



The slide features a decorative header with three vertical panels: a green panel on the left containing a white circular logo, a white panel in the center with a collage of three images (a building sign, a woman smiling, and flowers), and a green panel on the right.

# Creating an Accessible Learning Environment with Universal Design Principles

**Presenter:**

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Maryland University of Integrative Health  
Slide Deck: [www.kmsmithphd.com/conference](http://www.kmsmithphd.com/conference)

**Maryland University of Integrative Health**

Hello and welcome, I'm Dr. Smith and I am here to discuss how you can create an accessible learning environment, whether online or face to face. Also, keep in mind that This slide deck can be downloaded from [www.kmsmithphd.com/conferences](http://www.kmsmithphd.com/conferences)

# Agenda

*During this workshop, we will cover:*

- Accommodations versus Accessibility
- The difference between Section 508 and Section 504
- Universal Design Instruction
- Instructor Led Accessibility (ILT)
  - Universal Design
  - Barriers and Strategies
- Accessibility in Online Environments
  - Assistive Software and Devices
  - Key Accessibility Components in Virtual Environments
  - How to Executive Accessibility Checkers Word and PDF



Before we begin, let's review the agenda for our 1 hour together.

For this workshop, these are the resources I have available for you.

*During this workshop, we will cover:*

Accommodations versus Accessibility

The difference between Section 508 and Section 504

Universal Design Instruction

Instructor Led Accessibility (ILT)

    Universal Design

    Barriers and Strategies

Accessibility in Online Environments

    Assistive Software and Devices

    Key Accessibility Components in Virtual Environments

## How to Executive Accessibility Checkers Word and PDF

# Accommodations

**Accommodations** refers to changes made to the course **after** the course has been set to enable a student who has identified with possessing a specific “disability”.



## But first, Accessibility vs. accommodation

**Accommodation** refers to changes made to the course after the course has been set to enable a student who is differently abled to gain access to the learning. For example, a sign language interpreter may be required, large print books or materials, longer testing times, a note taker, specialized computer equipment, chairs or other tools. The course goals remain the same, but accessing the materials may have to be altered depending on the student's identified disability. The more accessible we make a course, the less accommodation is required.

## Accessibility

- Accessibility **does not** require the instructor to reduce its rigor or place the integrity of the course or degree in jeopardy.
- Parallels Universal Design.
- During this presentation/workshop, we are addressing Accessibility.



Accessibility does not require the instructor to reduce its rigor or place the integrity of the course or degree in jeopardy. The goal is **not** to modify the curriculum to reduce the requirements, but to maintain the learning goals and allow more flexible methods for learning and achieving those goals. There may be times when an accessible course will require accommodations for a student with a disability (e.g. longer test times), but an accessible course design improves the learning opportunity for all students and significantly reduces the need for accommodation.

For example, if you are using videos in your course, those videos may require captioning depending on the needs of the students (for example, a student who is hard of hearing or deaf). What research has found is that captioning not only benefits students who are hearing impaired, but also assists students whose first language is not English, those who may have processing difficulties, or those who may be watching the video in a noisy area such as a bus, cafe or cafeteria where hearing it may be difficult.

With that said, I want to be clear in your understanding that this presentation/workshop addresses Accessibility.

# Universal Design (UDL)

- Provides flexibility in the ways information is presented
- Reduces barriers in instruction
- Parallels Accessibility



Engagement



Representation



Expression

MUIH

When discussing Accessibility , you must not include the principles of Universal design.

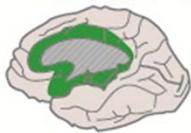
Universal design is "the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design." When designers apply universal design principles, their products and services meet the needs of potential users with a wide variety of characteristics. Universal design principles can be applied to many products and services, including instruction.

UDL Provides flexibility in the ways information is presented, in the ways students respond or demonstrate knowledge and skills, and in the ways students are engaged; and

Reduces barriers in instruction, provides appropriate accommodations, supports, and challenges, and maintains high achievement expectations for all students, including students who are differently abled and students who are limited English proficient through engagement, representation, and expression

Therefore, If you practice Universal Design, then accessibility should be automatic in your courses. Let's quickly review these 3 principles of UDL>

# Universal Design (UDL)



Provide Multiple Means of  
**Engagement**

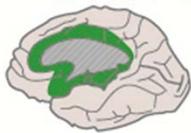
*Purposeful, motivated learners*

MUIH

The first principle of UDL is Engagement:

- **Engagement:**
  - Provide options for self-regulation
    - + Promote expectations and beliefs that optimize motivation
    - + Facilitate personal coping skills and strategies
    - + Develop self-assessment and reflection
  - **Provide options for sustaining effort and persistence**
    - + Heighten the relevance of goals and objectives
    - + Vary demands and resources to optimize challenge
    - + Foster collaboration and community
    - + Increase mastery-oriented feedback
  - **Provide options for recruiting interest**
    - + Optimize individual choice and autonomy
    - + Optimize relevance, value, and authenticity
    - + Minimize threats and distractions

# Universal Design (UDL)



Provide Multiple Means of  
**Engagement**

*Purposeful, motivated learners*



Provide Multiple Means of  
**Representation**

*Resourceful, knowledgeable  
learner*

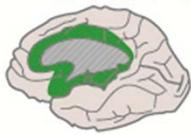
MUIH

Next, there's:

## Representation

- **Provide options for comprehension**
  - + Activate or supply background knowledge
  - + Highlight patterns, critical features, big ideas, and relationships
  - + Guide information processing, visualization, and manipulation
  - + Maximize transfer and generalization
- **Provide options for language, mathematical expressions, and symbols**
  - + Clarify vocabulary and symbols
  - + Clarify syntax and structure
  - + Support decoding text, mathematical notation, and symbols
  - + Promote understanding across languages
  - + Illustrate through multiple media
- **Provide options for perception**
  - + Offer ways of customizing the display of information
  - + Offer alternatives for auditory information
  - + Offer alternatives for visual information

# Universal Design (UDL)



Provide Multiple Means of  
**Engagement**

*Purposeful, motivated learners*



Provide Multiple Means of  
**Representation**

*Resourceful, knowledgeable learner*



Provide Multiple Means of  
**Expression**

*Strategic, goal-directed learners*

MUIH

And lastly,

## Expression

- **Provide options for executive functions**
  - + Guide appropriate goal-setting
  - + Support planning and strategy development
  - + Enhance capacity for monitoring progress
- **Provide options for expression and communication**
  - + Use multiple media for communication
  - + Use multiple tools for construction and composition
  - + Build fluencies with graduated levels of support for practice and performance
- **Provide options for physical action**
  - + Vary the methods for response and navigation
  - + Optimize access to tools and assistive technologies

## Knowledge Check

Which of the following is an example of universal design/Accessibility of instruction that benefits all students and might eliminate or reduce the need for accommodations for students with a disability? *Write the number corresponding to your responses.*

1. Selecting fieldwork sites that are wheelchair accessible
2. Providing a note taker
3. Making your class notes and outline available electronically
4. A flexible attendance policy
5. Requesting open-captioned videos



So that we're all on the same page with how Accessibility is defined, let's partake in this quick knowledge check.

On a sheet of paper, record your selections, we'll take about 1 minute.

Which of the following is an example of universal design/Accessibility of instruction that benefits all students and might eliminate or reduce the need for accommodations for students with a disability? *Write the number corresponding to your responses.*

## Knowledge Check

Which of the following is an example of universal design/Accessibility of instruction that benefits all students and might eliminate or reduce the need for accommodations for students with a disability? *Write the number corresponding to your response.*

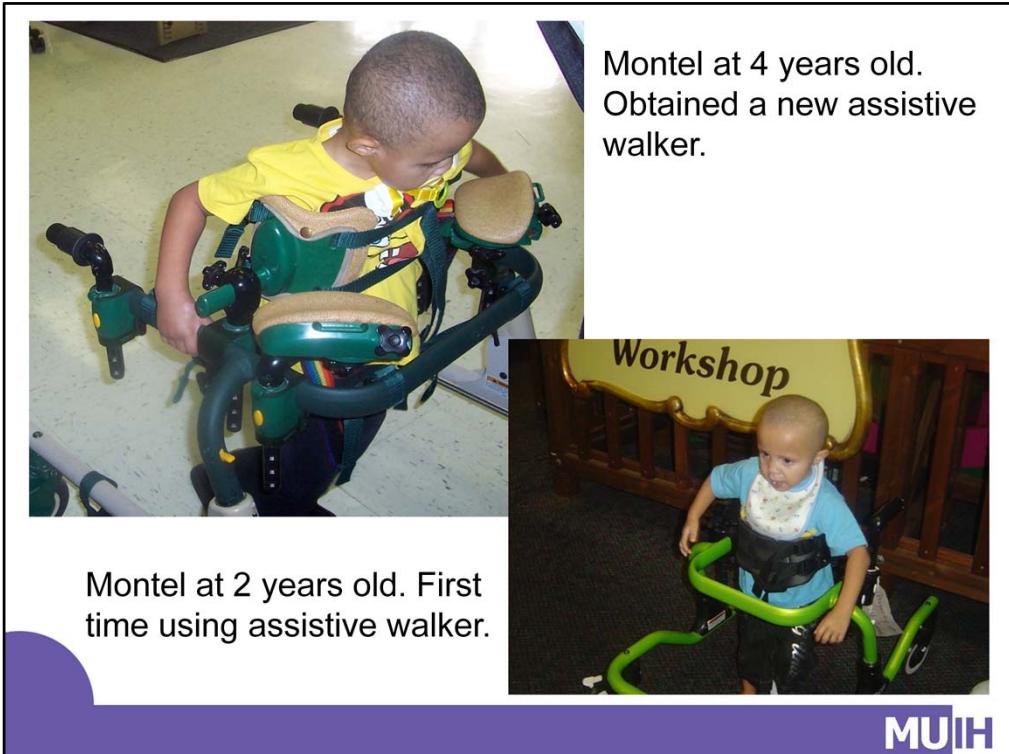
1. Selecting fieldwork sites that are wheelchair accessible
2. ~~Providing a note taker ( ACCOMMODATION)~~
3. Making your class notes and outline available electronically
4. ~~A flexible attendance policy (ACCOMMODATION)~~
5. Requesting open-captioned videos



Here are the correct responses - **Yes** for 1, 3, and 5 and **No** for 2 and 4.

1. Yes. Selecting fieldwork sites that are wheelchair accessible can eliminate the need for alternative assignments or last minute modifications for some students with mobility impairments.
2. No. A note taker is an accommodation required by some students with disabilities.
3. Yes. This will provide greater access to your course materials and make it easier, for example, for students who are blind to transcribe information into Braille or use adaptive technology to read the text with speech output software.
4. No. This might be an appropriate accommodation for a student with a health impairment. However, an attendance policy that is too flexible for too many people may become misused or problematic.
5. Yes. Open captioning is essentially the same as subtitling. It requires no special equipment. Many students can benefit from open captioning, including students with hearing impairments, learning disabilities, and those for whom English is not their first language.

Hopefully, this provided you with a better understanding of accessibility versus accommodations.

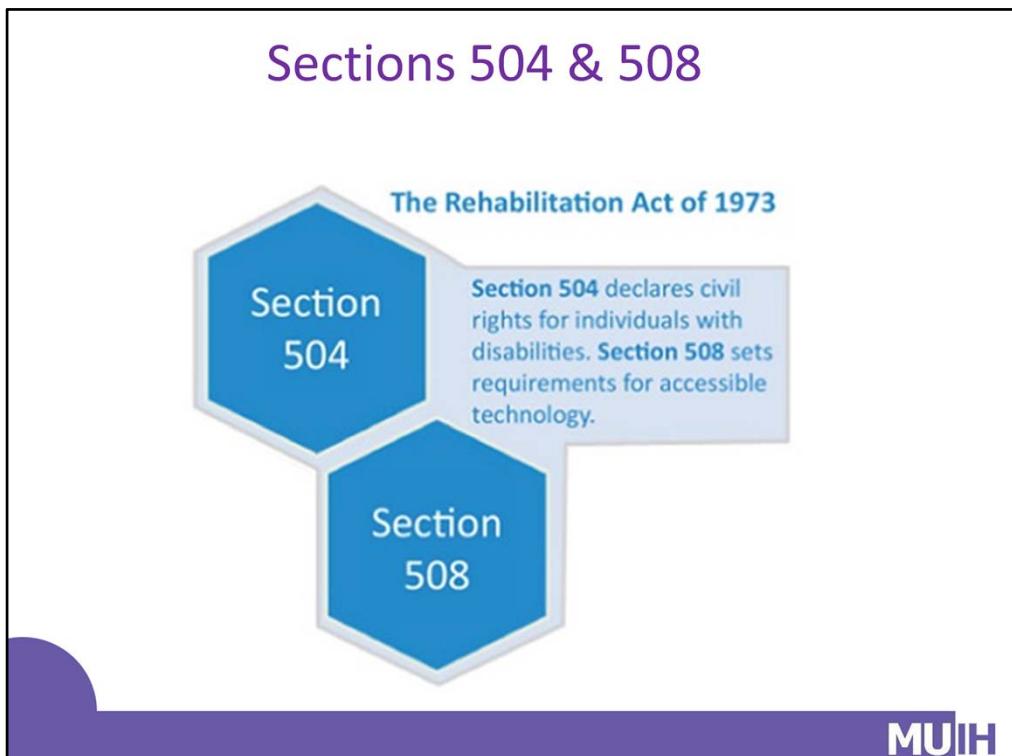


A little background:

What started this journey of accessibility in education was my observations of my nephew who has cerebral palsy as a result of a birth injury. He's just now being introduced to computers at school and with his limited dexterity, I'm concerned about his ability to have an equivalent level of academic experiences as his peers.

I understand equity for access to information is a big undertaking, but if we continue to build awareness to the digital divide among learners faced with limited mobility, visual and hearing impairments, we can narrow this gap.

## Sections 504 & 508



But before we delve into its application, let's identify the difference between Sections 508 and 504, as I know we've heard the term used quite often in Higher education:

In 1998, **Section 508** was added to the Rehabilitation Act of 1973. Congress amended the Rehabilitation Act to include Section 508 as it requires Federal agencies to ensure that persons with disabilities (both employees and members of the general public) have comparable access to and use of physical and electronic information technology.

**In addition, Section 504** was added. This required organizations to provide individuals with disabilities an equal opportunity to participate in their programs and benefit from their services. Therefore, any electronic and information technology used, maintained, developed, or procured by your institutions must be accessible to individuals who are differently abled.

For that reason, unless you are designing courses for a Federal agency, your institution is held to the standards of section 504 – However, Section 508 provides specific guidelines to support Section 504 and is often viewed as the ideal standards to follow.

Next, we will explore a few methods to employ when universally designing a face-to-face or instructor led environment (ILT).

## Instructor Led Training (ILT) UDL



Next, we will explore a few methods to employ when universally designing a face-to-face or instructor led environment (ILT).

## Instructor Led Training (ILT) UDL

### **Print**

- Allows autonomous learning
- Best when coupled with images
- Prepare a digitally recorded version



### **Print**

Print is a strong memory aid in that it can make the voice permanent. It enables the student to return to the text, to slow down or speed up the delivery of the materials and enable the student to focus on each word. Coupled with images, text becomes a powerful tool - the images present the information all at once rather than sequentially as with voice and text. It provides a different method for processing the information.

Images can also trigger an emotional response to the information increasing the potential for the information to become locked in memory. However, consider the impact on the learning when there is a deficiency in seeing, hearing or processing ability. This deficiency can lead to an impaired ability to learn.

# Instructor Led Training (ILT) UDL

## Print

- Allows autonomous learning
- Best when coupled with image
- Digitally recorded

## Digital Media

- Allows collaboration
- Increased Engagement
- Enables choice with how learners want to interact with the content



## Digital Media

Digital media provides the opportunity to improve learning at a substantial level. The ability to collaborate through networks, to share information, and build new knowledge can happen instantly. Information can be transformed, videos and graphics added, 3-D models developed and explored, interactive assessments developed - and all of it stored so that others can use it.

Technology enables choice in how students can interact with the materials depending on how best they learn. Digital media increases opportunity for multiple means of representation, expression and engagement. Textbook manufacturers have responded by providing e-tools with their books including test banks, interactive learning activities, videos, games, and more. Recently, Apple announced its iBook application for textbooks as it recognizes the shift from traditional print-based materials to highly graphical, interactive learning objects for learning.

## Instructor Led Training (ILT) UDL

**Barriers faced by Instructor Led (face to face) learners who are differently abled**

### **Low/No Vision**

- *difficulty reading, taking notes*
- *watching and learning from videos and demonstrations*
- *interpreting graphics and charts*



Lets review a few of the **Barriers faced by Instructor Led learners who are differently abled and some strategies to reduce these effects.**

Learners who have Low/No Vision may experience

- difficulty reading, taking notes
- watching and learning from videos and demonstrations
- interpreting graphics and charts

## Instructor Led Training (ILT) UDL

### Barriers faced by Instructor Led (face to face) learners who are differently abled

#### Low/No Vision

- *difficulty reading, taking notes*
- *watching and learning from videos and demonstrations*
- *interpreting graphics and charts*

#### Strategies to reduce Barriers

- *electronic notes, handouts readings electronic textbooks*
- *note taker, assistant*
- *consult with students as to how best meet his/her needs*



Here are a few Strategies to reduce these Barriers

- Offer electronic notes, handouts readings electronic textbooks
- note taker, assistant
- consult with students as to how best meet his/her needs

## Instructor Led Training (ILT) UDL

### **Barriers faced by Instructor Led (face to face) learners who are differently abled**

#### **Limited Mobility/Dexterity**

- poor pacing of workload can lead to fatigue
- classroom design can make it difficult to see the board, sit for long periods of time
- side effects of medication
- use of computers, tools, etc.



Next, those who are faced with Limited Mobility/Dexterity may experience challenges with

- poor pacing of workload can lead to fatigue
- classroom design can make it difficult to see the board, sit for long periods of time
- Consider that there may be side effects of medication
- Ensure that all digital content is accessible (which we'll discuss shortly )

## Instructor Led Training (ILT) UDL

### Barriers faced by Instructor Led (face to face) learners who are differently abled

#### Limited Mobility/Dexterity

- poor pacing of workload can lead to fatigue
- classroom design can make it difficult to see the board, sit for long periods of time
- side effects of medication
- use of computers, tools, etc.

#### Strategies to reduce Barriers

- *electronic notes for use with technology*
- *pausing long enough to allow students to ask questions*
- *allowing students to stand or walk around*



Here are a few Strategies to reduce Barriers

- electronic notes for use with technology
- pausing long enough to allow students to ask questions
- allowing students to stand or walk around

# Instructor Led Training (ILT) UDL

## Barriers faced by Instructor Led learners who are differently abled

### Hearing Impairment

- *background noise can be distracting*
- *multiple tasks such as writing notes, viewing videos, completing tasks are difficult when trying to lip-read or use sign language*
- *new terminology, complex concepts may be difficult to comprehend*



Learners who are hearing impaired may find difficulty with

- background noise that can be distracting
- multiple tasks such as writing notes, viewing videos, completing tasks are difficult when trying to lip-read or use sign language
- new content terminology, complex concepts may be difficult to comprehend

# Instructor Led Training (ILT) UDL

## Barriers faced by Instructor Led learners who are differently abled

### Hearing Impairment

- *background noise can be distracting*
- *multiple tasks such as writing notes, viewing videos, completing tasks are difficult when trying to lip-read or use sign language*
- *new terminology, complex concepts may be difficult to comprehend*

### Strategies to reduce Barriers

- *ensure there is enough light so that the student can read lips / see interpreter*
- *write new terminology on the board*
- *explain new concepts with visuals*
- *assign a student assistant/peer/note taker*

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Here are some strategies to assist in overcoming these barriers:

- ensure there is enough light so that the student can read lips / see interpreter
- write new terminology on the board
- explain new concepts with visuals
- assign a student assistant/peer/note taker

Now, let's examine how learners who are differently abled access virtual course environments

## Virtual/Online Accessibility & UDL



Now, let's examine how learners who are differently abled access virtual course environments

## Brad Using Switch Device



MU|H

To place learner diversity into perspective, this is Brad. He's a junior level college student, who is differently abled due to cerebral palsy, but has full cognitive abilities.

Brad attends most of his classes virtually with use of a switch device.

## Brad Using Switch Device



MU|H

With this technology, Brad has the opportunity to communicate with friends, family, and peers, as well as attend his college courses online.

## Brad Using Switch Device



MUIH

Here you will notice, I have circled Brad's switch device, which he controls with a tap of his leg and a joystick.

This assistive technology allows him to switch from the internet to a document, or from his computer to a cellphone.

## Brad Using Switch Device



MUIH

The switch device can be programmed to switch between multiple hardware devices, as well as software programs on his electronic dashboard, as shown here.

Take a moment and try to Imagine the obstacles Brad may face while navigating non-ADA compliant components in his online courses.

# Universal Design for Online Instruction

## Barriers faced by online learners who are differently abled

### Low/No

- *Difficulty recognize document components if there are no Alt text tags on graphics, links, forms, or tables*

### Limited Mobility/Dexterity

- *Cluttered layouts and small buttons or interactive objects*

### Cognitive Impairment

- *Moving objects design, layout, and navigability*

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Some Barriers faced by online learners who are differently abled may include:

1. Individuals with Low/No Vision may be negatively impacted if their Screen readers (which uses text to speech functionality) struggle to recognize online course components. Particularly, if there are no Alternate text tags on graphics, links, forms, or tables
2. Learners with Limited Mobility/Dexterity may be negatively affected by components that are Cluttered or even contain small buttons or links that pose navigational challenges.
3. Also, let's remember to consider Cognitive Impairment such as Autism, dementia, or traumatic brain injury. They may experience issues with a courses' design, layout, and navigation as well

Let's review strategies and techniques to reduce these barriers.

## Assistive Software



There are a number of assistive software options for learners requiring this technology, here we'll only look at a few.

## Assistive Software

### 1. JAWS® (Job Access With Speech)



Screen Reader (Braille Compatible)



Screen Reader (Braille Compatible)

Source: [Wall Street Journal](#)

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Keyboard emulators, such as JAWS (which is an acronym for Job Access with Speech) does have a Limited free version, however, the Full products costs approximately \$1100

Learners with Low/No Vision utilize this software for its text to speech capabilities. Text to speech software reads aloud words on the screen for unsighted end users.

On the contrary, speech to text (for example, the software program Dragon) is where the user speaks and the software types the users words (also called speech recognition).

- Learners may implement both forms of software to access a number of virtual environments. A few considerations regarding JAWS software:
  - It Works best in Windows and Chrome browser.
  - It is the Most popular and widely used program and supports Braille output
  - Contrastingly, Apple's browser, Safari, does not support JAWS.

## Assistive Software

### 2. WindowEyes®



Screen Reader (Text to Speech)



Screen Reader (Text to Speech)

Source: [Cisco Accessibility](#)

Source: [US Dept. of Labor](#)

MUIH

Similar to JAWS, there's WindowEyes (which costs anywhere from \$900 - \$1100), another text to speech software program.

Here are a few considerations of WindowEyes are:

- It Works best in Firefox.
- It is partially supported by Apple's Safari browser, however, some features are not operational.
- And, it Also Supports Braille output

We've covered a few of the most commonly used software programs for individuals requiring assistive technology.

3. Additional free screen reader software: NVDA, Serotek System Access, Apple Voice Over, ORCA, Emacspeak, and Spoken Web



Braille with Tablet  
Source: [State of Nevada](#)



Braille with PC  
Source: [Realtor Mag](#)

MUIH

A few additional screen reader software programs are NVDA, Serotek System Access, Apple Voice Over, ORCA, Emacspeak, and Spoken Web

Specifically, here are a few considerations of NVDA:

- It's the Second most popular Speech recognition software next to JAWS
- It works best with Firefox browser.
- However NVDA is not compatible with Apple's Safari Browser.

Alternatively, learners can use Apple Voiceover, with considerations that:

- Apple Voiceover works only with iOS, but works best in iOS mobile devices.

Take note of the images above. These learners, with visual impairment, are using electronic devices with braille connection.

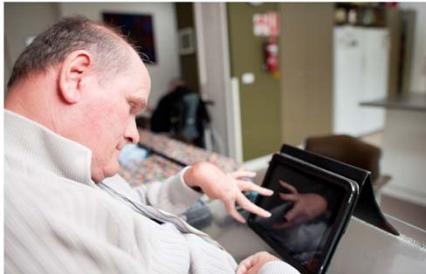
## Assistive Devices



In today's face to face and virtual classrooms, digital devices are the norm. Let's examine a few that are used to assist those who are differently abled.

## Assistive Devices

### 4. Touch Screens



Tablet Touch Screen



PC Touch Screen

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Here are 2 examples of learners using touch screen devices.

As you notice, the individual on the left is using a tablet and the other on the right is using a PC.

This is important to remember, as learners who are differently abled will access and participate in their courses from a variety of electronic devices.

# Assistive Devices

## 5. Navigation Devices



Head Wand  
Source: [UI Access](#)



Single/Multi - Switch Device  
Source: [VT Saran](#)

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This student is using a head wand assistive device.

Head wands can type characters and navigate online environments.

As you can imagine, Fatigue can be an issue when a lot of unnecessary keystrokes are required in order for learners using head wands to navigate a course.

The image to the right shows a Single Switch Device.

This is the same device which Brad was using earlier in the presentation to access his online course.

The switches can be placed in a variety of areas for learners who are mobility impaired.

For example, a switch could be placed to the side of the head that would allow the person to click with head movements, or knee movements as we saw with Brad.

The clicking action is interpreted by a software program, allowing the user to navigate their computer.

Let's look at one last learner and how he uses his assistive devices.

## Assistive Devices



Source: Jim Meldrum, Adaptive Computer Control Technologies <https://www.youtube.com/watch?v=Ao8p2PJzkjU>

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Connected to his wheelchair is a sip puff navigation device.

These are similar in functionality to the single or multi switches displayed in the previous slide,

Conversely, These devices are most commonly seen as individuals using it to physically move their wheelchair.

Yet, sip and puff devices are also available to interpret the user's breath actions as on/off signals, and can be used for navigating a keyboard and mouse.

It's a joystick-operated USB mouse that can be controlled with the users mouth, cheek, chin or tongue to shift the mouse cursor to their desired position. The further a user moves from the joystick, the faster the cursor travels. Users are able to perform right-click, left-click and double-click actions with the sip and puff switches built into the device.

## Key Accessibility Components



In these next few slides, I'll outline a few key accessibility components to be aware of in your course and its content....

## Key Accessibility Components

**Color - “required fields are in red”, “error is shown in red”**



### Color:

Color is an important asset in the design of Web content, enhancing its aesthetic appeal, its usability, and its accessibility. However, some users have difficulty perceiving color. People with partial sight often experience limited color vision, and as individuals age, they may not see color as well as they used to. In addition, people using text-only, limited-color or monochrome displays and browsers will be unable to access information that is presented only in color.

Examples of how instructors are conveying information by color differences are by use of prompts such as “required fields are in red”, “error is shown in red”, and “Mary's sales are in red, Tom's are in blue”.

Instructors have also misused colors for indications of an action such as to indicate that a link will open in a new window or that a database entry has been updated successfully. Another example of misuse is the prompting of a response such as using highlighting on form fields to indicate that a required field had been left blank.

## Key Accessibility Components

**Color** - “required fields are in red”, “error is shown in red”

**Multimedia** - time-based and synchronized media



### Multimedia:

The purpose of this guideline is to provide access to time-based and synchronized media. This includes media that is:

- audio-only
- video-only
- audio-video
- Or the combination with an interaction

## Key Accessibility Components

**Color** - “required fields are in red”, “error is shown in red”

**Multimedia** - time-based and synchronized media

**Keyboard Accessibility**



### Keyboard Accessibility:

When content can be operated through a keyboard or alternate keyboard, it is accessible for individuals with low/no vision (who find difficulty in using devices such as a mouse, that requires eye-hand coordination) as well as by those who must use alternate keyboards or input devices that act as keyboard emulators.

As covered in an earlier slide, Keyboard emulators includes software that performs speech input, sip-and-puff functionality, on-screen keyboards, scanning software and a variety of assistive technologies and alternate keyboards. Individuals with low vision also may experience challenges in tracking a pointer and find the use of these types of software more adaptable (or only possible) if they can control it from the keyboard.

## Key Accessibility Components

**Color** - “required fields are in red”, “error is shown in red”

**Multimedia** - time-based and synchronized media

**Keyboard Accessibility**

**Navigation**



### Navigation:

Learners who are differently abled may find challenges in locating content and keeping track of their location while online. For finding, navigation, and orientation, it is important that the user is kept aware of their virtual location. For navigation, information about the possible destinations needs to be available. Screen readers convert content to synthetic speech, because it is audio, therefore it must be presented in linear order.

Many users who are differently abled may benefit from additional time to complete tasks when compared to others : they may need more time to physically respond, read through items, or they may be accessing content through an assistive technology that requires more time. There are design approaches that address time constraints and provide learners enough additional time to allow them to equally complete their tasks.

## Applying Accessibility Components



There are several ways to apply accessibility features in your digital course components

Specifically, we'll identify improvements to meet ADA accessibility guidelines Word and PDF documents

Feel free to open a word document of your choice to follow along. Don't make any changes to your document just yet.

But use it as a reference to the components we're about to review.

# Headings

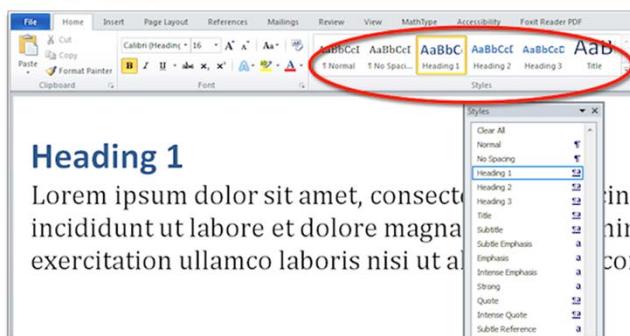
## Apply Headings

Heading 1 for the title

Heading 2 for main sections

Heading 3 for subsections under a main section

Normal for paragraph text

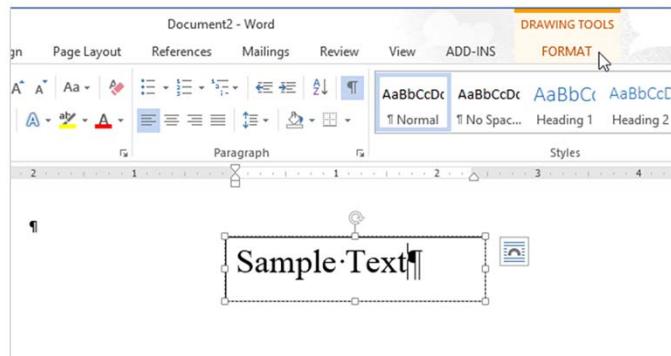


MUH

## Headings

- Screen reading programs, like Jaws, use Headings to determine a document's structure.
- Everything else to the reading program is mostly links and (Normal) text.
- Visually impaired users rely on Heading Styles and do not use the visual cues of larger-sized text to understand and navigate within a document.
- When you create a word document with hierarchy, Apply Heading 1 to a document title and Headings 2, 3, 4, 5 and 6 to lower levels as appropriate.
- Use Headings in the same way you would use an outline where
  - Heading 1 for the title
  - Heading 2 for main sections
  - Heading 3 for subsections under a main section
  - And the Normal style for paragraph text

# Text Boxes



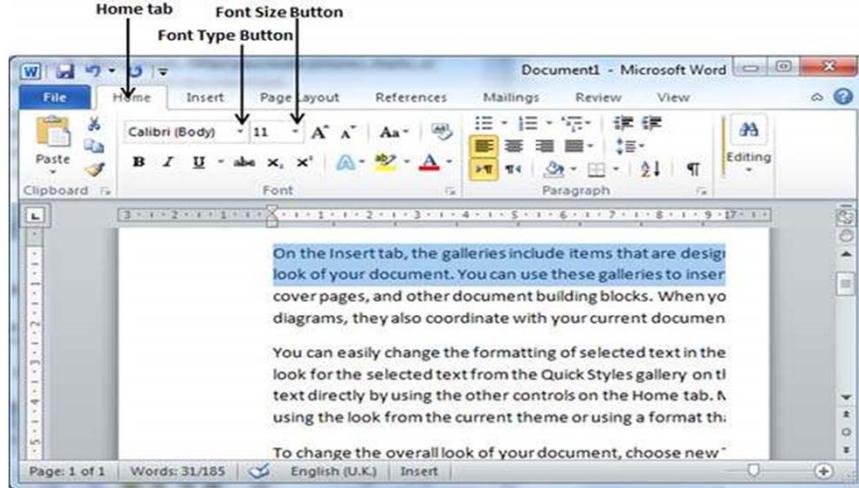
MU|H

## Text boxes

- Use regular text if possible and avoid using text inside text boxes, as Screen readers may interpret it as an image.
- Some items like logos that contain text are ok.
- If a document created before Word 2010 contains Word Art, it is seen as an image, and not text.
- Additionally, Text boxes may visually appear correctly within a document, but when converted to a pdf or read by a screen reader, they may be read out of order or missed completely.

# Fonts

## Be Aware of Font Size and Type



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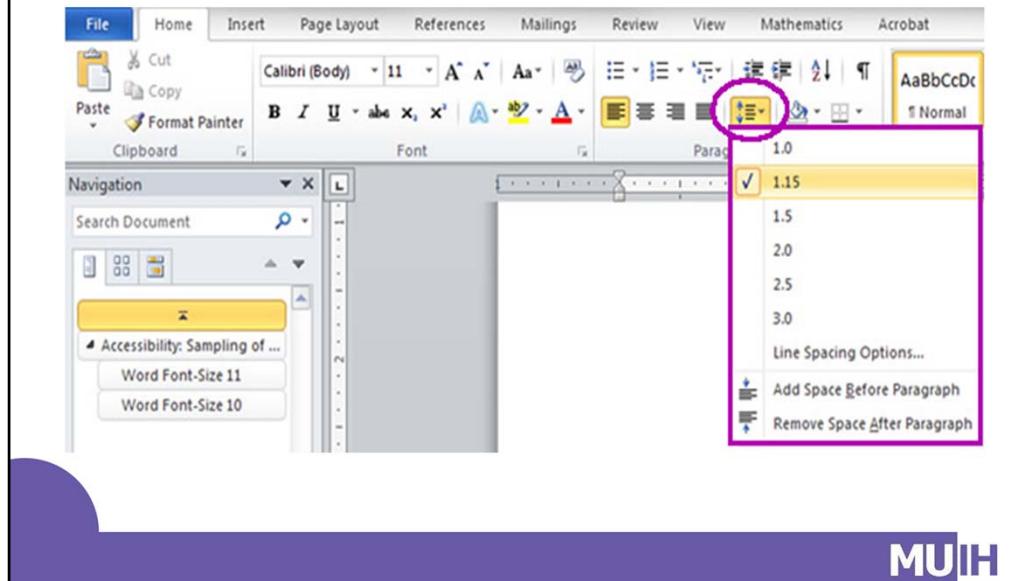
### Font Selection

Fonts such Sans-serif, Verdana, Tahoma, Arial, Suicidal Sans, Century Gothic, Bookman Old Style, Book Antiqua, and Comic Sans are typically easiest to read with a recommended size of 11

- Verdana font is much larger than the others.
- It is also one of the clearest fonts to read because of the character shapes and spacing.
- If using the default Calibri font, size it up to a minimum of 11 or 12.
- Other fonts, like Impact, can be used provided it is a large size.
- Keep in mind that Fonts vary in their darkness, which also impact readability.

# Line Spacing

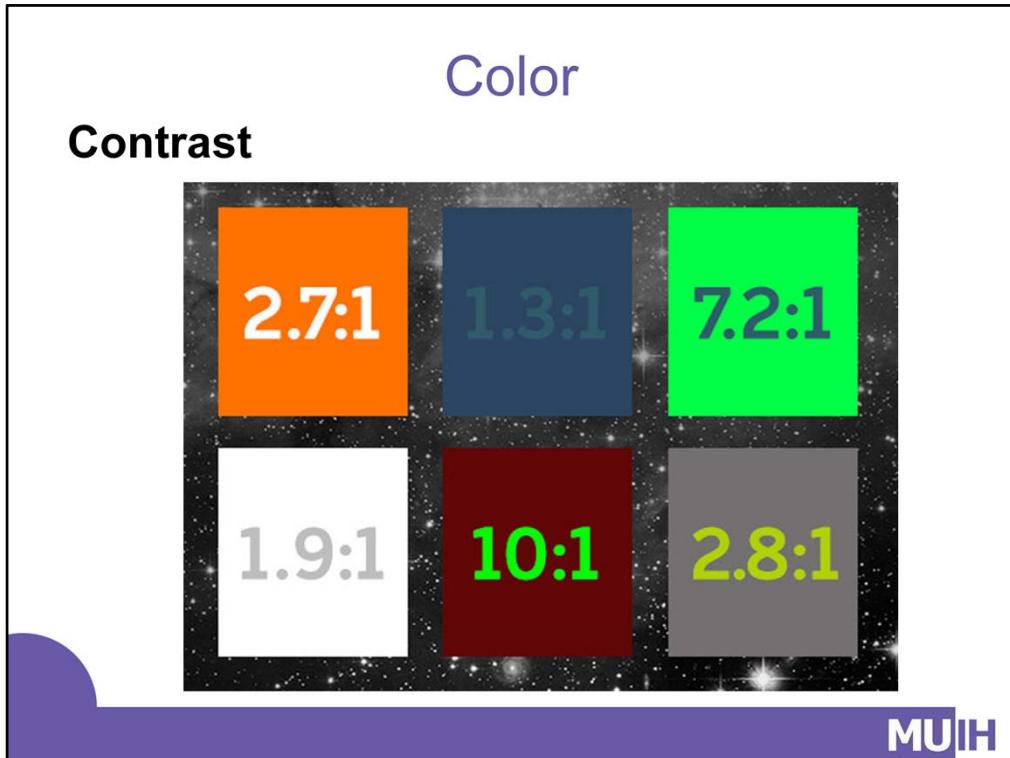
## Space Between Sentences and Paragraphs



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### Line Spacing

- Maintain white space between the lines, especially for longer text and paragraphs.
- However, to do this Use Word's paragraph option to Add Space Before or After Paragraphs, and/or increase the spacing using Line Spacing options, as shown here.
- Don't simply press "Enter" twice as Screen readers see that as empty text, which increases unnecessary scrolling.



## Color

The highest level of contrast is black and white.

Text size does make a difference when considering contrast and luminosity.

Here are a few examples of contrasting values.

In order to meet ADA requirements, your color contrast must be Approximately 4.5:1 between text and background.

Take a moment and look at the above contrasts. Which of these meet ADA requirements?

# Color

Inaccessible slide



Accessible slide

Welcome to  
Fall Ornamentals

John H. Doe, Horticulturist  
and  
Susan Sanders, Specialist

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Here is a comparison between a non-accessible color contrast and color that is accessible.

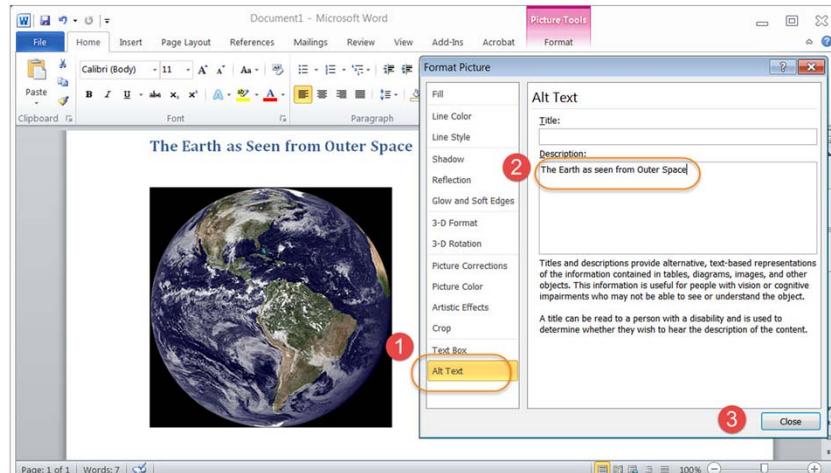
There are several free tools online to assist you with determining appropriate contrasting.

For example, The online **Color Contrast Analyzer** (<http://www.visionaustralia.org/digital-access-cca>) is the easiest tool to use, but it has to be downloaded.

Another resources is **Web Aim** (<http://webaim.org/resources/contrastchecker/>). This site allows users to enter either a hex color value and to use sliders to adjust color components.

# Images

## “Alt Text” tags Included on All Images



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### Images

- Screen readers read aloud the description text and Alt Text as part of reading the document.
- This is why it's equally important to provide meaningful information when an image conveys information and indicate when a decorative image occurs.
- To check for alt text, you can simply hover over an image, and the alt text will appear if it's inserted.

## Alt Text

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**Speaking of images, let's look deeper into these alt text attributes  
where....Context is Everything**

The alternative text for one image may be vastly different based upon the context and surroundings of the image itself.

## Alt Text

### Context, Context, Context

As circled in the below image, the two continents are linked at Panama, but there has been a debate about when this land bridge first appeared, with most experts placing its formation at about 3 million years ago.



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Take a moment to read the excerpt about the image.

Keep in mind the appropriate way to handle alternative text for images.

## Alt Text

### Context, Context, Context

As circled in the below image, the two continents are linked at Panama, but there has been a debate about when this land bridge first appeared, with most experts placing its formation at about 3 million years ago.

**Ask yourself if the image contains content (such as words) or if the image performs a function (such as a hyperlink)?**



MUH

The first step when determining appropriate alternative text for an image is to ask yourself:

Does the image present **content** (such as words or language) and if the image performs a **function** (such as a click-able hyperlink)?

## Alt Text

### Context, Context, Context

As circled in the below image, the two continents are linked at Panama, but there has been a debate about when this land bridge first appeared, with most experts placing its formation at about 3 million years ago.

**Ask yourself if the image contains content (such as words) or if the image performs a function (such as a hyperlink)?**

If No: Alt Text = “Earth” or “ ” (no need to state “image of”, that’s redundant for screen readers.



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If the answer is NO: Then a simple “Earth” or “empty ” alt text is recommended.

No Alt Attribute is necessary If the content has words or language that is **presented within text surrounding** the image and it's not a click-able hyperlink. Therefore, this is simply an image of the earth, so an empty alt text is appropriate.

# Alt Text

## Context, Context, Context

As circled in the below image, the two continents are linked at Panama, but there has been a debate about when this land bridge first appeared, with most experts placing its formation at about 3 million years ago.

**Ask yourself if the image contains content (such as words) or if the image performs a function (such as a hyperlink)?**

**If Yes: Alt Text should be something similar to -** *"The narrow strip of land that lies between the Caribbean Sea and the Pacific Ocean, linking North and South America. It contains the country of Panama and the Panama Canal."*

**Please Note:** If the image does NOT contain content or performs a function, then an alternative text attribute is not necessary and simply represented by 2 quotations (" ").



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However, when context is added, then the answer is YES: hence, A more detailed Alt text is necessary .

This is because you intend for the image to display something specific (which in this case is the Panama link circled in red).

Even though the paragraph above states the two land masses are linked, an unsighted learner should be provided the opportunity for visual display , or additional context, just the same as their sighted peers. This also supports different learning styles, such as visual, auditory, or kinesthetic learners(if there were an option to manipulate the image).

This is an example of how Universal Design and Accessibility go hand in hand.

## Multimedia Alternatives



In addition to alternate text, multimedia requires alternative forms of representation in order to do our best at ensuring educational content is available to all learners.

## Multimedia Alternatives

**Provide alternatives for pre-recorded AUDIO, such as:**

- Video
- Captions
- Screen reader to translate a document



Here, we'll discuss a few appropriate alternatives to consider when displaying content using multimedia.

Provide alternatives for pre-recorded AUDIO, such as:

- Video
- Captions, or
- The ability for a Screen reader to translate a textual document that tells the same story and presents the same information as the prerecorded audio-only content.

## Multimedia Alternatives

**Provide alternatives for pre-recorded AUDIO, such as:**

- Video
- Captions
- Screen reader to translate a document

**Provide alternatives for pre-recorded VISUALS:**

- Audio
- Document for braille usage



It is also suggested that you Provide alternatives for pre-recorded VISUALS:

- One approach is to offer audio descriptions of the video content, or
- A textual document that tells the same story and presents the same information as the prerecorded video-only content

In a video-only presentation, information is presented in a variety of ways including animations, text or graphics, the setting and background, the actions and expressions of people, animals, etc.

In order to present the same information in an accessible format, this technique involves creating a document that tells the an identical story. In this technique, the document serves as a long description for the content and includes all of the important information as well as descriptions of scenery, actions, expressions, etc. that are part of the presentation.

## Multimedia Alternatives

**Provide alternatives for pre-recorded AUDIO, such as:**

- Video
- Captions
- Screen reader to translate a document

**Provide alternatives for pre-recorded VISUALS:**

- Audio
- Document for braille usage

**Synchronized Media, such as:**

- Hyperlinks
- Interactive elements
- Live sign language interpretation



Synchronized Media will also need an alternative format. This includes:

- Hyperlinks
- Interactive elements or
- Live sign language interpretation

For synchronized media that includes interaction, interactive elements (for example hyperlinks or hotspots) these objects could be embedded in the alternative for time-based media.

## Multimedia Alternatives

**Provide alternatives for pre-recorded AUDIO, such as:**

- Video
- Captions
- Screen reader to translate a document

**Provide alternatives for pre-recorded VISUALS:**

- Audio
- Document for braille usage

**Synchronized Media, such as:**

- Hyperlinks
- Interactive elements
- Live sign language interpretation

**Asynchronous Interactions:**

- Textual representation with hyperlinks



Lastly, asynchronous Interactions. This includes:

- Textual representation with hyperlinks or hotspots

For example: An interactive pharmacy environment is created that allows users to locate items in a virtual pharmacy. An alternative for time-based media allows the users to access the same virtual pharmacy textually, however, you would have included hyperlinks to allow learner to choose aisles and appropriate medications instead of requiring the use of a mouse to select and drag these items onto the virtual pharmacy counter.

## Keyboard Accessibility

Check that all functionality can be accessed using only the keyboard or keyboard interface.



Let's next examine keyboard accessibility.

If all course functionality can be achieved using the keyboard, then it can be accessed:

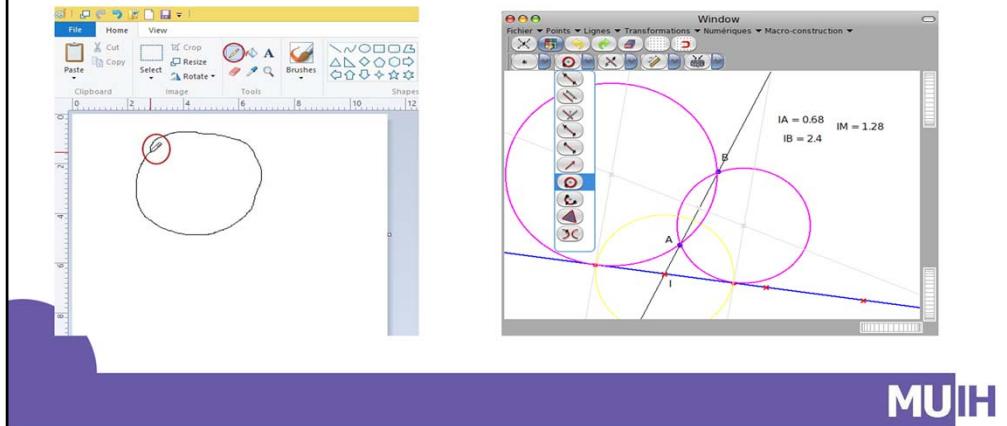
- By keyboard users,
- by speech input (which emulates a keyboard response),
- by mouse (with use of an on-screen keyboard), and
- by a wide variety of assistive technologies that create simulated keystrokes as output.

No other input form has this flexibility or is universally supported and operable by individuals with different abilities, as long as the keyboard input is not time-dependent.

When content can be operated through a keyboard or alternate keyboard, it benefits learners with low/no vision (or those who cannot use devices such as a mouse that requires hand-eye coordination), as well as by learners who must use alternate keyboards or input devices that act as keyboard emulators.

# Keyboard Accessibility

Check that all functionality can be accessed using only the keyboard or keyboard interface.

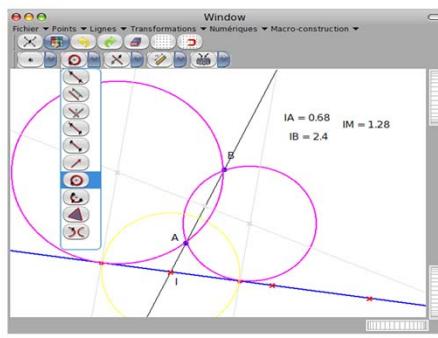
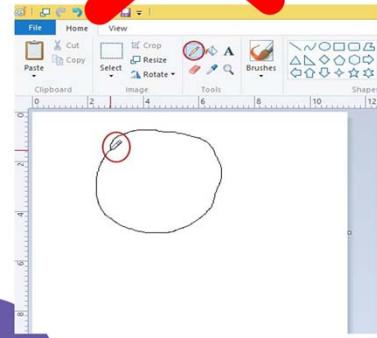


For accessibility, it is suggested that Most actions performed by a pointing device can also be done from the keyboard (for example, clicking, selecting, moving, or sizing).

However, there is a small class of input that is done with a pointing device that cannot be done from the keyboard, in any known fashion, without requiring an inordinate number of keystrokes. Looking at these two examples.....

## Keyboard Accessibility

Check that all functionality can be accessed using only the keyboard or keyboard interface.

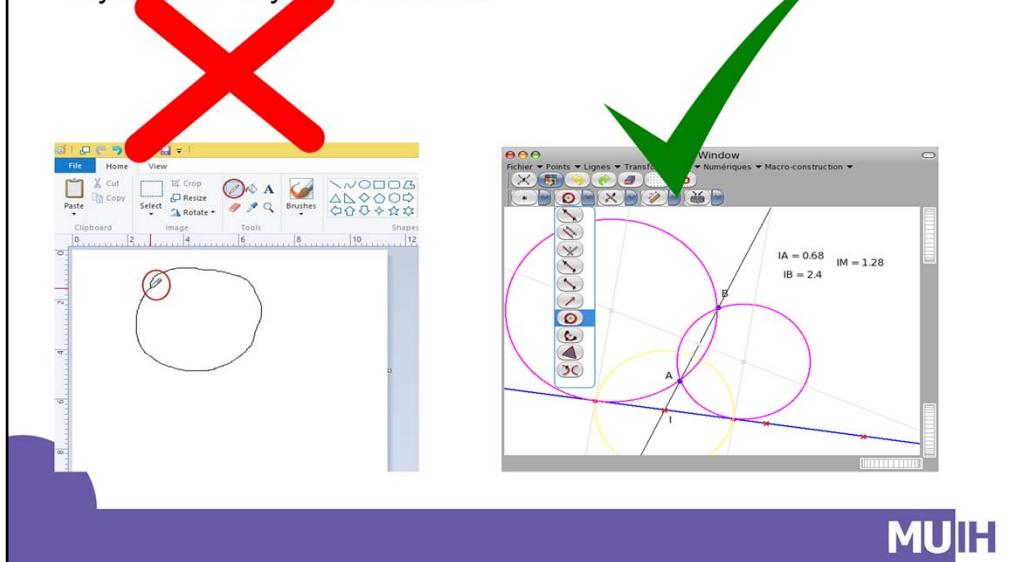


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Free hand drawing, watercolor painting, and actions requiring the continuation of a mouse drag, are all illustrations of functions that require path dependent input and cannot be accomplished with a keyboard alone.

## Keyboard Accessibility

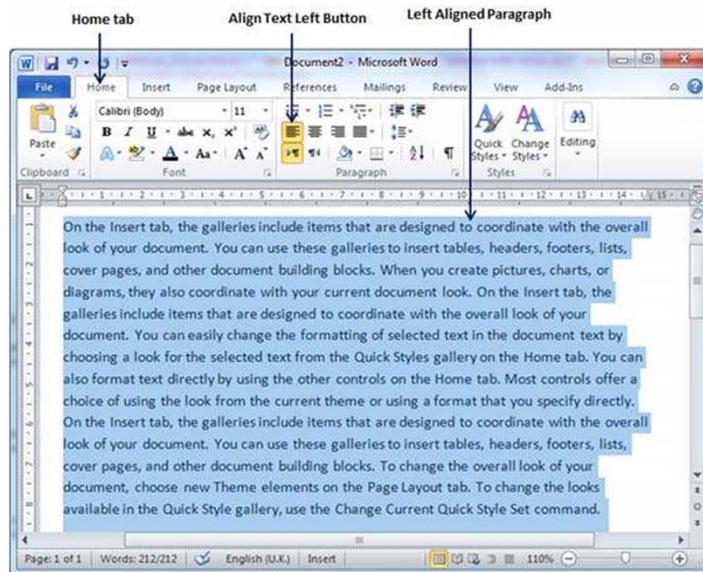
Check that all functionality can be accessed using only the keyboard or keyboard interface.



**Consequently,** Drawing straight lines, regular geometric shapes, re-sizing windows and dragging objects to a location (when the path to that location is not relevant) do not require path dependent input and can be accomplished solely by keyboard use.

This leads us into navigability....

# Margins



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## Margins

- Regular left-aligned margins are especially helpful for unsighted users because it imposes a predictability within a documents that enables it to be scanned easily by the software.
- It is fine to use Centered headings or a small amount of centered text, if used consistently within a document.
- Avoid justifying text to both right and left margins as the spacing within a line will appear too irregular.

# Hyperlinks

## Descriptive Hyperlinks

Non-Accessible Example: <https://www.nrc.gov/reading-rm/pdr/services.html>



### Hyperlinks

hyperlinks should always be **Meaningful**.

- **Meaningful links** specify the hyperlink as descriptive text.
- Be sure to use descriptive text for long hyperlinks, as the “text to display”, otherwise, screen readers will read every letter and symbol included in the link’s address.

# Hyperlinks

## Descriptive Hyperlinks

Non-Accessible Example: <https://www.nrc.gov/reading-rm/pdr/services.html>

Accessible Example: [NRC PDR Resource](#)



- Here's an accessible example of the same hyperlink leading to the same destination, but with descriptive text.
- The descriptive text allows users to distinguish this link from other links in the Web page and helps determine whether to follow the link, as destination URL's are generally not adequately descriptive.

# Hyperlinks

## Descriptive Hyperlinks

Non-Accessible Example: <https://www.nrc.gov/reading-rm/pdr/services.html>

Accessible Example: [NRC PDR Resource](#)

**Alt text:** Click on this image to learn more regarding the Panama link.



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- There may be instances when an image is the only content of a link. If this is the case, then the alternative text for the image should describe the unique function of the link.

# Hyperlinks

## Non-accessible

### Analysis of treat intake in FY 2009

The majority of treats in this year have been dog biscuits (<http://www.snackycakes-time.com/index.cfm?fuseAction=db>).

These treats are welcomed, and we wag our tails in thanks. However, the tastier meaty snacks biscuits (<http://www.snackycakes-time.com/index.cfm?fuseAction=msb>) and real bones biscuits (<http://www.snackycakes-time.com/index.cfm?fuseAction=rbb>) are our target. One of the main goals for 2010 is, therefore, to increase the percentage of real bones and meaty snacks. We must endeavor to persuade the distributors of treats to 'up the ante' from now on. Details are given in Appendix L of the New Deal Plan (NDP). [Click Here](#) for the NDP.



Here's another example of a non-accessible excerpt. Can you identify the exact accessibility issues?

# Hyperlinks



## Non-accessible

### Analysis of treat intake in FY 2009

The majority of treats in this year have been dog biscuits (<http://www.snackycakes-time.com/index.cfm?fuseAction=db>).

These treats are welcomed, and we wag our tails in thanks. However, the tastier meaty snacks biscuits (<http://www.snackycakes-time.com/index.cfm?fuseAction=msb>) and real bones biscuits (<http://www.snackycakes-time.com/index.cfm?fuseAction=rbb>) are our target. One of the main goals for 2010 is, therefore, to increase the percentage of real bones and meaty snacks. We must endeavor to persuade the distributors of treats to 'up the ante' from now on. Details are given in Appendix L of the New Deal Plan (NDP). [Click Here](#) for the NDP.

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Hopefully, you were able to notice non-accessible hyperlinks and character spacing.

Here, I've highlighted hyperlinks that are NOT **Meaningful**.

Moreover, this excerpt was created with justified character spacing. Make certain to left align all text as screen readers are programs to read from left to right.

# Hyperlinks



## Non-accessible

### Analysis of treat intake in FY 2009

The majority of treats in this year have been dog biscuits (<http://www.snackycakes-time.com/index.cfm?fuseAction=db>).

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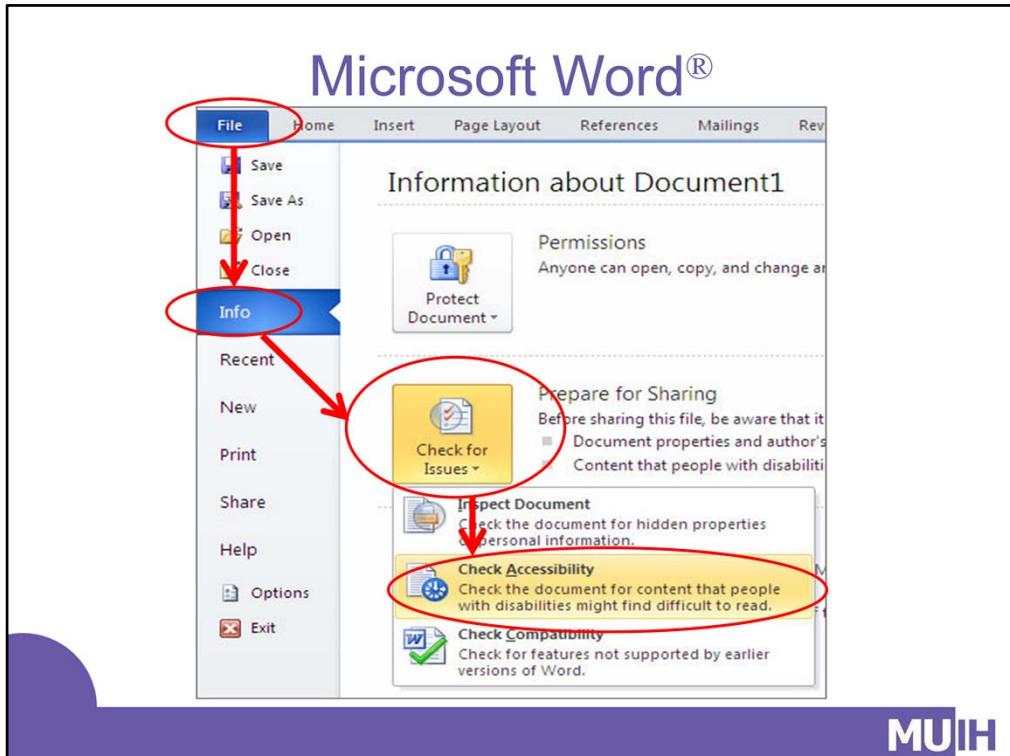
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- One last issue with this excerpt is its use of “vague” hyperlink language.
- For example, a Vague Link would read something similar to “Click here”, as highlighted in the last sentence of this excerpt.
- Avoid ambiguity and provide the learner with context related to its content and destination.....to give it meaning.
- Hyperlink text should be easily understood by all users, including screen reading programs and independent of all the content around it.
- Remember that online documents for visually impaired users are viewed by screen reading programs, which articulate headings, links and all manually entered text.
- long links as shown above are inconveniently spelled out and it will be verbalized by screen readers. That's why Short links are critical to universal design and accessibility.

## Accessibility Checkers



Lastly, lets take a quick look at how an accessibility check is performed in Word and Adobe PDF documents



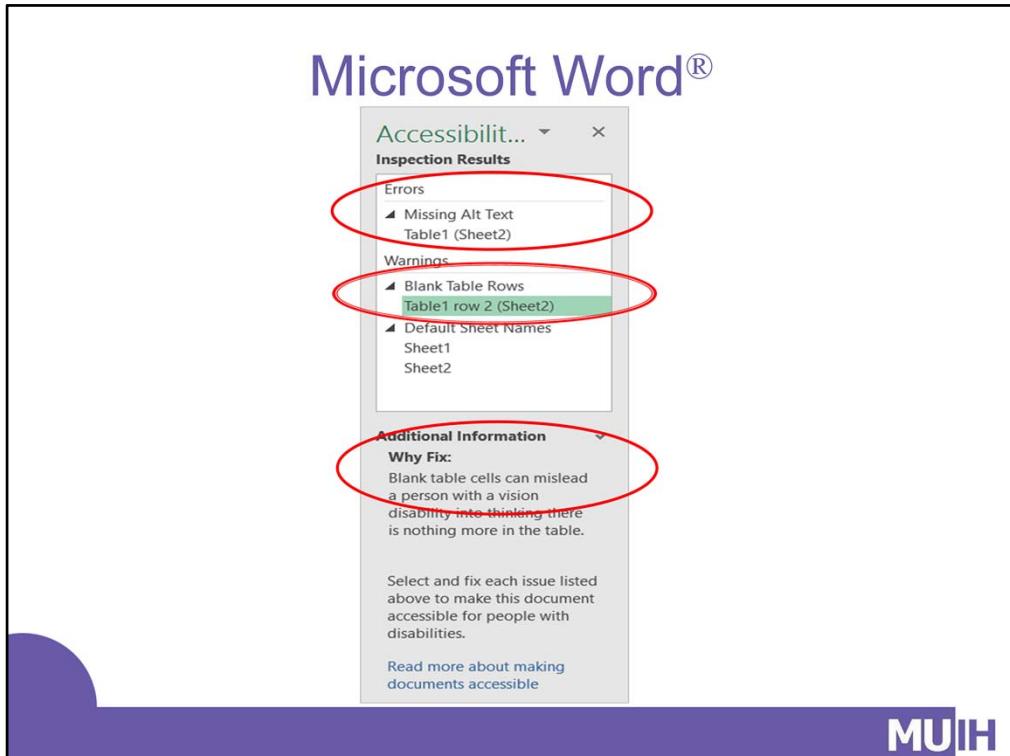
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To execute Microsoft Words “Accessibility Checker”, Open your document and Go to:

File > Info > Check for Issues > Check Accessibility

A right-side panel indicates potential errors and shows reading order.

- While a good start, the accessibility checker may not flag some errors like the alt text for an image should be in the Description box (not Title line).
- Therefore, you will also use the Word Document 508 Checklist you were given when you arrived, to ensure your document meets accessibility standards.
- In addition to Microsoft Word offering suggestions on “how to fix”, you can also use your ADA Compliant Document Guide.
- Pause this tutorial and take a few minutes to perform an accessibility check of your document.



Then a right-side panel will appear, indicating potential errors and displays reading order.

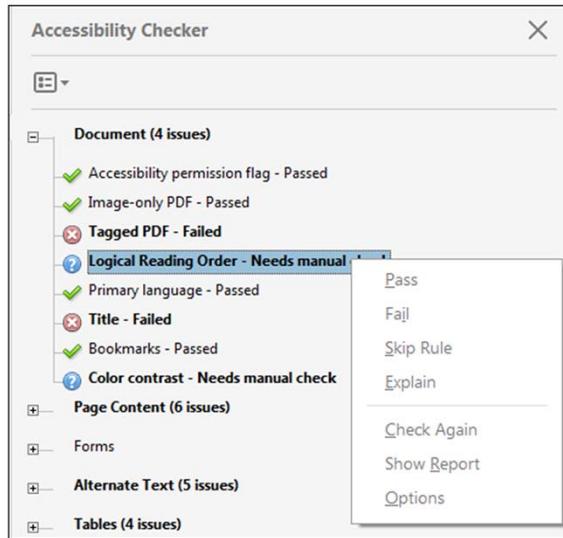
The checker's **Inspection Results** classifies accessibility issues into three categories: errors, warnings and tips.

- First Errors: This is content that makes a document very difficult or impossible for those who are differently abled to access.
  - *for Example: an image with no alt text.*
- Next, the report provides Warnings . This is content that in most—but not all—cases makes the document inaccessible.
  - *An Example would be: a link with text that is not descriptive of its function.*
- And lastly, it provides Tips: this is content that is accessible, however it may provide challenges based on how it's organized or presented.
  - *For Example: skipping from a first-level heading to a third-level heading.*

While a good start, Word's accessibility checker may not flag all errors. Such as alternate text for an image that should be in the Description field, yet it's in the Title line.

- So be mindful of its limitations and always double check your documents.

# PDF Documents



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Now, let's take a quick look at Accessibility in PDF documents.

- If you have Acrobat Pro, then you have access to Adobe's Accessibility Checker.
- In the “Required Fixes” document, check see if any of your errors are listed.
- If you do not have Acrobat Pro, the site listed on your PDF checklist is where you can download a Free PDF accessibility checker.
- This site is recommended by the federal government’s section 508 task force.

## Resources

- [Color Contrast Analyzer](#)
- [Web Aim Web Aim Alternative Text Lesson](#)
- [Acrobat Pro Accessibility Checker](#)
- [Access for All \(PDF Checker\)](#)
- [Checklist: PDF File](#)
- [Checklist: Word Document](#)
- [Checklist: Excel Document](#)
- [Checklist: PowerPoint](#)
- [Checklist: Multimedia File](#)

Feel free to send all Questions, Comments, Suggestions to:

**Keyonda Smith, PhD**  
*Director of Online Course Design*  
**Maryland University of Integrative Health**

Slide Deck: [www.kmsmithphd.com/conference](http://www.kmsmithphd.com/conference)  
Email: [KSMITH3@MUIH.EDU](mailto:KSMITH3@MUIH.EDU)



This concludes an introduction into the practical application of creating accessible content for your courses.

If there are any questions, comments, or suggestions, feel free to send me an email. These resources are here for you take or you can access them online.

*Remember to design with everyone in mind.*

Thank you for your attendance and participation and I look forward to seeing you soon.