Accessibility (A11y) & Universal Design
• Understand
  • Principles of universal design
  • Application of universal design to technology and to accessibility
  • CSU Accessible Technology Initiative
  • Accessibility best practices

• Be able to
  • Conduct a four-point accessibility evaluation
What is Accessibility and Universal Design?

ACCESSIBILITY
Accessibility ensures everyone can perceive, understand, engage, navigate, and interact with technology regardless of device, software, or product **without** barriers.

EVERYONE!

UNIVERSAL DESIGN
The design that is simple, useful and accommodates a wide range of individual preferences and abilities.

Making design accessible to everyone in society
Accessibility is not about disability; it’s actually about ability. It’s about making it easy for everyone.
Understanding Accessibility, 2 of 2

VISION

Low vision, blind, colorblind, etc.

• Screen readers
• Braille display
• High contrast settings
• Magnifiers

HEARING

Deaf, hard of hearing, noisy environment

• Sign language
• Captions/Subtitles
• Transcripts

MOBILITY

Muscular dystrophy, arthritis, injury, etc.

• Keyboard only
• Speech to text

COGNITIVE

Learning disability, dyslexia, ADHD, etc.

• Digital content layout
• Information organization

LEARNING

Learning styles, preferences, etc.

• Visual learners
• English as a Second Language (ESL)
• Accents
What is Assistive Technology?

Assistive Technology (AT) are “products, equipment, and systems that enhance learning, working, and daily living for persons with disabilities.”

Screen Readers
Magnification Software
Speech Recognition
Trackball Mouse
Keyboard

Zoom Text
Braille
Captions/Subtitles
Captioned Telephone
Video Relay Services

Sign Language Interpreter
Video Relay Services (VRS)

Deaf Caller
Hearing Caller
What are Screen Readers

Screen readers are a form of assistive technology (AT) software that enables access to a computer, and all the things a computer does, by attempting to identify and interpret what is being displayed on the computer screen using text-to-speech. Screen readers can only access and process live text. Normally used by someone who is visually impaired.
Screen reader program for Microsoft Windows that allows blind and visually impaired users to read the screen either with a text-to-speech output or by a refreshable Braille display. **NVDA screen reader** can be downloaded free of charge by anyone.

Provides auditory descriptions of each onscreen element using gestures, a keyboard, or a Braille display.

Adds spoken, audible, and vibration feedback to your device.

Screen magnifier for Microsoft Windows that allows you to see and hear everything on the computer.
Benefits of using a screen reader

- provides access to someone who does not have useful vision, mobility or has a learning disability to access text on the screen

- offers same level of independence and privacy as anyone else
Principles for Information and Communication Technology (ICT)

• **Perceivable:** so that individuals with visual impairments can understand the information being conveyed

• **Operable:** navigate to information in multiple methods (not only the mouse)

• **Understandable:** understandable enough so that all different learning styles can engage

• **Robust:** IT products should be compatible with a user’s desired technologies or system preferences
Universal Design Principles

1. **Equitable use.** The design is useful and marketable to people with diverse abilities. For example, a website that is designed to be accessible to everyone, including people who are blind and use screen reader technology, employs this principle.

2. **Flexibility in Use.** The design accommodates a wide range of individual preferences and abilities. An example is a museum that allows visitors to choose to read or listen to the description of the contents of a display case.

3. **Simple and intuitive.** Use of the design is easy to understand, regardless of the user’s experience, knowledge, language skills, or current concentration level. Science lab equipment with clear and intuitive control buttons is an example of an application of this principle.

4. **Perceptible information.** The design communicates necessary information effectively to the user, regardless of ambient conditions or the user’s sensory abilities. An example of this principle is captioned television programming projected in a noisy sports bar.

5. **Tolerance for error.** The design minimizes hazards and the adverse consequences of accidental or unintended actions. An example of a product applying this principle is software applications that provide guidance when the user makes an inappropriate selection.

6. **Low physical effort.** The design can be used efficiently, comfortably, and with a minimum of fatigue. Doors that open automatically for people with a wide variety of physical characteristics demonstrate the application of this principle.

7. **Size and space for approach and use.** Appropriate size and space is provided for approach, reach, manipulation, and use regardless of the user’s body size, posture, or mobility. A flexible work area designed for use by employees who are left- or right-handed and have a variety of other physical characteristics and abilities is an example of applying this principle.
Universal Design
Universal Design Example
Mobile Universal Design

- Siri, Genie, etc.
- Dictation
- Predictive text
- Vibrating/flashing alerts
- Safari Reader
- Screen Reader

iOS - Voiceover

Android - Talkback
Is Captioning Universal Design?
Multimedia Captioning

• CSUN is committed to ensuring that all content utilized by the campus is accessible to all users. This means that all videos, audio, captured lectures, recorded presentations— instructional media—must have closed captions. (This is a federal law, state law, and CSU policy.)

• All students who are enrolled in a course must be able to access the content in the course.

• Visit the [Request Services webpage](http://www.csun.edu/captioning) to request media captioning through NCOD: Deaf and Hard of Hearing Services.

[Image of four students using a laptop]
Americans with Disabilities Act (ADA)

Section 508
Accessibility compliance

State of California Government Code Section 11135

CSU E.O. 926
"It is the policy of the CSU to make information technology resources and services accessible to all CSU students, faculty, staff and the general public regardless of disability."

Accessible Technology Initiative
- Instructional Materials
- Web
- Procurement
Need for Accessibility

- 20% of the U.S. population has at least one disability (U.S. Census Bureau: Disability [2010])
  - 11% of college students report a disability (U.S. Department of Education, National Center for Education Statistics [2016])
  - Nearly 1 in 5 people have disability in the U.S. (U.S. Census Bureau Reports [2010])

![Chart showing millions of people in the U.S. with disabilities]

U.S. Census Bureau
POUR Best Practices

- Alternative Text
  - Images
  - Shapes
- Structure
  - Headings
  - Lists, etc.
- Navigation/Links
  - Link requirements
- User Interface
  - Keyboard accessibility
- Color
  - Color contrast
  - Meaning without color
Organize content with headings, subheadings, images, videos, and footer are important for **usability** and **accessibility**.
Example 1: Reading long, dense text documents can be a daunting task for learners

As part of our commitment to excellence through diversity and inclusion, California State University, Northridge (CSUN) strives to ensure that campus communication and information technology is accessible to everyone. The California State University system statement on accessibility is articulated in California State University - Executive Order 1111, in accordance with both federal and state laws including the Americans with Disabilities Act of 1990 (ADA) and Section 508 of the U.S. Rehabilitation Act.

Need assistance or have a question not answered here? Please contact the Universal Design Center (UDC) at UDC@csun.edu or, during business hours (Monday through Friday, 8am to 5pm Pacific time), at (818) 677-5898.

In this context, “accessibility” means that people with disabilities have access – to facilities, to information and to technology.

“Universal design” takes this concept one step further, to ensure that everyone can perceive, understand, engage, navigate and interact regardless of ability or preference.

The UDC supports the campus community in their efforts to make it possible for individuals to learn, communicate, and share via information and communication technology. One way we do this is by assisting the campus community to ensure their information and communication technology is interoperable, usable and accessible, so that individual learning and processing styles and/or physical characteristics are not barriers to access.

The role of the UDC is to help CSUN implement business practices which enable the campus to meet policy standards under the Accessible Technology Initiative Coded Memoranda.

What does this mean to me?

Everyone has a part in creating accessible and usable information. The responsibility of creating and maintaining accessible content falls to the entire campus community.

Example 2: Well-structured documents help students organize and process texts
Heading Styles, 2 of 2

• Use Heading Styles in a logical sequence
• Heading Styles (Heading 1 through Heading 6)
  • Heading 1: Document Title or a major section
  • Heading 2: Major subsection titles
  • Heading 3: Further subsection titles, and so forth
• Using heading styles means you can also quickly build a table of contents, reorganize your document, and reformat its design without having to manually change each heading's text.

Headings are styles to give a document structure by category or topic.

Without headings, a person using assistive technology like a screen reader cannot navigate by sections, subsections, or scan section titles to understand the document structure.
Heading Styles compatible with other programs

Microsoft Word

Website

```
<h1> Main Heading </h1>
<h2> Sub Heading </h2>
  <h3> Sub sub heading </h3>
<h2> Sub Heading </h2>
  <h3> Sub sub heading </h3>
```

Canvas

Header 2 -> This is the Title
Header 3 -> This is the sub title
Header 4 -> This is a category
Paragraph -> This is the body of the content

Google Docs

Adobe InDesign uses Paragraph Styles to format Heading tags <H1> through <H6>
Visual Challenge

Children leaving school before completing their Primary Education

In the Sub-Saharan, 11.07 million children leave school before completing their primary education. In South and West Asia, that number reaches 13.54 million.

Normal vision  Low vision  Color blindness  Blind or deaf-blind

What’s the best way to make images accessible to everyone?
Alternative or Alt Text

• A written description of images and/or objects that can be read by a blind or low vision using screen reader technology.

• Screen readers and other assistive technologies can’t convert images into words/texts.

• Captions are universal and accessible for everyone.

• “Image of…”, “photo of…” is not needed.

• Recommend brief descriptive text within 8 to 80 characters long.

• Best practices for accessible images

Tiny turtle eating a ripe strawberry.
**Color Contrast**

**HUMANITY & TECHNOLOGY**

**Global Bandwidth per second**
- 100 Terabytes (200,000,000,000 bits per second)
- 200 Exabytes (200,000,000,000,000,000 bits per second)

The global bandwidth is said to exceed 1000 Tbps by 2030 and data transferred will reach data scale much sooner than that.

**Library of Congress**
- Text, Audio, Video

**Digital Data Stored Globally**
- 20 Petabytes (20,000,000,000,000 bytes)
- 2.7 Zettabytes (2,689,000,000,000,000 bytes)

Digital data stored increased by almost 50% in a few years. We can only imagine the amount of data in the world by the year 2030.

**Human Speech in Data Form (2033)**
- 42 Zettabytes (45,097,156,608 Tbps)

The approximate cost of a zettabyte right now is $185 trillion (106 petabytes) and would require data centers the size of Oklahoma to house the information.

**Total Data Storable in Human**
- 170 Yottabytes (186,916,977,000,000,000 Tbps)

**Conversion Table**

<table>
<thead>
<tr>
<th>128 Megabyte</th>
<th>1 Gigabyte</th>
</tr>
</thead>
<tbody>
<tr>
<td>128 MB</td>
<td>1 GB</td>
</tr>
<tr>
<td>128 MB</td>
<td>1 GB</td>
</tr>
<tr>
<td>1 Gigabyte</td>
<td>1 TB</td>
</tr>
<tr>
<td>1 Petabyte</td>
<td>1 PB</td>
</tr>
<tr>
<td>1 Exabyte</td>
<td>1 EB</td>
</tr>
<tr>
<td>1 Zettabyte</td>
<td>1 ZB</td>
</tr>
<tr>
<td>1 Yottabyte</td>
<td>1 YB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1 Terabyte</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 TB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1 Petabyte</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 PB</td>
</tr>
</tbody>
</table>

**Sources**
- anilnath.technica, May 1st 2012
- blogloc.gov, April 25th, 2012
- thec.information, Nov 5, 2003
- businesswire.com, Dec 9, 2011
Meaning without Color

Fill Out the form below to register now

All field in red are required information

Contact Information

First Name: 

Last Name: 

City: 

Submit Query
Provide descriptions if using color to convey meaning

Example 1: Inaccessible color highlights in red
May 11-17, 2019

Example 1: Accessible with a description
May 11-17, 2019 (final exams)

Example 2: Inaccessible table

<table>
<thead>
<tr>
<th>Assignments (overdue in red)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td></td>
</tr>
<tr>
<td>Chapter 1</td>
<td></td>
</tr>
</tbody>
</table>

Example 2: Accessible table

<table>
<thead>
<tr>
<th>Assignments</th>
<th>Overdue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>Yes</td>
</tr>
<tr>
<td>Chapter 1</td>
<td>No</td>
</tr>
</tbody>
</table>

Example 3: Inaccessible color shape
Color identical may not be recognized by colorblind users

Example 3: Accessible color and number
Check Color Contrast

<table>
<thead>
<tr>
<th>Bad Examples</th>
<th>Good Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red on black is bad</td>
<td>Yellow on black is good</td>
</tr>
<tr>
<td>Blue on orange is bad</td>
<td>Black on orange is ok</td>
</tr>
<tr>
<td>Red on green is bad</td>
<td>White on green is good</td>
</tr>
<tr>
<td>Grey on purple is bad</td>
<td>Aqua on purple is ok</td>
</tr>
</tbody>
</table>

- Download [Colour Contrast Analyser](#) onto your computer (PC/Mac) to ensure accessible contrast or use an online contrast checker from [WebAIM](#).
- WCAG Level AA requires a contrast ratio of at least **4.5:1** for normal sized text (12 pt. font) and **3:1** for large text (14 pt. font).
- [Coblis Color Blindness Simulator](#)
Keyboard Navigation or Touch

- Users should be able to get to content without using a mouse
  - Keyboard
  - Hearing
  - Touch
- Users should be able to access content on different screens (phone, tablet, etc.)
Descriptive Hyperlinks

Not Accessible – vague and redundant

**CSUN News**

**Woman of the Year for the 18th Senate District**

California State University, Northridge President Dianne F. Harrison has been named Woman of the Year for the state’s 18th Senate District by Sen. Robert Hertzberg. [Read more]

**Important Dates for CSUN Commencement 2019**

For graduating seniors, CSUN GradFest 2019 will take place from 9 a.m. to 6 p.m., March 13 and 14, at the CSUN Campus Store Complex. The event gives students the opportunity to make their final preparations for graduation, including renting caps and gowns, information on ceremony schedules, reserving guest tickets, purchasing souvenirs and taking graduation portraits. [Read more]

Blinking the Friendly Hen: 40th Anniversary Exhibition

Comprised of a Relic Chamber, a Blinky Theatre, Blinky book editions (1979-2019), chapel, gift shop, stained glass, and historical artifacts, this fourth retrospective exhibition celebrates historical and contemporary works relating to four decades of the Blinky phenomenon. [Read more]

Accessible – descriptive and unique

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- Read more, click here, email me, or continue is vague and redundant
- Full URL text [https://www.csun.edu/universal-design-center](https://www.csun.edu/universal-design-center) (raw URL may not make sense to screen reader users or others, so make the link text descriptive i.e. [Universal Design Center](https://www.csun.edu/universal-design-center))
Navigation and links

• Link text should clearly identify the target of each link. Good link text should not be overly general.
  • Make sense when read out of context.
  • Describe the destination (document name, website).
  • Be unique for unique destinations.
  • Do not use click here or read more or continue.
  • Do not use different link text to refer to the same resource.
  • Do not use the same link text to refer to different resources.

• Best practice is to bold or underline links.

• Do not use color links as the only method to convey important information.

• Tab order should read from the upper left to the lower right, and make sense to both sighted and visually impaired users.
Microsoft Office Accessibility Checker

- Protect Document: Control what types of changes people can make to this document.
- Inspect Document: Before publishing this file, be aware that it contains:
  - Document properties and author's name
- Check Accessibility: Check the document for content that people with disabilities might find difficult to read.
- Check Compatibility: Check for features not supported by earlier versions of Word.

Universal Design Center

csun.edu/udc
Four-point Accessibility Evaluation

**FONT**
Is the font styling easy to read?

**COLOR**
Is the font color easy to read?

**TAB**
Can a user “tab” through the functions?

**ENLARGE**
Can a user make the font bigger? (ctrl +)
You **CAN** make a big **difference**

Best education and resources available to **EVERYONE** providing ACCESSIBLE

Make **one** design that fits everyone

Documents

Website

Media with captioning
The POWER of CONNECTION

Accessibility

Universal Design

Barrier-Free
access & student success
Reflection

• Creating accessible digital content can’t happen overnight.
• Accessibility and Universal Design is for everyone.

How can we help you make a big difference