**How Assistive Technology can benefit students with disabilities**

Advancements in technology have provided access to learning materials in a variety of ways, however, it is important to understand that there are still limitations. This understanding means the academic community can be proactive in education design to minimize accessibility barriers. On this page we cover what Assistive Technology (AT) is, why it is important as well as the types of technologies that can provide a more inclusive learning environment for students.

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## What is Assistive Technology (AT)?

Any tool that helps students complete a task that would otherwise be difficult or impossible. AT can be a separate device, but is often an app, software, or a built-in feature on a cell phone, tablet or computer. AT can consist of specialized technology, such as an eye tracker, or general use technology, such as an audiobook or word prediction on a mobile device.

### What Types of Files can be Accessible

If formatted for accessibility, the following types of files are generally accessible to most students:

1. PowerPoint
2. Word
3. EPUB

Warning: PDFs are often not accessible to students using certain screen readers or text-to-speech software or apps. Therefore, this should NOT be the only format in which material is provided to students.

## Why is Assistive Technology (AT) important?

Assistive technology can help students who have difficulty with reading, writing, note taking, and time management. AT can help improve the academic performance of students both with and without disabilities.

### Why is it important to create Accessible files?

Many students who would benefit from the use of assistive technology do not have access to accommodations from campus disability services. Both the testing required to obtain accommodations and the assistive technology students need may have prohibitive costs. Testing and the acquisition of adaptive technologies generally occur in elementary or high school. However, some students only realize that they have a disability when they reach post-secondary education. For example, students who struggle with reading comprehension may be able to do relatively well when the material they are expected to understand is covered in class. However, they may begin to struggle academically when they are evaluated on material that they had to read on their own. Furthermore, wait lists can be very long. For example, the student may do poorly their first semester, be encouraged to get tested in their second semester, but not receive testing and accommodations until a year later.

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|  | Check out these videos that demonstrate how students benefit from using assistive technologies.* [Assistive Technology for Visual Impairments or Blindness](https://www.youtube.com/watch?v=34hBBYmhNLE) (Oklahoma ABLE Tech)
* [Student with Dyslexia Blossoms with Assistive Technology](https://www.youtube.com/watch?v=JKrgxeXDtjk&t=4s) (Learning Ally)
* [Working Together: Computers and People with Learning Disabilities](https://www.youtube.com/watch?v=aa78XfHHf1Q&t=34s) (The Do It Center)
* [Text-to-speech and voice dictation technology: Uni student experience](https://www.youtube.com/watch?v=j4oAr5DSyG8) (Australian Disability Clearinghouse on Education and Training)
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## Types of Assistive Technology

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| **Category of technology** | **Description** |
| Text-to-speech  | Reads written text aloud, sometimes while highlighting the word or sentence being read. This is available in word processors, Adobe PDF, and most e-book readers, as well as in some apps and browsers extensions.   |
| Screen readers  | Software that reads ALL information on the screen aloud and describes events like error messages. Allows students to navigate using keyboard commands and to hear what is on the screen.   |
| Dictation (speech-to-text)  | Allows students to dictate text into a Word file or into other interfaces such as email.   |
| Handheld devices  | These include electronic dictionaries, digital recorders, magnifiers, smartphones, tablets, etc. that students bring to class.   |
| Braille display  | Provides access to information on a computer screen by electronically raising and lowering different combinations of pins in braille cells.   |
| Mainstream technology  | Most smartphones, tablets, and laptops have built-in features that can make course material more accessible. Students can also use numerous apps on these devices to help with reading, writing, time management, and organization.   |

## Common Assistive Technology Tools

### Reading Tools

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| **Type of AT**  | **Examples**  | **How it helps**  |
| Text-to-speech  | Available in [WordQ](https://www.quillsoft.ca/%22%20%5Co%20%22https%3A//www.quillsoft.ca/), [Kurzweil](https://www.kurzweiledu.com/k3000-firefly/overview.html), [ClaroRead](https://www.clarosoftware.com/portfolio/claroread/%22%20%5Co%20%22https%3A//www.clarosoftware.com/portfolio/claroread/), [Word](https://www.avantixlearning.ca/microsoft-word/how-to-hear-a-word-document-using-speak-text-to-speech/), [Adobe PDF](https://helpx.adobe.com/reader/11/using/accessibility-features.html) [See use the read out loud text-to-speech tool], [Read&Write](https://www.microsoft.com/en-ca/p/read-write-for-windows-ca-english/9p5rcf4vkrd0?activetab=pivot:overviewtab), e-book readers.  | * Reads text aloud.
* Can highlight the word or sentence being read.
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| Reading pens  | [C-PEN](https://cpen.com/products/readerpen/#:~:text=Product%20Brief,reading%20difficulties%20such%20as%20dyslexia.), [Wizcom ReadingPen 2](http://35pytx37zdp5j4hfr35of829-wpengine.netdna-ssl.com/atrc/wp-content/uploads/sites/25/2019/02/wizcom-2-2012.pdf) | * These “pens” have a small camera to scan and convert text to speech.
* Scans one line at a time.
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| Word clouds  | [WordItOut](https://worditout.com/word-cloud/create), [Free Word Cloud Generator](https://www.freewordcloudgenerator.com/), [Word Art](https://wordart.com/) | * Provides a visual representation of text by designating the most common words.
* Frequency is represented by the size of words in the word cloud.
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| Dictionary and thesaurus  | There are many Online dictionaries and thesauruses. Features of literacy tools such as Kurzweil, Read&Write, and WordQ.  | * These help students understand words they do not understand, which may improve reading comprehension.
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### Writing Tools

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| **Type of AT** | **Examples**  | **How it helps**  |
| Dictation (speech-to-text)  | Available in Office 365, Google Docs, and many other programs and apps.   | Converts what the student says aloud to text.  |
| Alternative keyboards  | Onscreen, one-handed, high contrast keyboards, etc.  | Facilitates typing for students with hand/arm difficulties.  |
| Graphic organizers  | Outline tools such as mind maps, printed templates or Word outlines.  | Helps students organize their writing.   |
| Word prediction  | Provides suggestions when students start writing a word.  | Helps students spell and choose the correct word  |
| Text-to-speech  | Students can have the text they wrote read aloud to them.  | Helps students proofread and hear errors in their writing.   |
| Dictionary and thesaurus  | There are many Online dictionaries and thesauruses. Many are also are features of software such as Kurzweil, Read&Write, and WordQ.  | Helps students with spelling errors for online exams and assignments.  |
| Spelling and grammar checkers  | Available in word processors (e.g., Word and Pages), as well as specific software such as Antidote and Grammarly.   | Helps students recognize and correct errors in their writing.   |

## Specific Technology Features

Review the types of document features that can facilitate the use of assistive technology.

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| **Accessibility Feature** | **How it facilitates accessibility** | **Which students this helps** |
| **PDF** |
| * Text that is selectable (not a photo)
 | Students can view text on the screen while text-to-speech software or apps read this aloud.  | All students who use text-to-speech software or screen readers.  |
| * Adding “Alt Text” to any visual content (e.g., tables, images, logos)
 | Allows students to hear a description of what others can see. Alt Text can be as simple as “logo of Montreal” or “pie chart showing that 50% of users are female.”  | All students who use text-to-speech software or screen readers.  |
| **Word**  |
| * Use style headings.
 | Allows students to jump to specific sections of the document  | Students who use text-to-speech or a screen reader.  |
| **PowerPoint**  |
| * Use the slide "layouts", rather than adding a text box use a slide that already has the appropriate number of placeholders.
 | Most slide layouts include a "title" slide and one or more "placeholder" areas where you add content like lists, images, and tables to each slide   | Students who use text-to-speech or a screen reader.   |
| * Check the reading order.
 | Ensures that the content on each slide is read in the correct order.  | Students who use text-to-speech or a screen reader.  |
| * Use header rows in the ‘Design’ tab
 | Makes the contents of tables more accessible to students using screen readers  | Students who use a screen reader.  |
| * Make links (URLs) descriptive (e.g., hyperlink “see required courses” rather than “for required courses click here” or http://Requiredcoursesareavailable.docx)
 | Designates URLs for students using screen readers.  | Students who use text-to-speech or a screen reader.  |
| * To see what content is accessible, use the Outline mode.
 | Text to speech programs and screen readers will only read aloud information available in the outline.  | Students who use text-to-speech or screen readers.  |
| * Use the Accessibility Checker
 | Helps identify many common accessibility issues, including checking the reading order of the content on each slide.   | Students who use text-to-speech or a screen reader.  |

## Tips for Instructors

As an instructor review what you can do to facilitate the use of assistive technology.

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| 1 | **When choosing textbooks**  | Select text books that have digital versions* Keep in mind EPUB works best for text-to-speech, PDF for fidelity with paper textbook.
* Many large publishers now have an accessibility certification displayed directly on the book listing on the publisher’s website.
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| 2 | **When curating class materials** **from other sources** | Pick accessible materials whenever possible. * **Do post** course content in Word, PowerPoint, or EPUB format, as well as in PDF. These allow students to change the font and size of text, the color of the background, contrast between text and background, and line spacing.
* **Do not use** files that have the following: Fuzzy or faint text; Handwritten notes or scribbles; Part of another page in the margins; and Highlighting and underlining in the text. This increases the likelihood that the text will not be accessible to students who use text to speech apps and software and screen readers.
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