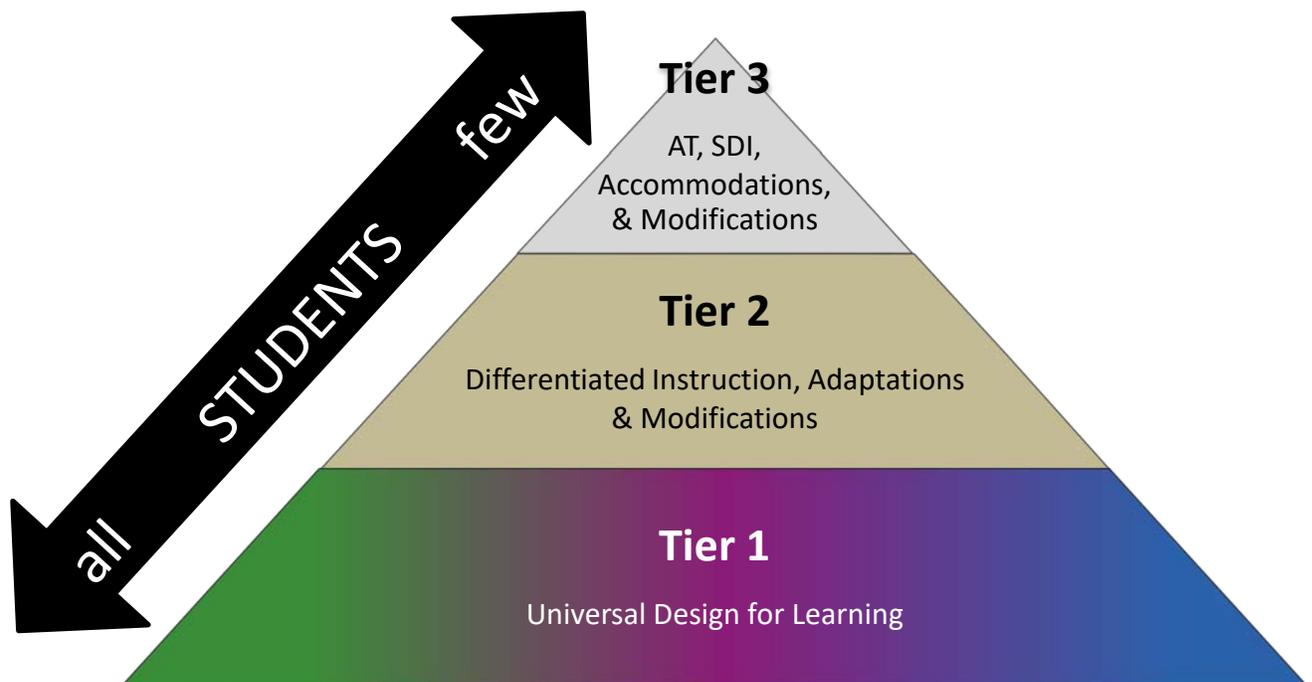


Universal Design for Learning: Tier 1 Computing Supports

Universal Design for Learning (UDL)

Universal Design for Learning (UDL) is a framework for designing instruction, materials, and interactions in a flexible manner that allows for access and engagement by a wide variety of learners. The goal of UDL is to design instruction in a manner that empowers the individual in becoming an independent learner and minimizes the need for retrofitting instruction because of barriers in the way it was initially designed. While UDL applies to all aspects of instructional design, the purpose of this document is to provide an overview of some of the features built into commercially-available computing platforms that can be used to provide flexibility and support to all learners.



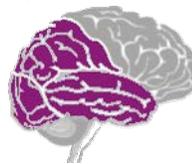
Multiple Means of Engagement



Create expert learners who are purposeful and meaningful

7. Recruiting Interest
8. Sustaining Effort & Persistence
9. Self Regulation

Multiple Means of Representation



Create expert learners who are resourceful and knowledgeable

1. Perception
2. Language & Symbols
3. Comprehension

Multiple Means of Action & Expression



Create expert learners who are strategic and goal-directed

4. Physical Action
5. Expression & Communication
6. Executive Functions

Universal Design for Learning Resources

- For additional information on the Universal Design for Learning guidelines, visit the [Center for Applied Special Technologies UDL website](#).

Walk-through of operating system features

- [Windows Accessibility](#) webinar archive
- [Mac and iOS Accessibility](#) webinar archive

Common Keyboard Shortcuts

- [Windows keyboard shortcuts](#)
- [Mac keyboard shortcuts](#)
- [Chrome keyboard shortcuts](#) (or press CTRL + ALT + / on the Chromebook keyboard)

Using This Guide

One useful feature is described on each page, followed by the processes for configuring and/or using feature on various platforms or browsers. ***Due to the wide variety of versions available for each platform or browser, there may be differences in the process or labels as described in the steps.***

- **Bold text** is used to indicate onscreen elements that a user must click (or keyboard shortcuts)
- *Italic text* is used to indicate text that appears onscreen (e.g., labels or descriptors in a settings panel or toolbar)

The table below indicates which version of the products were used for development of this guide and notes that may be important to the end user.

 Windows 10 Enterprise, 64-bit, version 1607 Windows maintains settings in two different user interfaces (UIs), so if setting changes do not impact a particular feature (e.g., text-to-speech), it may be necessary to change the settings in the alternate UI. The updated settings are referred to as Metro UI and the older settings are referred to as Legacy UI.
 OS X Mojave (10.14.1) Some settings are impacted at the system (OS) level, while others are handled by individual programs. In instances where this occurs, a parenthetical notation indicates which program settings are described.
 iOS 12.1
 Google Chrome, version 70.0.3538.76 (32-bit)
 Mozilla Firefox browser, version 63.0.3 (64-bit)
 Microsoft Edge browser, version 38.14393.0.0
 Adobe Acrobat Reader DC, version 19.008.20081.46137

Access to Digital Content

One of the most powerful – and increasingly simple – means to embrace UDL’s guidelines for multiple means of representation, action, and expression are to provide users with access to material in multiple formats. A printed document can be provided in digital format allowing it to be listened to, magnified, copied, edited, etc. This allows access to alternate representations of the same content or access to alternative or supplemental content via the internet. Simply posting an assignment to a web page or content-management system (e.g., Moodle, Blackboard) increases the possibilities for how users can interact with the material.

Quick Response (QR) Codes

Quick Response (QR) codes are scannable symbols that are linked to a variety of data. Most often, QR codes are used to quickly access a website address (URL). Free services are available to quickly create static QR codes that directly embeds the data into the code. Dynamic QR codes, on the other hand, are often available as part of an annual subscription service and allow one code to be repurposed to link to different content. By far, static QR codes are more commonly used by teachers and students.

Quick access to a URL is a feature that can be useful for users who need quick access to online content from a smartphone or tablet device. This can be an efficient way for a person to provide access to a digital version of printed material (e.g., a PDF article, study guide, etc.) to provide an alternate means of representation, action, or expression on the part of the person accessing the information. It can also be used to link to additional resources (e.g., a video illustrating a scientific concept or a whiteboard presentation demonstrating a mathematical process).

Capture the QR code to the right. This will launch “[QR Codes Explained by Common Craft](#)” on YouTube.



QR Code Generators

- [QRStuff.com](#)
- [goQR.me](#)
- [Qrafter – QR Code](#) app

QR Code Scanners

- ScanQR (Chrome Extension on the [Chrome Web Store](#))
- [QR Code Scanner](#) browser-based scanner

Shortened URLs

Shortened URL generators allow users to reduce the size of a web-based resource’s link. In the example to the right, the shortened URL <http://bit.ly/SADarchive> points to content at <https://www.dropbox.com/sh/z23umu22d2ao3qt/AADb8KFWKrIHL8h0D5tebSVpa?dl=0>. This shortened URL feature is useful to provide a link that is easier to type and/or remember and is a helpful alternative or supplement to providing a QR code since users can access the content with any device, not just one with a QR code scanner. Providing both a QR code and a shortened URL are two ways to provide flexibility for users to access the online content.



Shortened URL Generators

- [Bit.ly](#)
- [Tiny URL](#)

User Interfaces

The User Interface (UI) is the graphical environment that a user interacts with when using technology. It incorporates all of the colors, arrangements, fonts, navigation, and structure that allow humans to use a computer, tablet, or other devices. Developers design UIs with universal design principles so that people with a wide variety of abilities, preferences, and needs can interact with the device in the manner which is most natural or efficient.

As a result of the universal design that is applied in each UI, users will notice that there are often several ways to perform a specific action. Printing a document, for example, could be accomplished by clicking **File | Print**, clicking a printer icon, or using a keyboard shortcut like **CTRL+P** or **⌘P**. Being aware of the alternate means for accomplishing a given task can serve to engage students in the use of technology, alter the means in which those tasks are represented, and vary the action that a user must employ to complete the task – truly Universal Design for Learning in practical use.

For the sake of brevity, not all means of configuring and using features are included on the following pages. Be alert to the alternatives, though, and be sure to share them with users who may benefit from an alternative approach. In most UIs for devices that have keyboards, keyboard shortcuts are included next to items in text menus and icon ToolTips that appear onscreen. If a person uses a particular feature frequently, it may be worthwhile learning the keyboard shortcut or icon associated with it or customizing the UI so that it is more readily available to the user.

Feature	Windows ⌘ = Windows key	Mac ⌘ = Command ⌥ = Option	Chrome
New file	CTRL + N	⌘N	CTRL + N
Open file	CTRL + O	⌘O	CTRL + O
Save file	CTRL + S	⌘S	CTRL + S
Close file	CTRL + W	⌘W	CTRL + W
Print file	CTRL + P	⌘P	CTRL + P
Undo	CTRL + Z	⌘Z	CTRL + Z
Redo	CTRL + Y	⌘Y	CTRL + Y
Select All	CTRL + A	⌘A	CTRL + A
Copy	CTRL + C	⌘C	CTRL + C
Cut	CTRL + X	⌘X	CTRL + X
Paste	CTRL + V	⌘V	CTRL + V
Find	CTRL + F	⌘F	CTRL + F
Replace	CTRL + H	SHIFT + ⌘H	CTRL + H
Bold	CTRL + B	⌘B	CTRL + B
Italicize	CTRL + I	⌘I	CTRL + I
Underline	CTRL + U	⌘U	CTRL + U
Spell Check	F7	⌥ + ⌘ + L	CTRL + ALT + X
Navigate Open Documents	ALT + TAB	⌘TAB	ALT + TAB
Open taskbar application	⌘ + [#] <i>For digits up to 9</i>		ALT + [#] <i>For digits up to 8</i>
Dock Window to Side	⌘ + → or ⌘ + ←	Click-drag the green full-screen icon	ALT + [or ALT +]

Document Annotation

Document annotation is a feature that allows users to add comments, text, drawings, or other elements to an existing document. This feature benefits users who may need to see changes and suggestions in documents during the editing process or who are interested in adding additional information to what already exists in a document.

- *Comment tools*: Allows users to make and show comments. In programs where Track Changes is also an option, changes (i.e., additions and deletions) can also be retained and viewed for a user or collaborator to edit work in a manner which potentially avoids the loss of original work until a change is accepted or declined.
- *Insert tools*: Allow for the placement of text, images, shapes, equations, special characters, or graphic organizers. These features can be beneficial to individuals who need a legible alternative to pencil/paper or need executive function supports of features like SmartArt (Microsoft Office products).
- *Notetaking tools*: Provide users with specialized tools to import and organize files (e.g., PDF files or PowerPoint slides shared by another user); annotate with a wide variety of writing, drawing, and typing tools; and, in some products, insert audio, visual, and video annotations.

Most word processing, spreadsheet, and presentation applications now incorporate some commenting tools as part of the program's ribbon or settings panel. Comments are most commonly used for multiple people to collaborate on the creation of a document and track changes, but comments can also be inserted by a teacher, for example, to provide additional details or support in a document (e.g., including reworded or alternate directions to those that are presented within the visible text document). Commenting can also be helpful for users who would be negatively impacted by redoing writing/keyboarding tasks during the editing process.

Windows 10

- *Comment* (Microsoft Office): Click **Review** | **New Comment** to create a comment. Change these comment visibility settings in the **Review** ribbon | *Tracking* group by selecting one of the options (**Simple Markup**, **All Markup**, **No Markup**, or **Original**) from the *Display for Review* drop-down list. *Simple Markup* shows comments as speech balloon icons, while *All Markup* shows the comments along the right-side of the document. Choose from the tools in the *Comments* group to create, delete, or navigate through comments in the document.
- *Track Changes* (Microsoft Office): Click **Review** | **Track Changes** to turn on tracking for editing that is done to original text. Place the cursor somewhere in a tracked change and click **Accept** or **Reject** to use or delete the edit. This feature can be useful for users who type slowly, fatigue easily, or a hesitant writers by essentially adding a decision-point before permanent – and possibly irrevocable – changes are made to the document during editing or collaboration.
- *Insert* (Microsoft Office): Click **Insert** | **Pictures, Shapes, SmartArt, Chart**, or **Screenshot** to add items to the document. Shapes includes a *Text Box* shape and a variety of lines and arrows that can be useful in annotating a document. Most shapes can also have text added to them by right-clicking the shape after it has been drawn and selecting **Add Text** from the contextual menu. Holding the **Shift key** while drawing or resizing a shape retains proportions (this is an easy way to produce a perfect square or rectangle).

Mac OS X

- *Comment* (Pages): Click **Comment** in the toolbar at the top of the page (or **Insert | Comment**). Highlighting will be applied to indicate there is an embedded comment and a colored square will appear to the left of the text. Clicking on the highlight or the colored square will display the comment. The resulting comment box has controls to **Reply**, **Delete** or move to the **Next/Previous** comments. Controls are also presented in a *Comment toolbar* that appears at the top of the document window.
- *Track Changes* (Pages): Click **Edit | Track Changes** or click on the **Comment** icon on the toolbar and then click **Track Changes** in the toolbar that appears at the top of the document window. Use the Green Checkmark icon to accept changes or the Red X icon to reject changes. Tracking can also be paused using the toggle control.
- *Insert* (Pages): Click **Insert | Table, Chart, Text Box, Shape, Line, Highlight, Comment, Bookmark, or Record Audio** or click on the Insert icon in the toolbar. The Record Audio feature can be a way for a teacher to embed different representations of text for a student to access or an alternative means for a student to capture information instead of keyboarding.

iOS 12

- Capture an image using the *Camera* app and open the image in the *Photos* app | tap **Edit | More icon** (circled ellipsis) | **Markup** and use the tools at the bottom of the page to add drawings, change colors, or select more tools (using the + icon). Additional tools include text box, signature, magnifier, rectangle, ellipse, speech bubble, and arrow. The photo markups remain editable while on the original iOS device.
- Apps with this feature:
 - [Notability](#) app
 - [iAnnotatePDF](#) app
 - [ClaroPDF Pro](#) app
 - [SnapType](#) app

Google Chrome

- To annotate a PDF document on Chrome launch **Google Drive** | view the PDF file | tap the **down-arrow icon** next to *Open with Google Docs* | select one of the *Suggested third-party apps*
 - *Lumin*: Launch **Google Drive** | tap + **New | More | Connect more apps** and add *Lumin PDF*. Choose **Open with Lumin PDF** from the top of the Google Drive viewer window

Adobe Acrobat Reader

- Click **View | Tools | Comment | Open** to display the *Comment* toolbar at the top of the document. This toolbar will allow users to add sticky notes, text underlines, text strikethroughs, text boxes, drawings, stamps, shapes, etc. Once a comment is inserted, **right-click** on it and choose **Properties** to adjust the appearance (e.g., to remove the fill color and border for a text box). **Right-click** the comment and choose **Make Current Properties Default** to retain the settings for future use with that specific comment tool.

Text Replacement/Expansion

Text replacement/expansion is a feature that can correct common errors, allow users to replace one text item with another, or reduce keystrokes necessary to type long or repetitive words and phrases. This feature benefits users who have poor or emerging fluency with the keyboard, make common or consistent spelling errors, need to capture notes on a subject quickly, or struggle with typing for extended periods (due to anxiety, fatigue, attention, etc.)

- *AutoCorrection*: Automatically replaces one piece of text with another. Use the undo feature (CTRL+Z) to revert to the original text entry. This is best used to replace abbreviations for commonly-used, high-frequency terms and consistent misspellings.
- *Replace*: Manually replace one piece of text with another. Using non-English character sequences can be an efficient and useful strategy during notetaking or draft writing tasks. This is easily accomplished by starting abbreviations with a symbol such as an accent mark (e.g., ‘mc is used as an abbreviation for “*the Magna Carta*”). This is best used to replace on-the-fly abbreviations for content that is not a common writing topic (e.g., notes for a time-limited unit of study or assignment).

Windows 10

- AutoCorrection (system-level): **Windows icon | Settings | Devices | Typing** and activate toggle for *Autocorrect misspelled words*
- AutoCorrection (Microsoft Office): **File | Options | Proofing | AutoCorrect Options...** to enter an abbreviation in the *Replace* field and the full, correct text in the *With* field. Click **Add** to enter the abbreviation and enter a new one. Click **OK** to add the abbreviation and exit the dialog box.
- AutoCorrection (Microsoft Office): **File | Options | Proofing | AutoCorrect Options... | Math AutoCorrect | check Use Math AutoCorrect rules outside of math regions**
- Replace (Microsoft Office & Office 365): Navigate to the **Home** ribbon (**Editing** group) | click **Replace (CTRL+H)**. Type the original entry in the *Find what:* field. Type the replacement text in the *Replace with:* field

Mac OS X

- AutoCorrection (system-level): Launch **System Preferences | Keyboard | Text** and click the **+ icon** to add an abbreviation. Type the abbreviation or misspelling into the *Replace* field and the correction into the *With* field.
- AutoCorrection (Pages): Click **Pages | Preferences (⌘,) and click the Auto-Correction** tab. Ensure that the box is checked for *Symbol and text substitution* then click the **+ icon** to add a replacement entry. Type the abbreviation or misspelling in the *Replace* field and the expansion or correct spelling in the *With* field. Close the dialog box upon completion of all entries.
- AutoCorrection (Word): Click **Tools | AutoCorrect...** then type the abbreviation or misspelling in the *Replace* field and the correction or expansion in the *With* field. Click **Add** to enter the abbreviation.
- Replace (Pages): Click **Edit | Find (⌘F)**. Click the **drop-down arrow** next to the **Settings gear icon** and choose **Find & Replace**. Type the original entry in the *Find* field. Type the replacement in the *Replace* field.

iOS 12

- AutoCorrection: **Settings | General | Keyboard |** and turn on the toggle for **Auto-Correction**

- Replace: **Settings | General | Keyboard | Text Replacement** then click the **+** icon. Type the full, correct word or phrase into the *Phrase* field. Type the abbreviation into the *Shortcut* field.

Chrome

- AutoCorrection (Google Docs): Click **Tools | Preferences...** then type the abbreviation into the *Replace* field and the full text in the *With* field. Capitalization is not retained for proper nouns, so this feature is of limited use for proper nouns.
- Replace (Google Docs): Click **Edit | Find and replace...** (or **CTRL+H**) then type the original entry into *Find* field and the desired replacement text in the *Replace with* field.

Text-to-Speech

Text-to-speech features, at the most-basic functionality, read digital text aloud from the screen. The feature can be used to supplement printed text, as a replacement for printed text, as a means of editing, or as an alternative means of access without having to (or being able to) visually access text. Voices are selected in the operating system of the device or from settings within a program or browser. Highlighting of full paragraphs, sentences, or individual words is available in some cases. Color schemes and spacing options may also be available in some products. Text can be copied from another document, window, or file to provide audible access to content for struggling readers. Text-to-speech is a feature that can be useful during the editing process, offers an alternative when a reader is experiencing fatigue or eye strain, and can provide access to complex text that a reader struggles to decode and comprehend.

Text-to-speech may also be available - in some cases - to say letter names, words, and sentences as they are typed with the keyboard. Letter speech can be helpful for young users or those with poor fluency with the keyboard since it can help minimize the back-and-forth gaze shift between the keyboard and screen. Word and/or sentence speech is useful for editing purposes and to review text in preparation for subsequent entries.

Reading view features in web browsers may offer text-to-speech capability, but also serve to declutter web page content and provide text formatting capability that may improve a user's ability to access and attend to text.

Windows 10

- **Windows button | Settings | Time & language | Speech** | locate **Text-to-speech** and adjust voice and speed settings (this will configure speech for programs tied to the Metro UI).
- **Windows button** | type *Control Panel* and click **Control Panel** in the results pane | **Ease of Access Center | Speech Recognition** | locate the navigation panel on the left and click **Text to Speech** | adjust the voice selection and speed then click **Apply** (this will configure speech for programs tied to the Legacy UI).
- Microsoft Office: Add speaking capability by opening any Office product and clicking **File | Options | Quick Access Toolbar**. Change the setting under *Choose commands from:* to **All Commands** and scroll down to select **Speak**. Click the **Add >>** icon in the middle of the window and then click **OK**. The small speech bubble icon that is added to the Quick Access Toolbar can be used to read selected text aloud.
- To activate speech while typing, click the **Windows button | Settings | Ease of Access** | activate the toggle for **Narrator** | scroll down and activate the desired toggles in the *Sounds you hear* section. Note that Narrator speaks all screen content, so this may not be ideal for users who want speech to be provided for typing input only.

Mac OS X

- **Apple icon | System Preferences... | Accessibility | Vision (Speech)** | check box for **Speak selected text** when the key is pressed. The default key for text-to-speech is **Option + Escape (⌘Esc)**
- Pages: **Edit | Speech | Start Speaking**

iOS 12

- Click **Settings | General | Accessibility | (Vision) Speech** | activate toggles for **Speak Selection** and **Speak Screen**. A long-hold selection of text displays the **Speak Selection** option when the first toggle is activated. A

two-finger swipe down from the top of the device reads screen contents when the second toggle is activated.

- To activate speech while typing, click **Settings | General | Accessibility | (Vision) Speech | Typing Feedback** and toggle on the desired features.
- Apps with this feature:
 - [Claro ScanPen](#) app
 - [Seeing AI](#) app

Google Chrome

- Click on the status icons at the bottom-right corner of the screen (containing the clock) | **Settings icon | Advanced | scroll to Accessibility and click Manage accessibility features | activate Enable select-to-speak** and use **Search + S** to read selected text. Adjust settings in the **Text-to-Speech voice settings** section. An icon will appear in the system tray, just to the left of the status icons. Click the **Select-to-speak icon** and then use the pointer to drag a rectangle around the text to be spoken.

Mozilla Firefox

- Navigate to a web page that supports the *Reader mode* (an icon of a page of text will appear after the URL in the web address field). Click the **Toggle Reader Mode** icon immediately to the right of the URL (or press **F9**). A vertical toolbar appears along the left edge of the browser window. Click the **Narrate** icon (third from the top, just below the **Type controls** icon). Reading controls will appear in a window to control speed, pause/play, and rewind/fast forward.

Microsoft Edge

- Navigate to a web page that supports the *Reading view* (an icon of a book will appear after the URL in the web address field). Click on the **Settings and More icon** (three dots) | **Settings** | scroll down and adjust view settings under the *Reading* section. To listen to text in the reading window, click the **Settings and More icon | Read aloud**. *Note: The Read aloud text-to-speech feature is only available in Windows 10, version 1709 or later.*

Adobe Acrobat Reader

- **View | Read Out Loud | Activate Read Out Loud**. If the feature does not work, click **Edit | Preferences | Security (Enhanced)** | uncheck *Enable Protected mode at start up* and close the application. Restart Adobe Acrobat Reader and try activating Read Out Loud again. If unsuccessful, it may be necessary to run a repair installation of Adobe Acrobat Reader.
 - **Shift + Ctrl + Y** to activate read out loud for the session
 - **Shift + Ctrl + V** to read the current page only
 - **Shift + Ctrl + B** to read to the end of the document
 - **Shift + Ctrl + C** to pause reading
 - **Shift + Ctrl + E** to stop reading

Speech Recognition (Speech-to-Text)

Speech recognition (Speech-to-text) is a feature that allows a user to dictate text at a cursor insertion point and, in some cases, to control aspects of a computer's operations by voice. This allows for hands-free (or hands-reduced) use of a device and can benefit individuals who need an alternative method of writing/typing, have poor or emerging fluency with the keyboard, fatigue easily, make frequent spelling errors, or simply wish to quickly capture text for further editing later.

Important Considerations for Speech Recognition

- Speech recognition works best in quiet and relatively stable environments
- For laptop-based speech recognition, use of a noise-canceling headset microphone will provide better results than use of the microphone installed in the laptop body/screen
- Dictation will be distracting to others in the environment and other people can generate noise and speech which compromises accuracy. Speech recognition generally is not advisable as an input method in large-group settings
- Speech recognition results in accurately spelled words being presented onscreen, but does not guarantee that what is generated matches what was spoken by the user. While speech recognition simplifies the input of text for many individuals, it also introduces complexity in terms of editing, error recognition, and error correction.
- When available as an option, it is best to use speech to make corrections in speech recognition rather than utilizing the keyboard or mouse. Some speech recognition programs will degrade in performance during a session when keyboard corrections are used incorrectly or excessively.
- While "microphone training" in Windows 10 and Mac OS X may be skipped, it is advisable to use the training feature. Tips and key commands are often reviewed in the microphone training steps, providing a good, basic overview for successful use.

Virtual Assistants

Virtual assistants are the artificial intelligence programs such as Siri, Cortana, Alexa, Google Home, etc. that provide an increasing number of services, resources, and "skills" that are accessed by speaking to the virtual assistant. This feature can benefit users by providing access to reference supports within the context/environment that it is needed (i.e., a user doesn't have to exit a program to search for information, get a translation, convert a unit of measure, etc.). It can benefit users learning or honing language skills by providing spelling, grammar, pronunciation, and vocabulary assistance. Virtual assistant features can also be used as an alternative to mouse and keyboard navigation and control of a computer by searching for files on the hard drive, launching applications, or engaging accessibility features.

Windows 10

- *Speech Recognition* (Metro UI): Attach a noise-canceling headset microphone. Click the **Windows button** | **Settings icon** | **Time & language** | **Speech** | *(Microphone)* **Get started**
- *Speech Recognition* (Legacy UI): Attach a noise-canceling headset microphone. Click the **Windows button** | type *Control Panel* and click the icon in the search results | **Ease of Access** | **Speech Recognition** | **Set up microphone**
- *Virtual Assistant*: **Windows icon** | scroll through the *All Apps list* and choose **Cortana**

Mac OS X

- *Speech Recognition*: Attach a noise-canceling headset microphone. Click **Apple icon** | **System Preferences...** | **Accessibility** | *Interaction (Dictation)*
- *Virtual Assistant*: **Apple icon** | **System Preferences...** | **Siri** | check *Enable Ask Siri*. If keyboard shortcuts are desired for a particular user, configure **Apple icon** | **System Preferences...** | **Accessibility** | *Interaction (Siri)* | check *Enable Type to Siri*
- *Pages*: **Edit** | **Start Dictation** (or press the **Function key** twice).

iOS 12

- Tap on a text field to launch the onscreen keyboard | tap the **Microphone icon** to the left of the spacebar to begin dictation.

Google Chrome

- *Speech recognition* (Chrome OS): Click on the status icons at the bottom-right corner of the screen (containing the clock) | **Accessibility icon** | **Dictation**. The **Dictation icon** (microphone) appears to the left of the status icons. Click the **Dictation icon** | click a location to enter text | dictate text.
- *Speech recognition* (Google Docs): **Tools** | **Voice typing...** | tap the **Click to speak icon** that appears next to the document. Dictate into the document. Click the small **Help icon** that unhides in the bottom-right corner of the **Voice typing icon** to explore commands and guidance for using the feature.

Document Styles

Document styles are used to control the visual appearance of text in a document, but also add important mark-up information to make digital text accessible to a wide variety of assistive technologies for individuals with visual impairments or reading difficulties. While the use of styles often requires users to adjust initially to new ways to format documents, the use of these tools has countless benefits to individuals creating documents as well as those who are accessing them. In Microsoft Word, for example, applied styles allow for the useful display of a text outline in the Navigation pane or the quick change of text sizes, colors, and alignment by applying a new design theme. Themes can be designed to quickly allow text display for particular end-user requirements (e.g., double-spaced, 60-point font without serifs for large-print viewing) without extensive editing of the original document.

- Paragraph styles apply to an entire paragraph of text. Use Heading 1, Heading 2, Heading 3, Heading 4, etc. to structure
- Character styles apply at the word level. Use Strong in place of Bold and Emphasis in place of Italic.
- To change the properties of a style, apply it first, make changes to the font, color, spacing, size, alignment, etc. Right-click on a part of the modified text, and choose the option to modify/update the applied style. In Microsoft Word, right-click on the style in the *Styles ribbon* or *Styles panel* instead to modify from the selection.

Windows 10

- Microsoft Word: Select text or complete these steps prior to typing. Click **Home** | **Styles** and select a style to apply to the selection.
- Click **View** | (*Show*) **Navigation Pane** to display a panel on the left side of the window that shows indented outline based on applied heading styles.
- Click **Design** ribbon | select one of the formatted themes under the *Document Formatting* group.

Mac OS X

- Pages: Select text or complete these steps prior to typing. Click the **Format** icon at the upper-right corner of the window. The palette along the right-side of the window displays a drop-down list of styles at the top of the panel.

iOS 12

- Availability of styles is determined by the app developer. In cases of common word processors like Word, Pages, and Google Docs, the application of styles is often similar to the native apps.

Google Chrome

- Google Docs: Select styles from the **Styles drop-down list** in the toolbar.

Word Completion & Word Prediction

Word completion and word prediction are features which can reduce the amount of typing that is required by suggesting possible full-word choices based on initial keystrokes.

Word completion makes suggestions that are based on a properly-sequenced (spelled) string of characters. This feature benefits users by reducing the keystrokes that are required to type words, but also can serve a role akin to a real-time spelling assistant for users who accurately spell the first few letters of a word.

Word prediction suggests words based on keystrokes (just like word completion), but also suggests subsequent words based on usage rules and patterns. Some word prediction solutions are able to make suggestions based on incorrect spellings. This feature benefits users by reducing keystrokes, reducing spelling errors, and potentially extending the length and richness of sentences by suggesting additional words after a selection is made.

Mac OS X

- Word completion can be accessed while typing in Apple programs. Type the initial letter(s) and then press the **F5** key on the keyboard to access suggestions from the iOS Dictionary. Use a suggestion from the list by double-clicking it or use the **up/down arrows** to move through the list and then press **Enter/Return**. This feature requires the letter sequence to be accurate.

iOS 12

- Word prediction: **Settings** | **General** | **Keyboard** | activate toggle for **Predictive**

External Physical Keyboards

External, physical keyboards includes a wide variety of wired keyboards, wireless keyboards (employing Bluetooth or a USB receiver), or specialized keyboards (e.g., number pads). Small keyboards can be especially helpful to young users or those who type with only one hand by reducing the amount of space that has to be crossed to access all keys on the keyboard. Wireless keyboards allow for greater flexibility in the positioning of a keyboard which can improve access and reduce fatigue for users. External keyboards allow for stickers, foam pieces, or special overlays to be applied to guide users to important keys, aid proper finger placement, or provide better contrast and visibility to the key itself. Keyboard overlays can be used to support users with hand weakness by reducing the likelihood of inadvertent keystrokes.

Windows 10

- Click the **Bluetooth icon** in the lower-right corner of the system tray | **Add a Bluetooth device** | press the sync button on the external keyboard | tap the keyboard name when it appears in the *Bluetooth* list | **Pair** | follow onscreen prompts to complete keyboard pairing.

Mac OS X

- **Apple icon** | **System Preferences...** | **Bluetooth** | press the sync button on the external keyboard | tap the keyboard name when it appears in the *Bluetooth* list | **Connect** | follow onscreen prompts to complete the pairing process.

iOS 12

- **Settings** | **Bluetooth** | activate the toggle for **Bluetooth** | press the sync button on the external keyboard | tap the keyboard name when it appears in the *Bluetooth* list. When successful, the device will be shown as *Connected*.

Google Chrome

- Click on the status icons at the bottom-right corner of the screen (containing the clock) | **Bluetooth** | press the sync button on the external keyboard | tap the keyboard name when it appears in the *Bluetooth* list | follow onscreen prompts to complete the pairing process.

Keyboard Settings

Keyboard settings are configured in a device's operating system and control the way that an onscreen or physical keyboard responds to a user. These features can be changed to reduce a number of different, unintended keyboarding errors or provide information about the active state of certain keys (e.g., Caps Lock).

Note: System administrators sometimes block access to the Settings panel that would allow for some of these features to be configured.

- **Sticky Keys:** This feature allows for one-handed or one-finger use of the keyboarding by temporarily holding a modifier key. Most systems allow a quick-activation to be set by pressing the Shift key five times in quick succession.
- **Filter Keys:** This feature reduces errors and repetition from long holds or repeated activations of a key.
- **Slow Keys:** This feature allows a user to adjust the amount of time a key must be held before its character is sent to the screen.
- **Key Repeat:** This feature adjusts the repeat rate when a key is pressed and held and the delay before the key begins repeating.
- **Toggle Keys:** This feature plays a tone to alert a user when a modifier key is pressed.

Windows 10

- **Sticky Keys:** Windows button | Settings | Ease of Access | Keyboard | Sticky Keys to modify the function of Shift, Ctrl, Window, and Alt)
- **Filter Keys:** Windows button | Settings | Ease of Access | Keyboard | Filter Keys
- **Slow Keys:** Windows button | Settings | Ease of Access | Keyboard | Filter Keys | activate Enable Slow Keys
- **Key Repeat:** Windows button | Settings | Ease of Access | Keyboard | Filter Keys | activate Enable Repeat Keys
- **Toggle Keys:** Windows button | Settings | Ease of Access | Keyboard | Toggle Keys

Mac OS X

- **Sticky Keys:** Apple icon | System Preferences... | Accessibility | Keyboard | check Enable Sticky Keys to modify the use of Fn, Control, Option, Command, and Shift
- **Slow Keys:** Apple icon | System Preferences... | Accessibility | Keyboard | check Enable Slow Keys
- **Key Repeat:** Apple icon | System Preferences... | Keyboard | Keyboard tab | adjust sliders for Key Repeat and Delay Until Repeat

iOS 12

- **Settings | General | Accessibility | (Interaction) Keyboard | Show Lowercase Keys** to change the appearance of keys based on the status of the Shift key
- **Sticky Keys:** Settings | General | Accessibility | (Interaction) Keyboard | Sticky Keys
- **Slow Keys:** Settings | General | Accessibility | (Interaction) Keyboard | Slow Keys
- **Key Repeat:** Settings | General | Accessibility | (Interaction) Keyboard | Key Repeat
- **Toggle Keys:** Settings | General | Accessibility | (Interaction) Keyboard | Sticky Keys | Sound

Google Chrome

- *Sticky Keys*: Click on the status icons at the bottom-right corner of the screen (containing the clock) | **Accessibility icon** | scroll down to **Sticky keys** to modify the use of **Ctrl**, **Alt**, **Shift**, and **Search**

Onscreen Keyboard

Onscreen keyboards present users with a means for using a pointing device (i.e., mouse or joystick) or touchscreen to enter text on the same screen/plane as the cursor appears. This allows for greater portability and mobility via devices like smartphones and tablets. Onscreen keyboards also offer a backup when a physical keyboard is unavailable or non-functioning. In many cases, keyboards can also present characters in a variety of arrangements beyond the traditional QWERTY layout, can change the displayed character when modifier keys are pressed (e.g., displaying uppercase or lowercase letters when Shift or Caps Locks are used), and can offer color and sizing schemes that are more accessible to certain users. Onscreen keyboards increasingly function along with a device's accessibility settings to allow for typing with a patterned scanning sequence or hovering/dwelling over a key with a mouse or joystick. This feature benefits users who have difficulty shifting attention between the traditional keyboard and screen, require more visually-accessible keys, have a limited range of motion, or cannot type efficiently with one hand or finger.

Windows 10

- **Windows button | Settings | Ease of Access | Keyboard** | activate toggle for **On-Screen Keyboard**. Click the **Options** key that appears in the bottom-right corner of the onscreen keyboard to turn on the **Hover over keys** or **Scan through keys** features that can benefit users who have difficulty performing a mouse click. Activate **Use Text Prediction** to display word prediction at the top of the onscreen keyboard.

Mac OS X

- **Apple icon | System Preferences... | Accessibility | Keyboard | Accessibility Keyboard** | check **Enable Accessibility Keyboard**. Click **Panel Editor...** to create customized keyboard panels that works with the Accessibility Keyboard. Panels are activated with the key positioned at the upper-right corner of the Accessibility Keyboard.

iOS 12

- **Settings | General | Keyboard**
 - **Settings | General | Keyboard | Keyboards | Add New Keyboard...** to use third-party keyboard layouts (e.g., specialized font or color schemes, alternate keyboard layouts, etc.)
 - **Settings | General | Keyboard | Split Keyboard** to allow for the keyboard to be split and docked to the left and right sides of the iOS device
 - **Settings | General | Keyboard | Enable Key Flicks** to allow for secondary key functions (e.g., numbers and symbols) to be typed by a single-finger, downward flick on a key
 - **Settings | General | Keyboard | Predictive** to add word prediction to the keyboard
 - **Settings | General | Keyboard | Enable Dictation** to add or remove the dictation feature icon from the onscreen keyboard

Google Chrome

- Click on the status icons at the bottom-right corner of the screen (containing the clock) | **Accessibility icon | On-screen keyboard** to add a keyboard icon to the system tray. Icons at the top of the onscreen keyboard allow for entry via a standard QWERTY keyboard, handwritten/drawn input, or dictation.

Closed Captioning & Description

Closed captioning is a feature which displays text subtitles that are synchronized to video content. Captions are provided in the primary audience's target language, but increasingly options for additional languages are also available. Closed captioning refers to captions that can be viewed or hidden at the viewer's discretion. Open captions, on the other hand, serve the same function as closed captions but cannot be hidden. This feature is useful for individuals who have hearing difficulties, wish to view video in a loud environment, wish to view video without disturbing others in the vicinity, are learning a primary or additional language, or simply wish to be able to have opportunities to "catch" information that may have been missed.

Originally – and in the case of most broadcast companies – captions were generated by trained, human transcriptionists. In recent years, particularly with web-based technologies like YouTube, artificial intelligence is being utilized to generate captions through non-human means. As a result, it is advisable to view captions prior to making them available to users to determine whether the quality and accuracy of the captions is sufficient for the intended purpose and users.

Description is a feature which provides narrated description of information presented onscreen that is not conveyed via the existing audio or sound. This feature was initially purposed for the benefit of individuals with visual impairments or blindness, but it can also be helpful to individuals who may miss important non-verbal cues or actions onscreen.

Windows 10

- *Captioning* (Metro UI): **Windows button** | **Settings** | **Ease of Access** | **Closed Captions**
- *Description* (Legacy UI): **Windows button** | type *Control Panel* and click **Control Panel** in the results pane | **Ease of Access Center** | **Optimize visual display** | (*Hear text and descriptions read aloud*) check **Turn on Audio Description**

Mac OS X

- *Captioning*: **Apple icon** | **System Preferences...** | **Accessibility** | (*Media*) **Captions**
- *Description*: **Apple icon** | **System Preferences...** | **Accessibility** | (*Media*) **Descriptions**

iOS 12

- *Captioning*: **Settings** | **General** | **Accessibility** | (*Media*) | **Subtitles & Captioning** | activate the toggle for **Closed Captions + SDH**
- *Description*: **Settings** | **General** | **Accessibility** | (*Media*) | **Audio Descriptions** | activate the toggle for **Prefer Audio Descriptions**

Google Chrome

- *Live Captioning* (Google Slides): Launch a Google Slide presentation (even just a blank slide) | click **Present** (**Ctrl+F5**) to start the presentation | click **Captions** in the presenter's toolbar. The icon changes to a gold color. Begin speaking. Captions will be automatically generated and displayed in two scrolling lines at the bottom-center of the screen.

Magnification/Zoom

Magnification in this resource describes a feature that uses technology to improve visibility of real-life objects or printed matter on a page. Zoom, on the other hand, refers to the enlargement of content from a device screen.

Magnification/zoom capabilities enlarge the viewable content and also reduce the amount of content visible at one time. This feature can be beneficial for users with visual difficulties, for viewing content that was created with very small fonts or fine detail, or by users who get easily distracted from extraneous content.

Magnification/zoom is also helpful when viewing small image text (i.e., text that is not selectable and subject to changes with font and size tools) since the text cannot be enlarged any other way.

Windows 10

- **Magnification: Windows button | Settings | Ease of Access | Magnifier |** activate the toggle for **Magnifier**. An onscreen, floating toolbar (and/or magnifying glass icon) appears with controls to change the amount and type of magnification. Close the floating toolbar to turn off the magnifier.
- **Zoom:** When using a mouse with a scroll wheel, hold the **Ctrl key** while scrolling up or down to zoom in and out.

Mac OS X

- **Zoom: Apple icon | System Preferences... | Accessibility | Vision (Zoom)**

iOS 12

- **Zoom: Settings | General | Accessibility | Vision (Zoom).** Special gestures are explained in the settings description. Configuration options can control the level of zoom and whether the whole screen zooms or just a portion inside a movable window. Users also have the option of enabling an onscreen joystick which can aid navigation when a high zoom setting is configured.
- **Magnifier: Settings | General | Accessibility | Vision (Magnifier).** This feature also includes color filters and color inversion features for optimal visibility. Tapping the camera shutter button at the bottom-center of the screen freezes the document so that a user can navigate a document more comfortably with pinch-in and pinch-out gestures. Tapping the camera shutter button a second time unfreezes the screen and returns to live-camera functionality.

Google Chrome

- **Magnification:** Click on the status icons at the bottom-right corner of the screen (containing the clock) | **Accessibility icon** | click on **Fullscreen magnifier** or **Docked magnifier**.
 - Visit Chromebook Help for [details on associated keyboard shortcuts and gestures in the Google Chrome OS](#).
- **Zoom:** Click the **Customize and control Google Chrome icon** (three vertical dots at the upper-right corner of the window) | click + or – to change the level of zoom

Mozilla Firefox

- **Zoom:** Click the **Open menu icon** (three horizontal lines at the upper-right corner of the window) | click + or – to change the level of zoom

Microsoft Edge

- *Zoom*: Click the **More icon** (three horizontal dots at the upper-right corner of the window) | click + or – to change the level of zoom

