



Aesthetic-Usability Effect

- Aesthetic designs are perceived as easier to use than less aesthetic designs.
- A similar phenomenon is documented with regard to human attractiveness-first impressions of people influence attitude formation and measurably affect how people are perceived and treated.



v.s.

iMac
Pretty. Freaking powerful.



Meet the next generation of notebooks.



Majority of the audience who heard the first debate on radio thought Nixon won; those who watched on television were so seduced by the visual that they gave the nod to Kennedy.



Aesthetic-Usability Effect — subjectively rated easier to use even when no usability advantage can be objectively measured.

Aesthetic things are perceived to be easier to use than ugly things.

- Aesthetic things are often subjectively rated as easier to use, even when no usability advantage can be objectively measured.
- Aesthetic things are more effective at fostering positive attitudes than ugly things, making people more tolerant when problems are encountered.
- Aesthetic things are more likely to be tried, accepted, displayed, and repeatedly used than ugly things.
- Aspire to create aesthetically pleasing designs. It is more than ornamentation—it is an investment in user acceptance, forgiveness, and satisfaction.



People display the HomeHero extinguisher on counters due to its striking aesthetic, making it more accessible in emergencies.

Remember, what they say, versus what they do

The screenshot shows the homepage of the Fitbit Zip website. At the top, there's a teal navigation bar with the word "zip" in white. Below the navigation bar is a large photograph of three children playing hopscotch on asphalt. A pink Fitbit Zip activity tracker is superimposed on the ground between the children. Overlaid text on the image reads "The tracker that hides while you seek." In the center of the image, the product is labeled "zip WIRELESS ACTIVITY TRACKER". Below the product image are two buttons: "WATCH VIDEO" with a play icon and "BUY NOW \$59.95". At the very bottom of the page, there's a thin teal footer bar.



Evolution of user's perception, can change...

The screenshot shows the Arcadis website homepage. At the top, there is a navigation bar with links for "Global", "Select region", "Arcadis Blog", "Careers", "Investors", "News", and "Contact Us". The main header features the Arcadis logo with the tagline "Design & Consultancy for natural and built assets". Below the header is a large banner image showing a man and a woman looking up at a modern building at night. The banner includes the date "September 12, 2016" and the headline "Zurich Revealed As Most Sustainable Global City". A "View News" button is located in the bottom left corner of the banner. The rest of the page content is visible below the banner.



A KEY TAKE HOME POINT & PSYCHOLOGY AT USE



Dreamstime.com

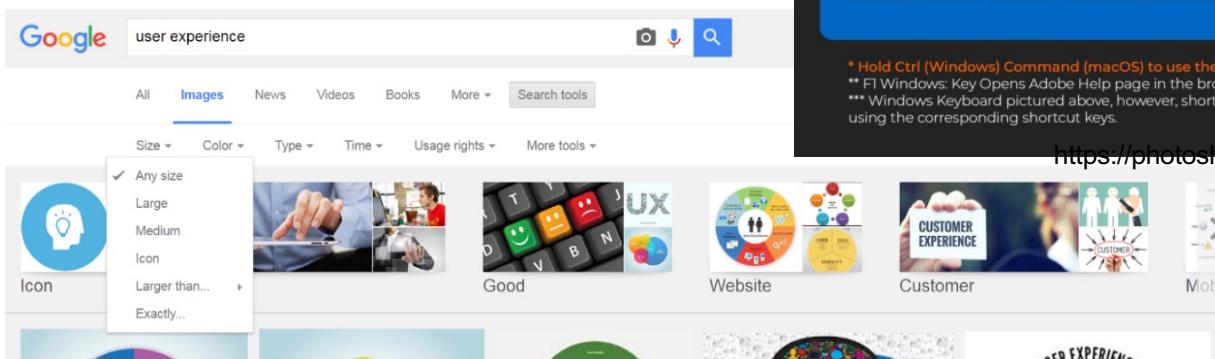
- What people say vs. what they do
 - You as a Developer, Design, Research, Computer Scientist, HCI person must find this out.
- Why the clown (for the record they scare me – eek)...
 - Images evoke physiological responses, memories, etc.
 - I use them to help make what I hope is a memorable point or to break flow and get your attention.



ACCELERATORS - ALLOW THE USER TO DO MORE OR LESS!

HOW TO HANDLE 80/20-PARETO EFFECT (SEE IN PARETO EFFECT IN SLIDES TO COME) IN INTERFACE DESIGN PROVIDES FLEXIBILITY + EFFICIENCY FOR MORE USERS.

- Accelerators – unseen by the novice user – may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.



While a novice user uses the default google image search, the expert user always can refine the search by size, color, type, and so on.