Part 4 - Assistive Technology: A Practical Implementation Resource

[Evan Loreto-Lee] Welcome to Assistive Technology: A Practical Implementation Resource. My name is Evan Loreto-Lee and I'm a teacher and an Assistive Technology Consultant with the York Region District School Board.

In this section we'll focus on how assistive technology can support students in organizing their thinking and their writing, and how these tools can help reduce barriers to learning, including for students who may be experiencing challenges with their learning. As we move through this section, consider how these tools might fit within your own context. Assistive technology is not meant to replace strategies that are working, but to expand access and support a range of learner needs. So in addition to reading and writing and organizing their thinking, students will need to interact with and work within texts. While there are many ways for students to demonstrate their learning, we will explore the tools available to make student learning visible.

Tools such as PDF and document annotators allow students to capture and markup content from websites that can provide another layer of visibility for students thinking. As we navigate the influence of artificial intelligence and student learning, and we look for different ways to demonstrate knowledge, these tools can support students in annotating and sharing evidence of their thinking, their wondering, and their connections as they work through texts.

But before we explore the different ways that we can interact with and work within text, it's necessary to identify the reason why text annotators are helpful. When we're supporting students with diverse learning needs, it can be challenging to observe progress as they're working through a task. In a large class, I may not be able to connect with every single student to discuss their progress or get any questions that they may have as often as I'd like. Similarly, without the opportunity to speak with each student as they work through something, we might miss out on the chance for rich conversations that could supplement our assessment for student learning. Document annotators allow educators to see how students have interacted with resources through doodles, through text boxes, through sticky notes, comments, voice notes, or other helpful options.

In some cases, these marked up documents can be shared through learning management systems, so they're easily accessible for the teacher. Educators can use this work as a kind of roadmap to see where students start and progress towards as they work through larger tasks, and especially as we grapple with the effects of AI on student work. Annotators provide teachers with the tools necessary and the students with the tools to capture process work, which is sometimes really hard to measure. When we can see where a student begins with a topic, we can see more of a trajectory of their work and of their thinking. Moreover, we can share feedback with students early on so that they can feel confident about the product they're completing, knowing that they're on task and on topic. So students who struggle to interact with text or work within text to synthesize their own thinking might have difficulty in the domains of memory, attention, and or visual spatial skills. Tools like PDF annotators or OCR scanners, which make scanned documents readable with most assistive tools. These ensure that all learning materials are automatically more accessible.

When we can open a PDF, for example, and be able to select the text, add text based notes or comments, or integrate dictation or voice notes, or connect with other more specific tools students have far more access than they would with a PDF file on its own. Historically, PDF files were locked so they couldn't be modified. Technology, thankfully, has shifted to recognize the importance of a user's ability to add their thinking to a PDF document in the form of annotations. Let's explore the ways in which these areas of processing might affect the learner's needs.

Now, before we continue, I want to draw your attention to the QR code in the bottom right of the screen. This will link you to a document produced by the York Region District School Board, called Understanding How Processing Affects Learning, and more, sort of, commonly known as the waterfall chart. As we go through the next examples, if you have the ability, try to access this document so you can follow along.

So when we look at the memory section of the waterfall chart, we can focus on the idea of retrieval. Now retrieval as this the document suggests, involves the use of strategies to quickly and efficiently access information. It can be recall and or recognition. PDF and document annotators can support students retrieval of information by encouraging them to actively engage with it.

Students can be encouraged to add a sticky note with a connection to self, to the world, or to others. They can draw doodles on the document and to be added, they can create cues for remembering key information. Text can be added in the margins of the content

to highlight thinking and or voice notes can help students restate, summarize, or question what they've read in their own voice, which can be revisited when they review their notes for a summative assessment. By providing these anchor points in the learning material. Students can revisit moments in their thinking and build connections that help them recall key ideas so they can apply. They can analyze. They can evaluate the content. Educators also can use this evidence of thinking as formative, ongoing assessment data to understand how students are navigating this content.

If a student doesn't have any annotations, it could be a signal that the conversation may be necessary to check in and see how the student is progressing through the task, and maybe if they have any questions. Attention can be supported in a similar way, as students can boost engagement through annotations that capture interests and leverage strengths. Reading OCR scanned content - and that's the content that's selectable when you hover over it with your cursor - it allows for the use of speech-to-text software. The current state of this technology can provide a seemingly endless supply of engaging, humanlike voices to help students attend to the content being explored. Reading scientific concepts, for example, with the smooth, comforting drawl of Morgan Freeman might be more engaging, memorable, and captivating than if a student had to read the content in their head or hear the teacher just read it out loud. Text-to-speech can also reduce working memory demands, allowing the students to focus on the message being communicated rather than the added task of decoding. When students understand how text-to-speech can work in PDFs or on a website, they become more active in the creation of accessible spaces.

As I noted previously, the inclusion of PDF annotators and tools that encourage students to interact with and work within text can support a student's visual, spatial skills. Difficulty with visual spatial skills may show up in a student's ability to decode and understand information presented visually, like in graphic texts, charts, maps, graphs, tables, or pictures. PDF and document annotation software can be particularly supportive, as it can increase comprehension of the visuals that are presented. Now, this could be done by the educator in partnership between the educator and the student, or by the student alone. By including annotations for marks on target text, students can rely on the additional cues to remain focused and navigate the resource with greater independence. If a student is able to understand the components or features of visual content, they can pre-empt their navigation by adding in cues and reminders about how they can explore the resource effectively with minimal support.

By adding a voice note with an audio description to prime the student, with maybe some

text or context details or task instructions, we can support the student's ability to interpret that visual information. If we can help them by giving them that auditory cue, they'll be able to navigate the text a little bit more independently. And all of that can be done as a recording outside of our interactions with those students. PDF document annotators are powerful tools that allow students to navigate documents actively and with the strategies that fit best for them. While document annotation is much more common on most operating systems, like on Google Docs or Microsoft Office, Word or Apple Pages, for example, PDF annotators are less common as a standalone program. PDFs were historically managed by programs like Acrobat Reader, but now most, if not all, web browsers can also open and annotate PDF files as well. These are what I would consider to be system tools that are made available without any additional downloads.

The most current version of web browsers will let us doodle or highlight or playback any text, as well as comment on the document. These have become the current standard across programs. When we look to current tools like OrbitNote, Kami or Dochub the offering of the tools are expanded. As we would with third party tools we must be sure that they have adequate security and privacy settings. Because we're going to be working with student generated content we want to be certain that data privacy and security is prioritized. Typically with paid subscriptions, programs will commit to protecting user data, but not always. Conversely, when we access free versions of software, it's typically under the assumption that user data may be shared or accessed by the company. So, as a general rule, refer to your school or district digital literacy policy to understand your responsibilities with student data and whether or not you should be accessing specific third party programs.

Now, when we're deciding on the best tool for your class, be sure to investigate any existing paid licenses provided by your school or your district. Many schools have paid access to PDF annotators because it ensures a measure of control and security over the user data. Programs like Kami, DocHub, OrbitNote and Acrobat may do many of the same things, so you might want to explore each to understand how each might benefit yours and your school's needs. Also, it's important to consider how your chosen program connects with other assistive tools that are maybe in use in your board or in your school. For example, OrbitNote is a program provided by the same company as Read&Write for Google Chrome, which is a pretty common assistive tech tool available to most students. The shared ownership provides many overlapping functions, buttons, and access, so students don't need to learn a whole new platform for each set of tools.

Similarly, how the tool integrates with your learning management platform like Google

Classroom or Brightspace is important as well. Can you cross post content from your chosen PDF annotation to Google Classroom easily? Can you assign files housed in Dochub with Brightspace? These kinds of questions of compatibility are important and should be explored in situations where tools are being considered for use.

Now let's see how some of these tools work. As I mentioned already, many will do the same kinds of things, so your decision to choose one program over another might be less about the specific tools and more about how it connects to existing programs, your IT infrastructure, student or staff skills, budgets, etc. I'll explore both a browser based PDF annotator and a third party tool. Note that again, my exploration of one or either isn't meant to be an endorsement of either tool, but it's an exploration of available options. So let's dive in. First, let's look at how Microsoft Edge opens and interacts with PDFs. So the document that you see on the screen is a PDF document, as you can see in the URL. And what we can see here is when I enter into this document, there are a handful of options.

So the first one is just a table of contents. How the document sort of is organized, and in this case there's only one page, but it may be sorted for for larger documents. It's it's a way to navigate between those pages a little easier. But then I have my highlighting ability which just allows me to select different parts. And if I wanted to highlight, I can choose sections to kind of keep okay. And again this offers multiple colours, different thickness or thinness in terms of highlight, okay? I could also do some sort of drawing, right, I can make my annotations with a freehand drawing. And I have the ability to delete all of this as well.

Okay. So with these tools I can also add text. And when I'm finished with this I can have all of these annotations remain on the PDF. And if I were to open it in a different program, all of those changes, all of those annotations would also remain. And that's one of the really great things about the state of PDF annotation right now, is that most of these companies have the intention of ensuring that all changes done on one program will translate into another.

So the next thing I want to talk about is the ability for it to playback. Now, because I can select this text, I can highlight... You notice that when I when I go over the text, my cursor changes to recognize that there is selectable text as well. And when I want to listen to it, all I need to do is click on this. This icon and it will automatically start reading the text in a sort of preset voice. So I'm going to click it so you can hear

[AI Speech] The Three Little Pigs. Once upon a time there were three little pigs.

[Evan Loreto-Lee] and with that I can always adjust all of those sorts of things. I can slow the speed down. I can choose a different voice as well, and it gives me different features. Now I can change the voice options. I can slow it down, and I can change actual the voices that are accessed when when reading as well. So the playback feature is is a pretty useful sort of easy to access as well as a translation feature. Okay. And as well as my usual sort of adjustments. So like I mentioned previously, I can also identify the different ways that I can make this document a little bit easier for me to read. So I could even do simple things like zooming in to make sure that the text is available. I can also rotate the page if the pages is not sort of oriented correctly, but then when I'm finished, what I can do is I can, I can print the document or I can save it with my annotations. And this is how I preserve the things that I'm doing with my document. So using something like Edge, and the built in PDF annotation feature is something that students should be aware of. And again, it doesn't necessarily have to be on this browser, but to show them that this is a function that we can expect with a PDF document is important.

So now I'm going to show you what this looks like with OrbitNote. Now OrbitNote again is think of it like a companion tool to Read&Write for Google Chrome. And OrbitNote is one of those tools that again holds a lot of different functions. And I'm going to pull that up right now. So as you'll see with OrbitNote there's lots of functions. Again that may or may not be useful. But when we're looking at having students interacting with and annotating PDFs, some of the more common or more useful things would be tools like my highlighter. So similar to what we saw on the Microsoft Edge annotator is these same highlighting feature. So I can identify text, I can highlight the important stuff that I want to keep, and I could even use different colors showing students that maybe different colors represent different pieces of information. I can also use shapes, and I can have students say, you know what, I want you to draw a box around the part that was most important. I want you to remember that as an important feature, because this has sort of the main argument or the main sort of topic sentence in there as well.

So I can use these different features to support, that annotation for my students. And then I can use, maybe I can release that by, by taking this document and maybe, and sharing it with them using my, my Google Classroom, for example, in this case, or if it's connected to two other services. So again, I have these annotations, I can use like my freehand drawing. I can say, okay, this is important. I want to remember that date or this is something that I don't understand. So I can draw a question mark. And for some

students that kind of an annotation would be really helpful. And as a teacher, I can see the work that they're doing because I can make this, individual for each student so that any annotations that is made is made by one student and only available for me to see. So if I'm sharing this document using Google Classroom, for example, I can go in and I can share this with my class by making a copy, just like I would do with, with a Google doc, file as well. And then any annotations after I've shared that document with them is then sort of private, just with me, so I can see that progress. And it's not made public. It's not something that other people can see or comment on, but I can use these annotations to help inform the journey the student is on when they're learning this new thing. So a few other features that I haven't identified.

So I mentioned that there was the ability to do text. So in this case I click down. And I can also use the dictation or speech input when I'm using that as well. And I can do basic formatting, things as well with that text. I can do... I can drop down, sticky notes. So I can maybe take a longer, maybe a question or something that I'm not quite sure about. I can write that down in the note. And when I click off, it just lives as an icon on my document, sort of, a reminder to go back there and get that information. But the nice thing, too, about this program is not all icons are the same. So I can use a question mark to represent something that maybe I'm not quite sure of, or an X or a check to say things that I like or I don't like. So these annotation tools can be really helpful because it shows student thinking as they're working through, a new text, for example. But this in addition to those annotation tools, I still have all of the other accessibility features, the playback features, access to things like a text based dictionary or even a picture dictionary. Right.

So if I want to understand what this word is, all I need to do is click on it and the picture will give me an image to help me support. Or I can have a text based description. And if I don't need those, I can turn them off, right? If students want to get rid of the things, they can just get rid of everything as easily as they put them on. Okay, so I have the ability to add or subtract for students. They can do that work themselves. And I have my playback features and a few others that would be useful. Okay. Another function that we can share with students that I think is really useful and maybe something that I think once students understand that it's available they would see, actually educators as well, would see the value in is the ability to comment in sort of multimedia ways.

So notice that when I'm in this program and I have maybe a comment I want to make about a particular sentence. If I grab a sentence, notice what happens when I let go with the mouse. You'll see a comment button pop up. And what this does is it invites users to

to type in a comment, maybe a question. You can add anything in here, but notice particularly with OrbitNote it allows you to use these same sorts of features, right? So I can dictate using my speech input. So I can click this and it will type out what I'm going to say. So I can say something like - What does this even mean? And it drops it in and I can actually play it back.
Right.

[AI Speech] What does this even mean?

[Evan Loreto-Lee] And if I wanted to, I could also even add a voice note. And a voice note is really neat because it lets me capture my thinking without trying to translate into text. And for some students, voice typing where it's taking the voice and it's putting it into text doesn't always work well.

So what I could use instead is what's called a voice note. And a voice not just is like a voice note that we would see in a in a chat room, or like it's almost like a voice mail on a on a phone. It leaves a message for either the student. It could be for collaborators, other people that are supporting on this document, or group members that they need to ask questions to.

Or it could even be from the teacher to the student where they are capturing their own questioning, being like, “Oh, I like what you're doing here. Could you give me a little bit more information? I don't know if you sort of caught everything on this document that was most useful. Maybe pay attention to paragraph three” for example.

And those notes are then imposed on to this PDF. And then anyone with that access has access to that audio file. So one of the really nice things is it allows you that text. It allows you the audio as a way of keeping these comments ready to go and sort of prominently placed so that you can see student thinking. You can also encourage student thinking by reminding them of things that they may not have noticed. So lots of different ways that we can include that feature into their navigation of PDFs. And I should say this is a tool that's available also on documents as well. So as I mentioned, there are lots of different tools, PDF annotators or functions within existing programs that will do this work for you and for students. But some are more robust than others. So the table on the screen identifies the functional language, a description of the related tools, and then some examples. And again, these examples aren't meant to be sort of the only ones that are available, nor are they the best ones necessarily. I'll say that programs like OrbitNote are quite common because it is a related product to things like

Read&Write for Google Chrome.

So again, sometimes these are tools that are available for your use and for student use. But I'm not saying that these are necessarily the best tools that are available. So if you are interested in understanding a more detailed exploration of this assistive technology, there's a link in the bottom right corner that will take you to an article that explores these tools within the context of universal design for learning.

So to conclude, assistive technology can come in so many different shapes and sizes, including in your operating system through accessibility features or added onto your school or district provided computer in the form of a paid license or installed program. We must therefore be aware of what assistive tech looks and sounds like from the vantage point, as educators, as well as how it could be used by students. Well, we don't need to commit to any one brand of assistive technology. Knowing the overall functionality of the main tools is vital to its effective use. Referring to resources like the York Region District School Board's, Understanding How Processing Affects Learning, or the waterfall chart resource we can make clear connections between students' skills or areas of need, and interventions for support.

So as you continue on your A.T. discovery journey, remember that there are resources within your school or district and even at your fingertips through tools like Copilot or Gemini that can answer questions about this software and how to use it. Success with assistive technology is a mindset. Even when the tools don't work, we can still model the idea that our environment, flexibly designed can boost strengths and support areas of need for all students. But we know that this support can be especially felt for those with learning disabilities. Thank you so much for listening to this practical implementation resource.

Again, my name is Evan Loreto-Lee and I hope this was of value to you. Thanks a lot.