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.

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

EVERYONE!
Accessibility is not about disability; it’s actually about ability. It’s about making it easy for everyone to:

- Acquire the same information
- Engage in the same interactions
- Enjoy the same services
Understanding Abilities, 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 Computer Keyboard  Captions/Subtitles  Captions Telephone  Video Relay Services

Deaf Caller  Hearing Caller

Sign Language Interpreter  Video Relay Services (VRS)
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.

- Provides access to someone who is visually impaired, mobility or has a learning disability to access text on the screen.

- Offers same level of independence and privacy as anyone else.
Types of Screen Readers

- **NVDA screen reader** can be downloaded free of charge by anyone. It provides auditory descriptions of each onscreen element using gestures, a keyboard, or a braille display.

- **TalkBack Screen Reader** adds spoken, audible, and vibration feedback to your device.

- **ZoomText** is a screen magnifier for Microsoft Windows that allows you to see and hear everything on the computer.
How Do Screen Readers Work?

• Screen readers read line-by-line from left-to-right and top-to-bottom.

• Screen readers start at the top of a document or website and read any text including alternative text for images, graphics or charts.

• Screen readers navigate a document or website using the keyboard without a mouse. Tab key: jump from link to link, Enter: select a link, arrow keys: navigate a document or website.

• Reading order is important for users with visual challenges. The users can become confused if the document (content, tables, images or charts) is poorly organized or out of order.
Click vs Select

Screen readers and physical or mobility limitation users navigate a document or website using the keyboard without a mouse. The word “Click” is not inclusive of people who can’t use the mouse. Use the word “Select” to write step-by-step instructions.

“Click” or “Click on” Example

- Go to YouTube video player
- Click on Settings gear icon
- Click on Subtitles/CC
- Click on Options to Customize
- Click on Caption Style

Use “Select” Example (Recommend)

- Go to YouTube video player
- Select Settings gear icon
- Select Subtitles/CC
- Select Options to Customize
- Select Caption Style
Designing for Accessibility with POUR

Accessibility incorporates principles to guide the designing and development process of digital content accessible. The POUR principles support foundational considerations for accessibility.

Image courtesy of Accessible Educational Materials
POUR = Perceivable

Can a person’s brain perceive the content regardless of the senses they use? Can a person access content despite being blind, low vision, deaf, deafblind, dyslexia, or...

- Alternative Text for non-text content in variety of formats (Braille, speech, symbols or simpler language)
- Captioning or Transcripts for time-based media
- Content presented in different way (simpler layout) without losing info or structure
- Easier for user to see and hear content (separating background and foreground)
POUR = Operable

Can you access and navigate regardless of the device the user is using?

- JAWS, NVDA, No Mouse, or...

- Functionality using just a keyboard (no mouse) for physical or motor limitations
- Enough time to read or use content
- Can be navigated to find content and know where one is on the screen
- Doesn’t cause seizures i.e. GIF or flickering media
POUR = Understandable

Can the content be understood as easily as possible through simple language and contextual information?

- Text content is readable and understandable (language, reading level, unusual words)
- Use plain language
- Web pages operate in predictable way
- Input assistance – users can avoid or correct mistakes
POUR = Robust

Can the content be accessed regardless of the users operating system, browser, browser window?

- Google Chrome vs, Firefox, vs iPhone vs Windows OS, Android, or...

- Maximize compatibility with current and future technologies
- Add metadata to make content easier to find and use
- Perform an accessibility check
- Perform basic assistive technology testing
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 for ALL
Inspired by Universal Design, Universal Design for Learning (UDL) applies these concepts in the education context, with the goal of minimizing barriers and maximizing learning for all students.

Universal Design for Learning

A research-based set of principles to guide the design of learning environments that are accessible and effective for all.

give all learners equal opportunities to learn including

Expression
providing several ways to demonstrate learning

Representation
presenting the same instruction in multiple ways

Engagement
extending a variety of opportunities for connection and interaction

every LEARNER is unique

Learning Opportunities for All
Universal Design for LEARNING, 2 of 2

AFFECTIVE NETWORKS: THE WHY OF LEARNING

ENGAGEMENT: Look for different ways to motivate and inspire students
Example: Interactive skill-building exercises

RECOGNITION NETWORKS: THE WHAT OF LEARNING

REPRESENTATION: Present information and content in different ways
Example: Captions and transcripts to accompany audiovisual materials

STRATEGIC NETWORKS: THE HOW OF LEARNING

ACTION & EXPRESSION: Provide multiple ways for students to interact with material and express their knowledge
Example: Tests that include different question types such as long answer and multiple choice

Visit CAST UDL Guidelines
Universal Design Example
Is Captioning Universal Design?
Captioning Videos

Per federal and state law, and CSU policy, instructional media (e.g., videos, captured lectures, recorded presentations) must have captions. This includes instructional media used in classrooms, posted on websites or shared in Canvas.

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

- **Faculty**: Funding is available to help faculty generate captions and transcripts for instructional media. Materials should be submitted **at least six weeks** in advance of their use in instruction.

- **Staff**: For CSUN staff who do not provide classroom material, there is a cost through chargeback. For information on the chargeback, email ncod@csun.edu.

[www.csun.edu/captioning](http://www.csun.edu/captioning)
Mobile Universal Design

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

iOS - Voiceover

Android - Talkback
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.
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])
Digital Accessibility Content Analogy

Organize content with headings, subheadings, images, videos, and footer are important for **usability** and **accessibility**.
Documents Structure Example

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

Universal Design Center (Heading 1)

Accessibility Statement (Heading 2)

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Need help? (Heading 3)

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What is Accessibility? What is Universal Design? (Heading 2)

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.

Universal Design Center Mission (Heading 2)

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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.
Direct vs Styles Formatting

Direct Formatting
- Not accessible to any assistive technology such as screen readers
- Can’t create a Table of Contents
- Can’t create a navigation to different sections in a document
- Huge barriers!

Styles Pane Formatting
- Provide structure and make document accessible
- Easier to modify existing formatting
- Accessible to screen readers
- Create and update a Table of Contents
- Quicker navigation to different sections in a document
- Retain document structure when export to PDF
- Save time and save lives!
Heading Styles

• Heading Styles (Heading 1 through Heading 6) in a logical sequence. Do not skip heading levels i.e. Heading 2 to Heading 4, headings should be in order.)
  • **Heading 1:** Document title or main content heading/title (just one)
  • **Heading 2:** Major section heading
  • **Heading 3:** Sub-section of the Heading 2
  • **Heading 4:** Sub-section of the Heading 3, and so on, ending with Heading 6

• *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.*

Headsings 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

Website

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

InDesign

```
Title
Subtitle
Heading 1
Heading 2
Heading 3
Heading 4
Heading 5
```

Google Docs

```
Normal text
```

Microsoft Word

```
AaBbCcDc
Title
Heading 1
Heading 2
Heading 3
Heading 4
Subtitle
```

Note: The image shows examples of heading styles in various programs and how they are represented in HTML, but not all styles are compatible across different programs.
Table of Contents

• Headings structure will automatically populate a table of contents and provide accessible for screen readers rely on headings structure to navigate a page quickly.

• Adding Table of Contents to any documents or syllabus over 8 pages to make it easier for readers to go directly to a specific section in the document.

• Or Custom Table of Contents

• Ensure the ‘Tab leader’ option is ‘…….’

• To change which styles appear, select ‘Options’

• Number each style in the order in the Table of Contents

• Select ‘Ok’ twice
What’s the best way to make images accessible to everyone?
The purpose of alt text is to allow low vision or blind users to understand the purpose of the image. Describe only how image relates to content. What is its purpose? Why the image there?

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.

Keep alt text short 8 to 120 characters or less.

Alt text should be very brief, no more than a sentence or two.

Best practices for accessible images
A stair chase leading up to an entryway is painted yellow with bold black text that reads museums are now.

A hand reaches out of a computer screen giving the hand gesture for stop. The screen reads ‘access denied!’

On the left is the book cover for Haben The Deafblind Woman Who Conquered Harvard Law, and on the right is the quote: “In the Tigrinya language of Eritrea and Ethiopia, Haben means ‘pride.’”

Michelle Obama claps and Barack waves.

Student holds a diploma hardcover up in the air during CSUN commencement. Caption text “and together, as Matadors, we will move mountains.”

More examples of How to Describe Images

• Document Learning Tools: Describing images
• How to Describe Images (Art, Chemistry, Diagrams, Flow Charts, Formatting & Layout, Graphs, Maps, Mathematics, Page Layout, Tables, Text-only images)
• Periodic Table of the Elements
• UDC Best Practices for Describing Images
How to add Alt Text in various software applications?

Office 2016
- Insert image
- Right-click on the image and select “Format Picture”

Office 365
- Right-click on the image and select “Edit Alt Text”

Google Docs
- Right-click on the image and select “Alt Text”

Canvas
- Insert an alternative text by clicking Embed Image
- Write the alternative text in the Alt Text field

Web-One
- Upload image
- Write the alt text in HTML Alt field

InDesign
- Right-click on the image
- Select Object Export Options
- Alt Text tab | Choose Custom from the Alt Text Source | enter alt description

There are more Alt Text field available Email Marketing, Facebook, Instagram, etc.
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.

Blinky 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.

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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. Continue reading about Blinky’s 40th Anniversary Exhibition.

Full URL text 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)
When creating hyperlinks, make sure the text associated with the link is understandable out of context.

• Avoid this: You may find this tutorial [here](#).

• Do this: You may find this [tutorial on creating accessible Word document](#) on our website.

For Printing

• If the document is likely to be printed, include the full URL. If the URL is long, consider creating a shorten URL ([tiny.cc](http://tiny.cc) or [bitly.com](http://bitly.com) or other URL services)

You may find this [tutorial on creating accessible Word document](http://www.csun.edu/udc/word) on our website.

• Avoid using [click here], [more info], [read more], [continue], [email me], and other vague language.

• Do not use different [link text] to refer to the same resource.

• Do not use the same [link text] to refer to different resources.

• Be unique for [unique] destinations.

• 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.
**Humanity & Technology**

**Color Contrast**

**Total Population**: 7.14bn

**Total Computers**: 1.2bn

**Total Cell Phones**: 6.287bn

**Global Bandwidth per Second**: 100 Terabytes (250,000,000,000 bytes per second)

**Data Transferred per Month**: 200 Exabytes (250,000,000,000,000,000 bytes)

The global bandwidth is said to exceed 100 Tbps by 2010 and data transferred will reach a scale much sooner than that.

**Library of Congress Text, Audio, Video**: 20 Petabytes (20,480 Terabytes)

**Digital Data Stored Globally**: 2.7 Zettabytes (2,899,102,900 Terabytes)

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 2023.

**Human Speech in Data Format (2003)**: 42 Zettabytes (45,097,156,608 Terabytes)

**Total Data Storable in Humans**: 170 Yottabytes (186,916,977,000,000,000,000 bytes)

The approximate cost of a zettabyte right now is 110 Trillion (108 cents) dollars and would require data centers the size of Poland to house the information.

**Sources**
- an technica, May 1st 2012
- blog.loc.gov, April 25th, 2012
- the cisco.com, Nov 5, 2003
- businesswire.com, Dec 1 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
People who have low vision or colorblind could encounter some difficulty distinguishing text color from a background color if the contrast is insufficient contrast ratio 1.5:1.

This example has a great color contrast ratio of 8.7:1. The contrast is sufficient for those who have color deficiencies.

- 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 regular sized text (12 or 14 pt. font) and 3:1 for large text (18 pt. font).
- Coblis Color Blindness Simulator
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
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.)
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 +)
Microsoft Office Accessibility Checker

The accessibility checker will identify certain accessibility issues:

- Headings that are not in logical order
- Images with no alt text
- Tables have the header box checked
- Tables that have merged cells or with empty cells
- Large numbers of repeated blank characters (spacebars, tabs, enters)
Accessibility... as sweet as pie

• Make accessibility into part of the culture by baking it
• Make it part of the everyday work of everyone on campus
• Pie is sweet and enjoyable
• Accessibility is a good thing and makes people's lives a little sweeter

Analogy courtesy of Lainey Feingold of LF Legal and Sue Boyd of Microsoft in their Beyond Compliance Presentation at CSUN 2018
Create with Accessibility in Mind

**Best Practices**

Tools to design accessible content creation workflow...

**Making digital content accessible for everyone**

- **Alternative Text**
  - Images
  - Shapes

- **Video/Audio**
  - Captions/transcripts

- **Navigation/Links**
  - Link requirements

- **Structure**
  - Headings
  - Lists, etc.

- **Color**
  - Color contrast
  - Meaning without color

- **User Interface**
  - Keyboard accessibility
Accessibility, it’s the _____ thing to do!

Right:
• Aligns with University Mission or Vision
• Increase usability for all people
• Attracts students to university

Legal:
• Equal access due to laws such as ADA, Section 508
• Department of Justice scrutiny
• Risk of litigation

Smart:
• Sustainable
• Large number of population has disability (19% of US population)
• “If they can use my products, they can buy them.” – Steve Jobs
• Creating a welcoming environment
• Support’s a person’s success and persistence in activity retention
Accessibility is a Journey

You can’t build an accessible content overnight. It’s making progress one step at a time. One small moment of victory propelling you forward to the next. Accessibility is a constant journey, not an end destination.
How can we help you make a difference?

Universal Design Center Offers

- Online, self-paced training
- In-person training each semester
- Consultations
- Tools and Services

Universal Design means design for everyone