UNIVERSAL DESIGN THROUGH MULTIPLE LENSES

Universal Design (UD) involves a proactive process of designing learning in order to achieve the highest level of functionality and positive user experience for the widest audience possible. Exploring a course through the lens of multiple learners with a variety of unique learning needs can help ensure your course is designed for maximum functionality and usability.

Select each lens below or scroll through the document to learn about the needs and challenges students may face when taking your online course, particularly those faced by students with visual disabilities, auditory disabilities, cognitive disabilities, motor disabilities or those with English as a Second Language.
ELAINA

Elaina was just diagnosed with the early stages of macular degeneration. The condition is progressive so while Elaina currently maintains some vision, this will gradually worsen over time. The effects of macular degeneration impact the central area of vision so what Elaina looks at directly will be the most difficult to see.

Below is what Elaina experiences as a result of macular degeneration. Images provided by webaim.org.

Adjusting to this news is a challenge for Elaina as it will greatly impact her lifestyle. She does, however, intend to continue with her plans to complete a graduate degree online. She is beginning to familiarize herself with some of the challenges and solutions.

UNIQUE CHALLENGES

- Graphics pose a challenge as she cannot see what she’s looking at directly. She must rely then on alternate text for images that provide her with a text description of what the graphic is and how it relates to the content.
- Sometimes color is used to denote meaning without a text explanation, which is meaning lost on Elaina.
- Some websites and web-based technologies contain links that just don’t make sense to a screen reader, which Elaina is now relying on.
- Some videos rely heavily on the graphics and visuals, without audio narrative to explain what’s happening. When no alternative is provided, Elaina misses out on whatever valuable information is being shared.
- Some assignments in her graduate courses require her to put together a visual presentation, which is challenging for her due to her disability and therefore not necessarily a true indicator of what she has learned and skills she has developed in the course.
Some or most of the course material are scanned copies of content or visuals that her screen reader is not able to read for her.

RESOURCES
While Elaina’s story is a common one, there are many potential challenges related to a wide variety of visual disabilities. To learn more about:

- Blindness, visit [http://webaim.org/articles/visual/blind](http://webaim.org/articles/visual/blind) and explore key considerations [http://webaim.org/articles/visual/blind#keyconcepts](http://webaim.org/articles/visual/blind#keyconcepts)
- Low vision, visit [http://webaim.org/articles/visual/lowvision](http://webaim.org/articles/visual/lowvision), and explore key considerations [http://webaim.org/articles/visual/lowvision#keyconcepts](http://webaim.org/articles/visual/lowvision#keyconcepts)
- Color-blindness, visit [http://webaim.org/articles/visual/colorblind](http://webaim.org/articles/visual/colorblind), and explore key considerations [http://webaim.org/articles/visual/colorblind#keyconcepts](http://webaim.org/articles/visual/colorblind#keyconcepts)

Another common visual disability is color-blindness. Below is an example provided by webaim.org that demonstrates how color used to depict meaning will not work for someone who is color-blind. Both images show the same map but lines depicted using color are lost on someone who is color-blind.

Additional Resources:
- [Web Accessibility Evaluation Tool](http://webaim.org/wave) (WAVE) (helps to determine the level of accessibility of a webpage)
- [Guidelines for Describing Graphics](http://webaim.org/inaccessibleimages/guidelines)
- [Accessible PDF and PDF from Word and PowerPoint](http://webaim.org/inaccessibleimages/pdf)
- [Creating PDF from Scanned Images with OCR and Checking and Tweaking PDF Accessibility](http://webaim.org/inaccessibleimages/pdf)
- [Captioning](http://webaim.org/inaccessibleimages/captioning)
- [Audio Descriptions](http://webaim.org/inaccessibleimages/audio)
STEFAN

Stefan experienced a severe illness during childhood. As a result of the illness, Stefan has hearing loss and has cochlear implants that allow him to decipher most speech. Stefan’s hearing loss significantly impacts his lifestyle and the way he accesses information. He is now pursuing a degree online, which he thinks is a good option for him instead of sitting in a classroom with extra sounds and noise that may cause interference for his cochlear implants.

This video demonstrates what it’s like to hear through a cochlear implant.

UNIQUE CHALLENGES

- He is able to understand most clear speech due to his cochlear implant and with some lip reading but when there are extra sounds, background noise, or lack of clear audio, it is nearly impossible for him to gather any meaning.
- Videos do not include synchronous captions so while Stefan may be able to gather some meaning from visuals alone, most points are missed without the additional audio.
- Anytime audio is central to gathering meaning or giving a message, unless there is also a visual element, the message will be lost on Stefan.

RESOURCES

There are a wide variety of levels and types of hearing loss. To explore more visit Auditory Disabilities.

Additional Resources:
- Captioning
WILLIAM

William was in a car accident two years ago and suffered a traumatic brain injury. As a result, William has difficulty reading and comprehending written text, though prior to his accident he always excelled academically. He works hard to be successful at work despite his injury and has therefore decided to pursue a graduate degree that will help him stay marketable and learn more about the field, despite these new challenges. He feels that an online classroom will offer him more time to reread materials and develop thoughtful answers.

UNIQUE CHALLENGES

• When there are little or no graphics that support the written word, William misses out on any helpful visual cues related to comprehending the content.
• When William is prompted to read content that contains sarcasm, satire, parody, and metaphor it is particularly challenging for him to comprehend.
• If an author implies meaning indirectly without stating it explicitly in the writing, the message is then lost on William.

Figure 1: Reading Problem Example

Here is an example provided by www.webaim.org of a reading challenge that William faces. See if the associated accessibility fix helps you.

What is being said in this phrase?

Tob eornot obe

Now check the power and importance of embedded graphics as a way to enhance the context of the written word by looking at the phrase with a graphic.

RESOURCES

There are many potential cognitive disabilities including; memory, problem solving, attention deficit, reading/linguistic/verbal comprehension, visual comprehension, math comprehension. Learn more: http://webaim.org/articles/cognitive/design

Additional Resources:
• Graphic Organizers
OLIVIA

Olivia returned from military deployment and now has a motor disability due to an injury from an accident overseas. As a result, Olivia does not have functional use of her arms and hands and uses a technology called Dragon Dictate to speak into a computer that types what she says. Olivia is not able to drive so her connection to the world via the internet is important to her. Due to this she has decided to pursue a degree online rather than attend class on campus.

UNIQUE CHALLENGES

• Olivia finds some websites challenging since she is unable to use a mouse and has to rely on her directive speech to navigate web pages. When webpages are not properly designed to allow for tabbing from link to link or for voice-activated software, Olivia has a challenge navigating the site.
• Since she directs the computer via speech, there are occasional glitches that can result in the wrong actions being taken. When programs are not designed in such a way as to “double check” that a user actually wants to take the action they’ve requested, there may be errors made that negatively impact her experience.

RESOURCES

To learn more about other motor disabilities review: http://webaim.org/articles/motor/motordisabilities#keyconcepts

The Web Accessibility Evaluation Tool (WAVE) can help to determine the level of accessibility of a webpage.
YUKIO

Yukio moved to the United States with her family several years ago and has begun to pursue her education along with working to support her family. English is not her first language, though she manages to communicate well through the written word. She is pursuing an online degree program so that she can more easily live at home and work part-time to support her family.

UNIQUE CHALLENGES

• Some of the videos the instructor posts do not contain captions so when Yokio hears new terminology or is unsure of what has been said she is not supported with text.
• Some videos in the course contain captions but are spoken so quickly that it is challenging for Yokio to keep up and the same content is not covered elsewhere.
• The course content contains lengthy paragraphs without headings that might help provide meaning and organization.
• Some of the course content contains metaphors and sarcasm that is hard for Yokio to understand.
• There are frequent references to aspects of American culture that Yokio is unfamiliar with and no additional explanation or background is provided.

RESOURCES

To learn more about students with English as a Second Language visit: http://www.edtechpolicy.org/StudentWork/yesmin/www.glue.umd.edu/~ysahin/EDUC477/Empowering%20ESL%20students%20with%20UD.htm

Additional Resources:
• Captioning
• How to Make Information Accessible
• Do’s and Don’ts for Teaching English-Language Learners