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Assistive technology for reading and writing, and coping with anxiety

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Abstract

It seems that in the 21st century digital technology has evolved to help, assist, and support students with their learning. I wanted to research about anxiety in students and coping with their struggles in reading and writing because it connects with me on a personal level. I did not have the luxury to use the assistive technologies that are out there today. I wanted to find out the benefits and disadvantages of using assistive technologies with students that have anxiety. I believe researching this topic will help me in my future teaching practice because I will have gained more knowledge about my topic. To obtain some background knowledge about my topic, I had to do some research about anxiety in students and students who have difficulties in reading and writing. Through this background research I now have a better understanding about assistive technology and how it can help students. From my research findings, I learned that yes assistive technology can help students with anxiety and problems with reading and writing, but to not let the students become too dependent on the technology. I also found out to make sure the technology matches with the student because if not then the student will avoid using the

technology and anxiety can increase. Another key take away from my findings was that I need to be knowledgeable about the assistive technologies I plan on using with students. If I do not have the knowledge it is not going to help a student who has certain learning needs.

Introduction

Now that we are in the 21st century technology has grown and evolved substantially. Digital technology is now able to support, assist, and help students who struggle with certain subjects and for those who have learning disabilities. Digital technology also helps students keep engaged when they are learning because it is interactive. The question that I wanted to explore is “How can assistive technology help elementary students with anxiety and cope with their struggles regarding reading and writing?”. I chose this question because I connect with this topic on a personal level. I have been diagnosed with an anxiety disorder and I stress out easily and it is hard to cope with, plus I have also struggled with reading and writing during my school experience. Having an anxiety disorder and difficulties in literacy did affect academic performance, confidence, and self-esteem. I was not exposed to much assistive technology until about high school, but still I believe that I did not get the potential help I could have. There are so many different softwares out there in the present digital age that I wish I got the opportunity to use some of these softwares and programs.

I know that when I become a teacher I want to provide assistive technology to those students who struggle with reading and writing. Also I want to find different techniques of how to help students cope with anxiety and learning disabilities in general. I want to learn about the varying kinds of technologies, so that I can help students with different learning needs regarding reading and writing. I want to make every student has an empowering, meaningful, and a rewarding learning experience. If I can do anything to help students who struggle with reading

and writing, I am determined to make sure that students learning needs are met. That is why I think assistive technology can be very beneficial with students who find reading and writing difficult. With technology helping students with their reading and writing it can help ease some anxiety that they have. These are the topics that I wanted to explore because of how they strongly resonate with me.

Background

Anxiety in students is nothing to ignore. It leads to frustration, stress, low self-esteem, lack of confidence which can all factor in with their learning experience. When students struggle with reading and writing their anxiety levels can increase substantially. The integration and support of assistive technology will hopefully alleviate the anxiety the students have and help them with their reading and writing skills. For my research I had to split up my question in order to get the results that I was looking for. I looked at the effects that anxiety has on academic performance and is there a way to ease that anxiety. Also I explored how teachers can incorporate assistive technology for reading and writing, and what kinds of assistive technologies are out there to help students who struggle with reading and writing. With the research that I managed to find they all agreed that anxiety does affect a student in many ways, and the amount of assistive technology that is available for teachers and students is endless.

According to Antshel and Guy-Ronald (2006) there are two types of of learning disabilities that can lead to stress and anxiety which are “language-based and nonverbal disabilities” (p.194). Language-based is associated with “reading and spelling dysfunctions” (Antshel & Guy-Ronald, 2006, p.194) and nonverbal with “arithmetic problems” (Antshel and Guy-Ronald, 2006, p.194). Now that Antshel and Guy-Ronald (2006) has suggested that there are two types of learning disabilities makes me think of what to watch for in my classroom. I

agree that there are different kinds of learning disabilities which can lead to anxiety. Gills et al. (2014) discusses and explains the relationship between anxiety and reading in young students and states, “Anxiety disorders are among the most prevalent child mental health concerns” (p. 418). Gills et al. was actually surprised that when they were doing research there was not much on assessing anxiety in children (p. 419). I am surprised as well because anxiety in children is an important issue to address. Antshel and Guy-Ronald discuss (2006) how parents can get stressed because their child has a learning disability and that there is not a lot of research done from the parents point of view (p. 194). Gills et al. (2014) states that with “reading difficulties, a major problem for young elementary students, would seem to increase tension or serve as a source of stress and anxiety” (p. 419). Gills et al. (2014) made a critical point because when a student has reading difficulties it can lead to high anxiety, and I have experienced this myself.

Gills et al. article “Anxiety and response to reading intervention among first grade students” (2014) explains how not only test anxiety should be looked at, but the other forms of anxiety that are overlooked such as social and separation anxiety (2014, p. 419). I agreed with Gills et al. (2014) because there are different dimensions of anxiety and not only one specific area should be addressed. All of these types of anxieties affect academic performance, we as educators need gain strategies and techniques, “and intervention efforts aimed at improving child learning outcomes.” (Gills et al., 2014, p. 419). Both authors, Antshel & Guy-Ronald (2006) and Gills et al., (2014), agree that learning disabilities such as anxiety does have an impact on students success in school.

This one article “Identifying Symptoms of Depression and Anxiety in Students in the School Setting” Allison et al. (2014) goes in-depth of how school nurses are able to help identify

students with anxiety and depression and how it affects their learning experience (Allison et al., 2014, p. 167). Within the article Allison et al. mentions that;

According to ACCAP (2007), . . . revealed a prevalence rate for anxiety in childhood at 6-20%, making anxiety one of the most common forms of mental health disorders in children and adolescents. Fear and worry are normal in children, but when these fears persist, they may become anxiety (Shafer, 2010). (as cited in Allison et al., 2014, p. 166)

I agree with how if fear continues to build in children, anxiety will develop as a result.

Identifying symptoms of anxiety and depression in children sooner rather than later is crucial because if these symptoms are not attended to it can lead to “school [behavioural] problems, academic difficulties, and school attendance issues” (Allison et al., 2014, p. 167). The article mentions that nurses used two types of screening tools to help identify depression or anxiety in students: “the Patient Health Questionnaire-9 item (PHQ-9) . . . [is] for detecting depression in adolescents, and the 5-item Screen for Child Anxiety Related Emotional Disorders (SCARED)” (Allison et al., 2014, p. 165). They screen different age groups to see where anxiety and depression affect which age group the most. Which will help identify where intervention for anxiety and depression is needed most.

Biancarosa and Griffiths article “Technology tools to support reading in the digital age” (2012), goes into explanation about e-reading technology can help students with learning disabilities, especially if they struggle with reading. The article mentions “although technology is no panacea for literacy problems, it can be part of the solution” (Biancarosa & Griffiths, 2012, p. 142), which I find interesting because I wondered if technology can be a solution for students who struggle with literacy. Biancarosa and Griffiths (2012) made an excellent point about technology, “technology can be more than a tool for drilling students on skills; it can be a tool

for acquiring the vocabulary and background knowledge essential to becoming a skilled reader” (p. 142). This would mean that assistive technology goes beyond than just developing skills. The article goes into detail about what e-reading technology is: “e-reading technology . . . refer[s] to the hardware and software used to display and interface with digital text” (Biancarosa & Griffiths, 2012, p. 142). Using e-readers, tablets, laptop computers, and smartphones are all examples of hardware technology (Biancarosa & Griffiths, 2012, p. 142). The wide variety of programs and applications that can be used with hardware devices are the software technologies (Biancarosa & Griffiths, 2012, p. 143). I know from experience that Raz Kids and tumble books are just a few software programs that can be used for literacy learning. Another example of a program is text-to-speech and the article defines this as, “either a human or computer-generated voice reads digital text aloud for users” (Biancarosa & Griffiths, 2012, p. 143). I believe that text-to-speech can be beneficial for students who are struggling with reading and students who are ESL. Ofra Korat believes “e-reading tools that can build both procedural skills (such as phonological awareness and word reading) and conceptual skills and knowledge (such as vocabulary) that foster learning to read” (as cited in Biancarosa & Griffiths, 2012, p. 143). I agree with Korat and I would add that e-reading tools can build confidence and self-efficacy in students, and result in reducing anxiety.

The site *Great School* is a great resource for teachers and parents for finding out more information on how to help students with learning disabilities. Stanberry and Raskind (2010) provides information about certain technologies that students’ can use if they have difficulties with writing. Stanberry and Raskind (2010) go in-depth regarding the different softwares that students’ can use and which ones will be beneficial. Stanberry and Raskind (2010) have divided the writing softwares and programs into different categories: abbreviation expanders, alternative

keyboards, graphic organizing and outlining, paper-based computer pen, and proofreading software just to name a few (Stanberry & Raskind, p. 1-4). Under the categories Stanberry and Raskind (2010) put a description about that category, who would benefit from the tools, and the different products that can be used. This is a great insight for teachers wanting to know about these softwares if they have a student that has difficulties with writing, which would bring down their anxiety. I know that for myself I have found this resource extremely helpful because of how Stanberry and Raskind (2010) tackle the different areas of writing that students might struggle with. I have gained more knowledge from this site.

The article “Empowering students with learning disabilities” Karen Forgave (2002) describes the different kinds of programs students’ can use if they are struggling with reading a writing. Forgave (2002) explains how the main problem with reading with students are their decoding skills (p.122). I would agree with Forgave because I know I struggled with decoding reading material. Forgave indicates that having “lower-level decoding problems lead to poor comprehension of textbooks and course reading materials” (2002, p. 122). Difficulties in writing can have an affect on a students learning experience (Forgave, 2002, p.122). Forgave goes into great detail about programs, just like Stanberry and Raskind (2010) but for both reading and writing. Forgave provides the reader of the advantages and the disadvantages of these programs, which is great to get those perspectives. Some of the programs Forgave (2002) explains are: Speech Synthesis (Text-to-Speech), Organizational Software, and Voice Recognition Software (Speech-to-Text) (p.122-125). Forgave (2002) gives insights for teachers wanting to know about these programs, and which ones would be most beneficial for their students’ with high anxiety and different learning disabilities (Forgave, 2002) . Forgave (2002) relates to Biancarosa and Griffiths (2012) because she also believes that “technology is not an answer to all the problems

that students with learning disabilities face, but there are many reasons why its use should be considered for these students (Forgave, 2002, p. 126). I agree with all three authors because yes technology might not be the answer for every student with a learning disability, but it is a good start with helping these students.

A great way to know the different perspectives on the assistive technologies is for parents and their children reflecting on these technologies. The article “Assistive technology and literacy learning: Reflections of parents and children” Tara Jeffs, Michael Behrmann and Brenda Bannan-Ritland (2006) provides the reader with insight of how parents and children’s reactions to these technologies. This article goes in profound detail about the different kinds of assistive technology that can be used to help children with learning disabilities, especially ones who struggle with literacy. What is great about this article is that Jeffs et al.(2006) have conducted a survey and interview with parents and children reflecting on these technologies. The authors express that in order “to select the appropriate AT tools, children need time to examine the learning task along with the opportunity to explore and discover their own learning style and technological needs” (Jeffs et al., 2006, p. 38). I believe that this is true in some ways, and I never thought of children choosing their own assistive technologies. However, it does make sense because only children know how they learn best, so why not let them contribute to the decision making in what assistive technologies to use. Both parents and children had positive and negative remarks about the assistive technology. The parents in this study “were beginning to realize that, when given the right tools, their child could be successful in reading and writing activities. The technology had given them a sense of encouragement” (Jeffs et al., 2006, p. 41). I think that is a very moving experience for parents to see that the technology that their children was using were making them more confident in themselves, thus having a more positive outlook

to learning. Through the study Jeffs et al.(2002) concluded that “parents . . .emphasized the need for parent and school collaboration and involvement in implementing AT for students with disabilities” (p. 42). I think that having parents involved with establishing assistive technologies makes me question if that would be beneficial for students with disabilities?

The article “Curb cuts for writing: Students with learning disabilities' perceptions as learners and writers using assistive technology” Robin Elizabeth Schock (2011), provides valuable insight with regards of the perceptions of students with disabilities on the assistive technologies that are available for them. It discusses how it is important to help students with learning disabilities with assistive technology, especially if they are struggling with reading and writing skills. From Schock’s (2011) study, she was able to give some insightful perceptions for students who used certain technologies:

Students referred to their assistive technology as having the ability to make school work easier and afforded students the chance to catch up with their peers. Due to the support from the software, students expressed the idea that school was less frustrating and they did not fall behind as often.(p. 72)

Schock (2011) explains that the students voiced that their frustrations towards learning had decreased because of the assistive technology which in my opinion is a great achievement for these students (p. 78-79). Schock (2011) observed during her focused groups for her study that students confidence and self-efficacy had increased:

The theme of increased self-efficacy continually surfaced through student responses to the focus group questions. Students referred to increased feelings of independence, improved grades, feelings of inclusion versus exclusion, increased confidence from success with software applications, feeling less bullied, increased abilities to problem

solve and generate new ideas, all outcomes self-reported from student use of the laptop. (p. 80)

With this statement assistive technology is becoming very beneficial for students with learning disabilities, and it is great to hear that it is actually making a positive impact. Troia makes an excellent point that “if a student’s self-efficacy beliefs are enhanced, the anxiety and apprehension for a task may be diminished or eliminated” (as cited in Schock, 2011, p. 39). This statement strongly resonates with me I truly believe that when self-efficacy grows and develops it will hopefully result into slowly reducing anxiety in students. However self-efficacy needs may need help developing especially with students that have a learning disability.

With the amount of research that I was able to find I have now gained so much knowledge, and now have a better understanding about my topic. I gained more insight about the different types of assistive technologies that are available for students who struggle with literacy. I also learned how important it is not ignore anxiety in students because of how it can affect their academic performance. I know that for myself I want every student's learning experience to be positive, especially students with learning disabilities.

Research Context/Methods of Investigation

My data for my study was collected in my Education 2325 classroom at Mount Royal University. I have completed the Government of Canada Human Research Ethics Tutorial to gain the knowledge about conducting a study involving people. I learned how to make sure that my participants identity was not revealed and to make sure to keep my participants safe and that they would not be harmed.



Figure 1. Government of Canada Human Research Ethics Certificate

. The survey that I created was to get different perspectives from a variety of people such as my Education 2325 class, teachers, professors, family, mentor teachers, and peers. Twenty-two participants participated in my survey. To create my online survey I used *Google Forms*. I made sure my participants who contributed in my survey knew that the responses I received were confidential. I posted my survey on social media such as *Facebook* and *Twitter* to get more of a perspectives from people who are not professionals in the field. I conducted two interviews for my study. I had an email interview with Rob Blake, who is an Assistive Services Coordinator at the University of Calgary. My other interview was in person with Danielle Hendricks, who is a second year student in the Bachelor of Education Program at Mount Royal University. I made sure that I asked Rob Blake and Danielle Hendricks if I was allowed to use their name within my paper. For my interviews and survey I would ask specific questions in order to get sufficient data.

I formulated my research first by using a survey, just to get a wide variety of opinions from different people. The results that I received from this survey helped me think of more specific questions that I wanted a second opinion on, or questions that I wanted more in depth of an answer. I created specific questions and used these questions in both of my interviews. I

believe that getting data in a variety of ways will be more effective.

To analyze my data for my surveys I created word clouds using *Tagxedo* so that I can see the main themes from each question. I explained my interpretations of each survey question from those word clouds. I am separated my data into two parts; anxiety in children and assistive technologies that can help students who struggle in literacy. To organize the data that I received from my surveys I would first use *Google Spreadsheet* so that I can see the different answers for each questions. I would then use graphs for questions that were multiple choice.

Findings

The first section of my findings are the results from my survey. I would show my key findings in the following ways; I would use *Tagxedo* to get the key themes from my survey, just so that I can see the main focal points. Also I would use charts and graphs to show the percentages from my questions. For my two interviews I would integrate their answers into the questions that were similar to my survey. Also I ask some different questions so I integrated those within my findings. To start off my survey, I wanted to see who were my participants to get a general idea of the population that were answering the questions (*Figure 2*).

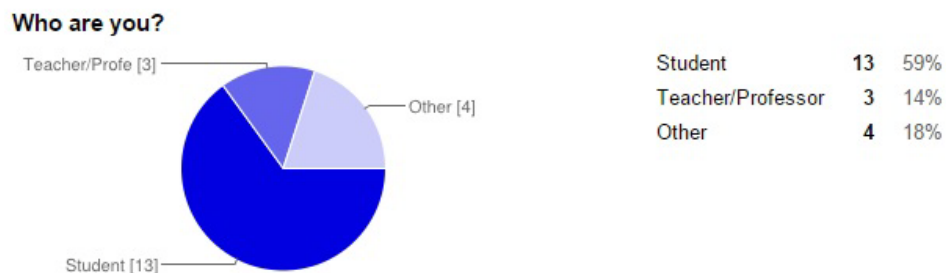


Figure 2. Participants for my survey

The results from this graph (*Figure 2*) tells my that 59% of the participants were students from my education class. I wanted to get more responses from teachers/professors, but I am glad that I got some teacher/professor responses. Putting my survey on *Facebook* and *Twitter* helped



Figure 6. Can digital technology help students with high anxiety

Figures 5 and 6 are almost the same question just one talks about the benefits and the other is about how assistive technologies helps elementary students. One big benefit of using assistive technologies that I got from my participants was assistive technologies helps increase confidence in students. I agreed with my participants because students are using devices, tools, programs, and softwares that will help them with their reading and writing skills, which helps boost their confidence. My participants also thought that assistive technologies can help reduce stress and anxiety in students. Participant 2 stated that assistive technologies will help students with anxiety because “they feel like they have help and are allowed to develop at their own rate rather than being pressured by the rest of the class”. I agreed with Participant 2 because when students have the assistive technologies to help them, they can do their work at their own rate and not feel the pressure to keep up with the rest of the class. Participant 22 made an excellent point that “assistive technologies can provide students with an alternative means to communicate and express their knowledge”. I agreed with this participant because assistive technologies can

provide students who have anxiety another way to communicate with their classmates and teacher. Students can then express their ideas and opinions through assistive technologies. Participant 9 (a parent) stated “students will be able to develop their minds and flourish in a classroom environment when they realize that are capable of learning the curriculum”. I believe that Participant 9 makes an excellent point about how assistive technologies can help develop a student's' mind and become confident in themselves they can learn the curriculum.

Blake believes that there are two ways assistive technologies can help students with anxiety: “One way is a *function* of assistive technology, and the second is a *result* of assistive technology use” (Rob Blake, email interview, November 20 & 25, 2013). He explains that the function of assistive technology can help “address specific symptoms of high anxiety or consequences of experiencing high anxiety: difficulty concentrating, disorganization, feeling overwhelmed, etc.” (Rob Blake, email interview, November 20 & 25, 2013). I would agree with Blake because assistive technology can help with the process of identifying what symptoms of anxiety a student has. Once that symptom is identified it helps narrow down what assistive technologies can be introduced to the students and as Blake explains “we may find that the technology has benefited the student because the overall level of anxiety has been reduced” (Rob Blake, email interview, November 20 & 25, 2014). Hendricks believes that providing assistive technologies to elementary students with high anxiety it gives them “the relief from the pressures they have around reading and writing” (Danielle Hendricks, personal interview, November 20, 2014). On a personal level, assistive technologies helped Hendricks because “reading becomes possible for [her]. [She] would not do [her] readings if [she] had to do them on [her] own. Because [she has] the support of technologies, [Hendricks] feels confident in [her] abilities to conquer those readings, and they're not as daunting” (Danielle Hendricks, personal interview,

November 20, 2014).

Since I know the benefits of using assistive technologies, I wanted to know the disadvantages, so I asked Blake and Hendricks what the disadvantages were. Blake explains that “When working on introducing assistive technology into the workflow of a student with high anxiety, we need to be careful to set reasonable timelines and reasonable expectations” (Rob Blake, email interview, November 20 & 25, 2013). Blake explains that at the beginning when introducing assistive technologies to students that have anxiety can increase because “there is a natural level of anxiety, fear and uncertainty” (Rob Blake, email interview, November 20 & 25, 2013). I would agree with Blake because at the beginning of the school year already creates anxiety in students because there is that fear of not making friends and failing in school. Also being in a new and unfamiliar environment can also create anxiety in students. Blake also mentions “if the student has an anxiety disorder this natural level of anxiety is heightened. To then ask this student to learn and integrate new technologies and new ways of learning is likely to lead to them abandoning the technology altogether” (Rob Blake, email interview, November 20 & 25, 2013).

Hendricks told me about an experience she had in Grade 3:

She was given a class computer, and she was the only one that had a computer, it singled her out. Computer faced the back of the class, did not learn how to type, still doesn't. Lots of pressure to use the computer properly, which created a lot of anxiety for her, and then she avoided using the computer. Typing programs at home created more anxiety for her, because she had to do it properly. (Danielle Hendricks, personal interview, November 20, 2014)

I can see when pressuring students to use assistive technologies, as Hendricks was, can actually

program that has to be purchased by the school. This program can take any text, and get it to read back to you and you can read along at the same time.” (Danielle Hendricks, personal interview, November 20, 2014). Hendricks gets her “textbooks scanned and put on a USB stick and then [she] can listen to them, so there is not a lot of pressure to read the text” (Danielle Hendricks, personal interview, November 20, 2014). I can see great benefits of using this program for students who have struggles in reading.

Now that I found out the different technologies that can be used for students who have difficulties in reading and writing I wanted to know what is the process in matching the right technologies to elementary students. Hendricks gave me some advice:

Knowing what technologies are available is the first step, second step is see how your student is struggling, what you think they will benefit from, doing a trial and error approach. Don’t have the expectations that this is it, give it a try. Just be flexible, not everything is going to work for every students. (Danielle Hendricks, personal interview, November 20, 2014)

I realize now that when working with assistive technologies you have to be knowledgeable of what technologies are available for students. I recognize not every assistive technology is going to work for every student, so Hendricks suggested take a “trial and error approach” because of how it is the only way to find that perfect match. Blake gave me some advice about how to match assistive technologies to students:

Match the user to the technology, not the technology to the user: so rather than consistently recommending the same technology to all users with a certain disability, you want to start with assessing the unique needs and challenges associated with each student and from there consider the technology that could best address these needs and

challenges. (Rob Blake, email interview, November 20 & 25, 2013)

I would agree with Blake with regards to that each student has different learning needs and not every technology is going to work for them. Getting students to use technology that will not benefit them can lead the student to not use it. As mentioned from both Hendricks and Blake, assessment needs to be made in order to know which technologies can be best suited for students with different learning needs.

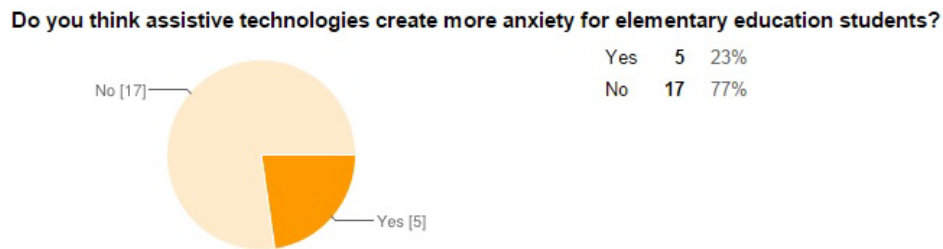


Figure 8. Can create more anxiety in students

Figure 8 shows the results of my question “Do you think assistive technologies create more anxiety for elementary students?”. Five people (23%) said yes it would and seventeen people (77%) said that it would not. I find this result very interesting because I would of liked to know from the people who said yes their reasoning behind it.

Another main theme I found with my findings was to make sure students do not become too dependent on the technologies because it takes away from students minds developing independently. Now I wondered how can teachers avoid elementary students from becoming too dependent on assistive technologies and Hendricks believes that “it’s something teachers need to be consciously aware of. Maybe introducing non-technology days or classes where teachers specifically look at alternative mediums for producing work” (Danielle Hendricks, personal interview, November 20, 2014). I like Hendricks idea of having non-technology days and looking at various mediums for producing work.

My participants think that there needs to be a balance when using assistive technology with students. Also my participants recommend that I am knowledgeable about the different technologies by taking classes on them. Therefore, in the future I am going to take some classes and attend conferences to help build that confidence and knowledge about the different technologies. I also found that I need to match the right technology to the student with anxiety or other learning needs, but in order to this I have to go through trial and error. Hendricks made a great about how I should not be afraid to use the technology. Hendricks “finds that a lot of people are caught up in the worry, just try the technology and see if it works, if not then move on” (Danielle Hendricks, personal interview, November 20, 2014). Blake also gave me some recommendations with regards of using assistive technology:

Where possible, start small: you are going to encounter students with varying levels of technological knowledge and comfort, and you are likely to work in places that have varying levels of resources. It won't always be possible or wise to recommend the latest and greatest piece of technology for a student – the student may not be capable or open to learning the technology, and the student/school may not be able to afford the technology. Where possible, start by exploring what the student already uses and see if you can build upon that existing technology, and/or try what the school already has at its disposal. Get the student on board: they need to understanding the point of using assistive technology and be an active participant in the selection process. If they aren't engaged, it becomes much more likely that they will abandon the technology. (Rob Blake, email interview, November 20 & 25, 2013)

Blake's recommendations gave me some strategies of how I can introduce technology to students that have high anxiety. I know now that I need figure out what kind of knowledge students have

about technology and see what resources are available at the school. Blake's advice to find out what technologies the student regularly uses and find ways to utilize it is a great strategy because the student is already comfortable in using that certain technology.

During my study I have learned a significant amount about assistive technologies, and how they can help students with anxiety and cope with their struggles in reading and writing. I learned I have to put a tremendous amount of thought into the assistive technologies that I use within the classroom. As a future teacher I think it is important to know of the various assistive technologies that can be provided to students. I believe assistive technology is an adequate foundation for starting to help students with anxiety and their struggles in reading and writing. I learned some valuable skills and knowledge about assistive technologies, and I will use what I learned in my future teaching practice.

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