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:

- Acquire the same information
- Engage in the same interactions
- Enjoy the same services

In an equally effective and equally integrated manner, with substantially equivalent ease of use.
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

Universal Design Center
csun.edu/udc
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

Additional tools and services include:
- 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.

Normally used by someone who is visually impaired.
Types of screen readers

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
**POUR Principles: Information and Communication Technology (ICT)**

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

<table>
<thead>
<tr>
<th>Perceivable</th>
<th>Operable</th>
<th>Understandable</th>
<th>Robust</th>
</tr>
</thead>
<tbody>
<tr>
<td>To make sure learners can see and hear your content</td>
<td>To make sure learners can interact with your content with a variety of tools</td>
<td>To make sure learners can understand your content and enjoy a predictable experience</td>
<td>To ensure your content works well with current and future technologies</td>
</tr>
<tr>
<td>• Add alternative text to images and other visuals</td>
<td>• Provide a clear structure with properly marked up headings</td>
<td>• Clarify expectations through clear directions and models</td>
<td>• Add metadata to make content easier to find and use</td>
</tr>
<tr>
<td>• Close caption videos or provide transcripts</td>
<td>• Create descriptive links that make sense out of context</td>
<td>• Follow conventions to ensure a predictable and consistent experience</td>
<td>• Perform an accessibility check</td>
</tr>
<tr>
<td>• Provide sufficient color contrast between text and its background</td>
<td>• Provide sufficient time for interaction and response</td>
<td>• Use plain language</td>
<td>• Perform basic assistive technology testing</td>
</tr>
<tr>
<td>• Make sure content does not rely on color alone</td>
<td>• Avoid content that can trigger seizures</td>
<td>• Indicate the language of your content</td>
<td><strong>Courtesy of National Center on Accessible Education Materials</strong></td>
</tr>
</tbody>
</table>

![POUR Principles Diagram](image-url)
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.

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Universal Design: Process, Principles, and Applications (UW)
Universal Design
Universal Design for ALL
Universal Design Example
Mobile Universal Design

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

iOS - Voiceover

Android - Talkback

csun.edu/udc
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 to request media captioning through NCOD: Deaf and Hard of Hearing Services.
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

csun.edu/udc
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])
Create with Accessibility in Mind

Best Practices

- **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
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 Memorandums.

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)

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.

Shared Campus Responsibility (Heading 3)

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

Canvas

Google Docs

InDesign

```
<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>
```

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
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.

- 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
Visual Challenge

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

When we explore the boundaries of information we know every day, continuously reaching new heights.

GLOBAL BANDWIDTH

PER SECOND

100 TERABYTES
(250,000,000,000,000 bytes per second)

200 EXABYTES
(250,000,000,000,000,000,000 bytes per second)

DATA TRANSFERED

PER MONTH

The global bandwidth is said to exceed 100 TBs by 2018 and data transferred will reach that scale much sooner than that.

LIBRARY OF CONGRESS

TEXT, AUDIO, VIDEO

20 PETABYTES
(20,000,000,000,000,000 bytes)

2.7 ZETTABYTES
(2,700,000,000,000,000,000 bytes)

DIGITAL DATA STORED GLOBALLY

Digital data stored increased by almost 58% in a few years. We can only imagine the amount of data in the world by the year 2020.

HUMAN SPEECH IN DATA FORM (2003)

42 ZETTABYTES
(45,997,156,608 TB)

The approximate cost of a zettabyte right now is $10 Trillion (100 zettabytes) and would require 100 data centers the size of Dallas to host the information.

TOTAL DATA STORABLE IN HUMAN

170 YOTTABYTES
(186,916,977,000,000,000,000 bytes)

A COMPUTER ON EVERY DESK IN EVERY HOME
- Bill Gates

We are dealing with data at an exponential rate. We are overwhelmed with information and its capacity grows every day. Many computer and mobile devices sold today are designed to work every day. Today, the search is for better ways to process this data. There is currently a need to develop better infrastructure and work towards a world environmentally aware of our actions.

CONVERSION TABLE

<table>
<thead>
<tr>
<th>1 GIGABYTE</th>
<th>1 TB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 GB</td>
<td>1,000,000,000 bytes</td>
</tr>
<tr>
<td>1 MB</td>
<td>1,000,000 bytes</td>
</tr>
<tr>
<td>1 KB</td>
<td>1,000 bytes</td>
</tr>
<tr>
<td>1 B</td>
<td>1 byte</td>
</tr>
</tbody>
</table>

SCALE MODEL

WATER 1 LITER = 1 MEGABYTE
EARTH 14 MEGAGRAMS = 1 PB (PETABYTE)
100 GIGABYTES = 100 GIGABYTE

SOURCES

- anisthecnica, May 1st 2012
- blog.loc.gov, April 25th, 2012
- The CIC: st.anne's, Nov 5, 2003
- tnbiswison.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

Universal Design Center
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>Introduction</th>
<th>Chapter 1</th>
</tr>
</thead>
</table>

Example 2: Accessible table

| Assignments | Overdue | Introduction | Yes | Chapter 1 | No |

Color identical may not be recognized by colorblind users

Example 3: Inaccessible color shape

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 regular sized text (12 or 14 pt. font) and 3:1 for large text (18 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.

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.

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.

Accessible – descriptive and unique

CSUN News
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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 (raw URL may not make sense to screen reader users or others, so make the link text descriptive i.e. 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: Check for issues and accessibility before publishing the file.
- Check Accessibility: Check the document for content that people with disabilities might find difficult to read.

Universal Design Center
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

Universal Design means design for **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 is for everyone.

How can we help you make a big difference?

Accessibility Modules with Canvas Courses
• Universal Design Principles
• Instructional Materials
• Web Accessibility
• Accessibility FAQs