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Debugging the future: quality of life, academic success and student acceptability of assistive technology

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DEBUGGING THE FUTURE:

QUALITY OF LIFE, ACADEMIC SUCCESS AND STUDENT ACCEPTABILITY OF

ASSISTIVE TECHNOLOGY

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<u>MASTER'S THESIS</u>

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Abstract

Research has shown that integration of Assistive Technology (AT) in the educational environment is minimal but can offer life-changing benefits. My study explores the obstacles of AT and the relationship between acceptability of AT and student quality of life as well as individual self-reported academic success. I surveyed two existing groups of students at a regional comprehensive university. The first group is receiving assistance through instruction and tutoring services. The second group is receiving support to pursue future doctoral studies. Participants provided self-report of their academic strengths and challenges, acceptability of AT, and quality of life. I offered participants multiple opportunities to learn about and engage in different types of AT. Types of AT offered included: Read and Write Gold 10 (2013 Texthelp Ltd, 2013) Grammarly (Grammarly, Inc., 2013), and Dragon Naturally Speaking (Nuance Communications, Inc., 2012-2013). I predicted that higher self-reported academic challenges would increase acceptability towards AT and decrease self-reported quality of life. I also predicted that students with higher GPA would be less accepting to AT interventions. I found that there was no correlation between GPA and acceptability of AT or self-reported academic struggles and acceptability of AT. I did however find a significant negative correlation between quality of life and self-reported academic challenges.

Keywords: assistive technology (AT), acceptability, quality of life, academic success

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Debugging the Future: Quality of Life, Academic Success, and Student

Acceptability of Assistive Technology

A student at a regional comprehensive university, Janine was nominated by

faculty members and selected as a research scholar for a program that aims to support

students in seeking and obtaining doctoral degrees. Janine met with her assigned

research advisor and began planning for her research study. She verbally proposed a

well-designed study to investigate the effectiveness of reading interventions in a local

school district. However, when Janine submitted her written literature review, her

advisor could barely read the document due to the large number of misspellings and

missing words. Not knowing much about Assistive Technology (AT) herself, the advisor

suggested that Janine explore options to use a speech to text program, Dragon Naturally

Speaking. Janine verbalized much resistance to using AT, including; 1) not knowing

how AT might help her 2) not having the time to learn AT; 3) not being able to afford

certain programs because they were too expensive; and 4) fear that others would realize

that she was using AT.

Because Janine expresses multiple concerns regarding AT, her advisor assumed

that she would not pursue use of Dragon Naturally Speaking. However, the following

year Janine produced a written paper to her advisor that matched her articulate spoken

voice. Her emails began to include content and expression, when they previously were

limited and often inaccurate. Janine's written word suddenly appeared to match the

professionalism seen in her presence and oral expression. In fact, Janine not only learned

one AT program, but multiple programs including voice to text, text to voice, and

grammar/writing improvement software. She entered graduate school and successfully

completed her own assignments while utilizing a combination of AT devices she found most beneficial for her challenges in reading and writing. She even reported being able to write a one page paper in three minutes, which previously took her hours longer than the average student. Janine shared that using AT has drastically improved the quality of her academic and pre-professional experiences. Janine is the inspiration for this project.

History

According to the Individuals with Disabilities Education Act webpage (2004), AT is defined as; "Any item, piece of equipment, or product system, whether acquired commercially, off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of a child with a disability." The Individuals with Disabilities Education Act (2004) defined learning disability (deficit) as; "a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations." Throughout this paper, I will be using the word deficit since AT is a universal design shown to improve academic success in those with and without a registered learning disability. To enhance the understanding of these obstacles, past research on the relationship between AT and academic struggles is extremely important to consider. Some factors that are important to consider include the growth of AT, the prevalence of learning challenges, and the past and current struggle to bring AT to the educational environment.

Some say that the Technology Related Assistance for Individuals with Disabilities Act ("Tech Act") of 1988 was the first significant effort to provide AT for every individual with a learning deficit (Edyburn, 2008). Others may argue that it wasn't until

the Reauthorization of the Individuals with Disabilities Education Act of 1997 (IDEA, 2004). During this act, it was authorized that individualized education program (IEP) teams "consider" the implementation of AT when planning an IEP. Although this broadcasted serious attention for AT in the schooling environment, AT is far from reaching every student in need (Edyburn, 2008).

This lack of integration could be a result of the sudden boom in the field of AT because of the amount of different interventions to choose from, it can be overwhelming. According to Poel (2007), "fewer than 100 assistive technology devices were commercially available in the 1970s, but there are more than 29,000 devices available today (pg. 64)." The lack of incorporation could be related to the sudden increase in learning disabilities worldwide. In fact, between 1988 and 2000 the fastest growing category among students who had a disability was learning disabilities (Henderson, 2001). By year 2000, two in five freshmen with a disability reported having a learning disability (40 percent) versus only 16 percent in 1988 (Henderson, 2001), and that is not including all those students who were not registered as a disability, but were also struggling in school. This field of research is underdeveloped. Additional support is needed to produce evidence that is necessary to answer further questions regarding impact and accountability (Edyburn, 2008).

Despite the rapid escalation in AT over the past 10 years, research on the effectiveness of AT in miniscule and not much can be said except for the fact that it helps. We are also unaware of what specific technologies are the most useful, and for what disabilities they are helpful. The integration of technology in the educational system is a very slow process, and the more information I can gather, the more expertise

can be obtained regarding implementing and teaching these programs to students with learning disabilities.

Since the early 1990's, access to technologies escalated in schools, but the pace of adoption and use of technology was 'episodic, uneven, and slow' (Cuban, 2001). This contributes to the insufficient amount of training needed for integrating technology, as well as the lack of exposure to a variety of assistive technologies. These both are consistently showing up as barriers to AT use in the school environment (Jost & Mosley, 2011). In fact, a recent study which surveyed 224 pre-service and in-service teachers regarding teacher awareness of AT, working knowledge of AT, and transformative perspectives related to AT proved some frightening statistics (Jost & Mosley, 2011) This study revealed a significant 135 respondents (60.3%) reported no experience with AT, 80 (or 59.3% of these 135 respondents) had no experience locating AT for their learners, yet 70.3% reported that they had learners with disabilities in their classrooms (Jost & Mosley, 2011).

However, with further analysis, the study discovered high degrees of interest and openness to AT. The 'voice' of teachers in this study is clear: "if we can see how AT can address functional issues in the classroom, then we are certainly interested and are likely to become strong advocates for implementation of those technologies" (Jost & Mosley, 2011, p.13). In fact, students often enter postsecondary institutions with limited knowledge of the access to technologies needed to accommodate their disabilities, and given the large variety of different technologies available, students need training on assistive devices (Wolfe & Lee, 2007).

Although the literature suggests that individual's express an interest in AT, little evidence exists supporting data collection becoming a routine for AT professionals (Edyburn, 2008). This circles back to the original question; why has this field of study not been researched more thoroughly yet? Dave Edyburn proposed two perspectives as to why this might be. The first describes the youth of the profession. Only within the last 10 years has the profession begun to seriously examine the evidence supporting AT practices. This contributes to the lack of ability when answering critical questions about the effectiveness of AT. The second suggests an evolving standard of proof. Since the explosion of AT services in the 1980's and 1990's was only of concern to the consumer and the provider, these outcomes were not measured in any formal manner, "it was obvious assistive technology helped" (Edyburn, 2008, p. 18). In addition the fact that AT "just worked," Lewis (1988) stated that the "most powerful technology is useless if the operation cannot be mastered (p.23)."

With the information from this previous research and with contribution of additional research, our goal is to uncover the obstacles creating resistance to using AT and to increase the integration of AT in the academic environment.

Acceptability

Treatment acceptability can be defined as "the judgments about the treatment procedures by non-professionals, and consumer of treatment as to whether treatment is fair, reasonable, and intrusive (Kazdin, 1980, p. 259)." In general, it discusses the overall evaluation of the techniques (Kazdin, 1980). Research shows that interventions viewed as difficult to understand will diffuse more slowly and few people voluntarily embrace change that makes their lives more difficult (Ellsworth, 2000). This is not a huge

conundrum; AT is time consuming, and for the most part, unknown, so students do not wish to take time out of their already busy lives to learn something new. In fact, a very wide variety of consumer groups struggle with the adaptation to new technologies, not only students (Gilly et al., 2012). However, those with more severe challenges tend to report being more accepting to various treatments (Kazdin, 1980).

AT can also be considered a stigma (Parett & Scherer, 2004). A stigma is defined as a "characteristic that makes a person different, and less desirable, than would normally be expected" (Crandall, 2000). The use of an assistive device can increase attention to the student in a way that makes them "different" than those around them who do not need help reading or writing. This is especially obvious with the use of Dragon Naturally Speaking, a speech to text program. This device is trained to your voice and requires users to wear a headset and speak into the device to control the computer. If a student is already feeling stigmatized by their inability to perform up to average standards, he or she may be hesitant to accept using a device so obviously outlining their academic challenges to others, although it could benefit them in many ways.

When attempting to implement AT in a school setting, considering teacher acceptance is very important (Parette & Scherer, 2004). Whether or not a teacher is supportive of AT can affect how the student perceives their stigma, and in turn could affect their acceptability of useful devices. "Students require skilled and caring teachers who view technology as a tool, not a replacement, for teaching" (Parette & Scherer, 2004, p.221). When teachers have negative viewpoints towards students with disabilities it may decrease their ability to accept the child in a particular environment (Parette & Scherer, 2004). Along with this, teachers who are accepting and have a sufficient amount of

training with AT may increase a student's acceptability and openness to trying different assistive devices.

Human characteristics and individualities can also lead to the resistance of acceptability for students. Some cultures may be more open to the use of technology while other families with cultural or linguistic backgrounds valuing acceptance and fitting into the community, may disregard the use of any device that can draw unwanted attention (Evmenova, n.d). Also, some cultures may view AT as directly linked with "disability" which also can create resistance. Religious factors, family views, and/or life circumstances may prevent the acceptability of unfamiliar devices. No limitation exists when considering the wide variety of individualized characteristics that could create barriers regarding the use of AT.

Maria Lund and Louise Nygard identified three categories when they attempted to assess the understanding of how people experience the meaning of assistive devices; the pragmatic users, the ambivalent users and the reluctant users (Lund & Nygard, 2003). The pragmatic users took a practical view if their situation and saw the desirable outcomes. The ambivalent user's maintained continuous uncertainty toward the desirable and undesirable outcomes and for the reluctant users, undesirable consequences took precedence (Lund & Nygard, 2003). When assessed further, they discovered that the pragmatic users did not consider themselves as people with disabilities when they could achieve goals with the use of AT. The ambivalent users seemed to be influenced by social and cultural values, but over time became more aware of the desirable outcomes of AT. The reluctant users avoided use to protect themselves against negative attitudes and

feelings of shame. The common thread was that each one of these users was maintaining

a self-image on society (Lund & Nygard, 2003).

Some of the other barriers that impede on the acceptance of AT can also be

classified into three group; Situational, Institutional and Dispositional (Messenger-

William & Marino, 2010). Situational includes lack of funding, deficits in teacher

knowledge and abilities to integrate AT, lack of available resources, lack of teachers

time, lack of collaboration and lack of consideration (Messenger-William & Marino,

2010). Institutional consisted of lack of AT specialists, AT designs are that too

complicated, lack of availability of devices and insufficient funding. Dispositional

includes teacher reluctance to AT and the negative attention AT gives students

(Messenger-William & Marino, 2010).

This study will hopefully reveal some reasons for resistance to acceptability in

students at the comprehensive regional university to help us understand how to overcome

these AT barriers and affectively reach our students in need. With the information

provided by past research, I predict that students with a higher GPA will be less accepting

to AT interventions.

Academic Skills and Success

Students with learning challenges often struggle with completing academic tasks

on their own, but the use of AT can increase academic success. Finn's 1997 study

demonstrated the potential positive impact of AT. Focus groups were utilized to

investigate services that were of importance to college aged students with learning

disabilities. One participating student stated, "To me, it has been devastating, I didn't

want anyone to know I had a learning disability" (Finn, 1997, p.7). Most students will

simply struggle through school, despising it along the way without ever really

understanding or seeking help for their struggles. With the help of AT these

circumstances can change. According to Kristine Webb, Karen Patterson, Susan

Syverud, and Janice Seabrooks-Blackmore (2008) investigation on students with

academic challenges in postsecondary education, "The proper type of technology applied

in appropriate situations can make a difference between success and failure whether in a

college course or a career (p. 201)."

One benefit of AT is that it can help students with learning struggles to read

information, organize their ideas, and write more clearly (Forgrave, 2002). The

advantage of this is that students are given the opportunity to complete their own

assignments "that truly reflect their knowledge and skills" (Forgrave, 2002, p.125).

Currently, thousands of assistive devices exist that can benefit a wide range of people.

Speech to text software, which consists of a student speaking to the computer while it

types what they say, is one that allows students to get their ideas down before they are

forgotten due to slower than average typing speed (Forgrave, 2002). This type of

technology also has helpful benefits. When a specific word or phrase is wrong, the

program drops down a list of options, encouraging the student to read the possibilities

and choose the correct answer, making it a learning process in itself (Higgins & Raskind,

2000).

Students with certain learning challenges can have problems decoding words, and

when these errors occur in reading they miss pieces of information and comprehension is

affected (Forgrave, 2002). Speech to text can help minimize these errors. In fact, a study

in 1995 showed that a speech recognition program affected the essay writing performance

of university students with learning disabilities in a way that was superior to a

handwritten essay (Higgins, 1999). Two years after the experiment was over, most

students proceeded to use this technology and reported "improved reading abilities" with

enhanced word comprehension. Although it wasn't a fact, participants felt the

improvements were due to the use of the AT (Higgins, 1999).

As this research shows, AT can benefit those in need. Since those who struggle

academically may be motivated to better their grades, they may also be more open to

intervention. Thus, I predict a positive correlation between academic struggles and

acceptability towards AT.

Measuring Academic Skills and Perceptions

To measure academic success I utilized the School Motivation and Learning

Strategies Inventory (SMALSI). The SMALSI, developed by Kathryn Chatham Stroud

and Cecil Reynolds (Western Psychological Services in 2006) originally has two forms.

The Child Form (ages 8-12) and the Teen Form (ages 13-18) (Novak 2013; Write, 2010).

I was given permission to use the unpublished college form for this project that will not

be released until summer 2013. Since the form has not been published, information

regarding validity and reliability are currently unavailable. The form utilized for my

research is also a shorter version than the one being released.

The SMALSI is a 164 item, self-reported tool designed to measure student

performance across different learning strategies. It takes 20-30 minutes for students to

complete (Novak 2013; Write, 2010). The learning strategies measure in the college form

include: Study Strategies, Note-taking/Listening Skills, Reading Comprehension

Strategies, Writing-Research Skills, Test-Taking Strategies, Organizational Techniques

and Time Management (Novak 2013; Write, 2010). These seven strategies are considered

student strengths. Also included are three liability measure including: Academic

Motivation, Test-Anxiety and Attention/Concentration. All 10 of these constructs are

broken down and explained more thoroughly later on in this paper.

Quality of Life

Students may struggle with the acceptance of their academic struggles, resenting

the obstacles that block their futures. Research suggests that children and adults are more

likely to achieve academic success and emotional growth when they can understand and

interpret reasons related to their learning weaknesses (Rothman & Cosden, 1995). In

fact, one participant in a study of different types of support on learning struggles stated,

"It helped me a lot knowing what the problem was and not just going through school and

thinking well, I am dumb and stupid, and I just can't get it" (Finn, 1997, p.7). People

who struggle to learn do not always understand why they are different from their peers.

This misunderstanding may create self-esteem issues and possibly worse psychological

effects. In the same study, many students with academic weaknesses reported wanting

self-esteem training, indicating a difficulty in maintaining their self-esteem (Finn, 1997).

In a separate study, Mark, a student at Landmark College (which is designated for

students with learning difficulties), had a history of struggling in school. When he

discovered text reader, he gained the confidence that he was able to read every word,

which he lacked before (Engstrom, 2005).

AT has resulted in significant advances for individuals with learning struggles to

become independent and productive members of society (Brackenreed, 2008). A case

study was done involving a 12 year old name Alex who exhibited Dyslexia and severe

anxiety. She expressed "specific fears about doing something wrong in the classroom in front of her teachers and peers" (Brackenreed, 2008, p.74). Alex began using a combination of assistive technologies to compensate for her struggles and discovered that those tools gave her an opportunity to build her self-esteem and self-perceptions of her deficits. She was no longer fearful and was soon implementing presentations by herself in confidence. Her mother stated, "Alex maintains a love of school and her stress level is reduced by using technology (Brackenseed, 2008, p.79)." This evidence shows that psychological stressors can coincide with academic challenges, and with the appropriate assistance, these anxieties and other reactions can be decreased significantly, helping children with academic challenges live a healthier lifestyle.

Many students with academic challenges are capable and driven to get a college education, but they lack the fundamental skills necessary for success (Enngstrom, 2005). A large number of students are often placed in remedial classes that teach skills in isolation in their early education years. This causes them to leave secondary schools without the skills they need to succeed in their future (Engstrom, 2008).

According to Bryant and Bryant (1998), "the use of technologies by students of all ages can help promote not only academic success, but also independence, self-worth, and productivity." Not only is AT useful in academics and psychological stressors, but it also can contribute to independence and productivity which can improve the overall quality of life. One of the most vital points when selecting a specific AT is to observe how it would decrease the student's limitations. It should never hinder their ability, but should increase, or at least maintain their independence (Bryant & Bryant, 1998).

The purpose of the current research is to examine the openness to specific AT usage in relationship with the overall quality of life for students with self-reported academic struggles. Given the significant change AT can have on students with academic struggles, it is very important to understand the effect that this change can have, and the barriers that keep students from accepting the use of these interventions.

If the use of AT can make someone more independent, increase their quality of life and improve their academic performance, the importance lies in uncovering the obstacles that these devices create. This includes determining why students show resistance and how this information can benefit how we address to use of AT to students. Perhaps students who are more accepting to AT have a higher overall quality of life because they are open to reaching out and trying different things that can help improve their lives. Thus, I predict that there would be a positive correlation between the acceptability of AT and quality of life.

Method

Participants

Participants included students from a regional comprehensive university. Participants were selected from two different groups at the university. The first provided students with an opportunity to get assistance through instruction, tutoring services, advising and technology support. It also provided students with an individual tutor to access help that they need in any variety of school topics. These students were told about the research project through their individual tutor and voluntarily filled out the consent form.

The second is a program provided to increase the amount of PhD's obtained for students from unrepresentative segments of society. Students who are eligible for this program are low-income, first generation college students, or from populations underrepresented at the doctoral level. It provides these students additional support through internships, research and seminars to help them achieve their goals of higher education. These students were asked to fill out the consent form as a requirement for their program, and before they could use any AT.

Design

This is a correlational design. Students were offered different types of AT to help create academic improvements. The types of assistive devices offered include; Read and Write Gold, Grammarly and Dragon Naturally Speaking. Read and Write Gold is a technology specified for reading difficulties. It gives the student the ability to highlight items on a page and have the program read the highlighted text back (Logsdon, 2012), helping the student understand their notes or other documents, targeting auditory learning.

Grammarly is a specified writing technology which helps students by completing free grammar checks. It also will incorporate student learning by providing a drop box for the student to choose a correction to their document so they can learn from their mistakes (Instant Grammar Check, 2012). By simply copying and pasting or uploading any typed document students have the ability to go through their paper and correct grammar over 250 different types of Grammar mistakes, improve word choice, and check for plagiarism (www.grammarly.com).

Dragon Naturally Speaking is an AT device by Nuance Communications designed

using a computer an easier task (www.Nuance.com). Users simply talk, and the computer

types for them. This program can be utilized to launch programs, edit documents or

emails, open files, control the mouse cursor and much more (www.Nuance.com). Dragon

assists in helping capture thoughts, while also getting thoughts down faster

(www.Nuance.com).

Materials and Procedures

Each student was asked to participate by their individual tutors or by their

program. They were given the SMALSI in person and then were asked to fill out the

acceptability and quality of life surveys via email. I gave students several opportunities

to utilize types of AT according to their most needed area of improvement. I distributed

flyers to all students who had consented to our study and had taken the SMALSI. I also

posted public flyers inviting students to come "Learn how to increase their academic

skills" and ran a 25 minute presentation on AT every 50 minutes from 9:00am to 5:00pm.

I only received a surprising two people throughout the day. I also provided opportunities

for one on one training to learn new AT devices and again, found very little interest.

Student Perception of Academic Performance

First, students completed the School Motivation and Learning Strategies

Inventory (SMALSI) College Form. Students were given this self-report measure by

their individual tutor during the first session where they filled it out on their own and then

returned it before their next tutoring session. Since the only published versions of the

SMALSI are the teen and adolescent forms, I emailed the author, Kathryn Stroud, and

had the honor to obtain the new college form, unpublished, that will be available in fall, 2013. This is a 164 item measure that takes on average 20 to 30 minutes to complete.

The SMALSI is made up of seven strengths including; Study Strategies, Note-Taking/Listening Skills, Reading/Comprehension Strategies, Writing/Research Skills, Test-Taking Strategies, Organizational Techniques and Time Management. Also, three liabilities are assessed including; Low Academic Motivation, Test Anxiety, and Concentration/Attention Difficulties. Each question had four options: Never (N), Sometimes (S), Often (O), or Almost Always (A) true. Each student rated how each question related to them specifically. Some example questions included, "I look over my notes to make sure I understand them," and "I don't think I need to do well in college to get the job I want. See Appendix A for definitions of SMALSI variables.

Learning strategies were well defined by Mayer in Witrock (1986) as "behaviors and thoughts that a learner engages in during learning and that are intended to influence the learner's encoding process." These specific learning strategies included in the SMALSI (as seen in Appendix A) are strategically chosen because if a student becomes proficient, it may improve academic achievement in most, and possibly all subject areas in a schooling environment (Stroud, 2006).

Study Strategies: The importance of study strategies is crucial to academic performance. Student who have not developed appropriate study strategies may not be able to store and retrieve information learned in school at the appropriate times (such as during a test). Whether it is memorizing note cards, listening to lectures more than once or simply reading over notes multiple times, study strategies are detrimental to academic success and students have the flexibility to develop a strategy that works best for them.

Note-taking/Listening Skills: Note-taking and listening skills are vital to academic performance. In college students are surrounded by information and are receiving it at a fast pace. To be able to listen to information and write down what you feel is most important is a learned skill and what you think is important may not be what is deemed important by your peers or your different teachers. This is a skill that is not only needed to be developed, but is must be able to be adapted as needed. They need to not only notice repetition, but manipulate what they hear into an effective format so it can be reviewed later for tests and assignments.

Reading and Comprehension Strategies: This component is vital in the world of academia. This can relate to text books, notes, assignments or any form of text. To be able to comprehend the importance of what you are reading is extremely essential to performance on tests and understanding what is being asked for in assignments.

Writing-Research Skills: Writing skills are very commonly used throughout a schooling career. They are required to pass state tests and your skills range needs to be very broad to be able to adapt to different audiences, different perspectives and different types of writing. As I sit here and type this paper, I can only imagine the (additional) frustration that would occur if I did not possess these writing skills. Then again, I also think back and wonder if I would be here today writing this if I had not broadened my skill range at an early age. Would I have been accepted to graduate school without being able to portray my personal thoughts through a letter? As Kathryn Stroud (2006) mentioned in her dissertation, "it is perhaps the best means of communicating the understanding of concepts, as well as one's ideas or feelings" (page 36).

The importance of research skills is emphasized at an early age. Children wander the library in elementary school learning how to locate books. The resources in libraries are very extensive, and students should know what it available to them and how to locate these materials. Being able to locate a resource is the beginning step to organizing thoughts about a topic and broadening personal perspectives.

Test-taking strategies: Pop quizzes, state tests, mid-terms, finals…the list goes on and on. College students are consistently assessed by their content knowledge and for a student to be successful determining the strategies needed, can be very important. Test taking, however, includes a large variety of different strategies. Some of the strategies mentioned by Kathryn Stroud (2006) include monitoring time. This consists of answering questions you know while not spending too much time on others that you are not sure of. Students can minimize the amount of errors by accurately reading and understanding directions while also checking for mistakes. "Educated guessing strategies increase a student's chance of answering a question correctly" (Pg. 44). These are only a few of the many strategies that can be learned or adapted to test-taking.

Organizational Techniques: Organization can significantly help students increase their academic performance. This can range from knowing where a homework assignment is or what day the next quiz will be to something as simple as knowing where their notes are located and where to find specific items. Folders, planners and other simple, yet helpful items can make a huge difference in the life of a student.

Time Management: Time management is involved in all aspects of a college student's life. It would be extremely difficult if a student lacked the ability to manage their time. Time can easily slip by and with how many tasks are demanded of a student

while balancing other aspects of their life, it can easily become overwhelming. Students

who are not rehearsed with this skill may fall behind in school simply because they do

not get their assignments done on time. They also may not efficiently study for an exam

due to their inability to make time and prioritize their school work.

Academic Motivation: Motivation encompasses all aspects of a student life.

Motivation gets homework done and tests passed, but not only does it get them

completed, it helps get them done adequately. Motivation is behind all learning strategies

listed in this measure. Kathryn Stroud (2006) enforced its important role by stating,

"Motivation determines investment in the process of learning, which strategies are used,

and the amount of effort put into carrying them out (pg. 53)."

Test Anxiety: Anxiety can create a significant amount of worry for students that

can dramatically affect their academic performance overall, but especially on tests. The

increased anxiety can be from a variety of things such as being unprepared, the unknown

of what will be on the test or simply the threat of having to take a test in itself. Although

a healthy amount of anxiety can benefit students and help them prepare adequately, when

anxiety increases it can create significant barriers to academic success.

Attention/Concentration: To be able to attend to class lecture and maintain that

concentration through a huge exam can have an enormous on a student's academic

success. If students, (such as one struggling with ADHD), cannot attend to information

being provided they will not be able to retain needed content that will be assessed

throughout their classes. Although a student could have ADHD, students who do not

have a diagnosed disability may also struggle to overcome their inability to concentrate

and that may produce frustration in regards to academia.

Acceptability. I put together this survey to target student's willingness to use and general thoughts around AT. This ten item measure includes questions such as, "I would be willing to use AT," "I like Assistive technology" and "Overall, AT will help me." The student will use a five point Likert scale to answer the questions; (1) Strongly Disagree, (2) Disagree, (3) Neutral, (4) Agree and (5) Strongly Agree.

Quality of Life. For this aspect of the study, the Multidimensional Student' Life Satisfaction Scale written by Scott Huebner in 1994 was utilized. Although this test contains many subsets, I only used the "school" section which is an 8 item measure containing feelings and perceptions that those have about attending school. Some examples of question are, "I look forward to going to school," I learn a lot at school" and "I wish I didn't have to go to school." These questions were answered by using a four point likert scale including; (1) Never, (2) Sometimes, (3) Often and (4) almost always.

Administration. After students have finished the SMALSI, I sent them the Acceptability Survey and Multidimensional Student Life Satisfaction Scale (school section) via survey monkey through their individual email accounts. Throughout this process I offered information on how to access videos to inform them about AT along with one-on-one sessions with a research assistant who is already trained to implement the AT. Whether or not they learned about or utilized AT was to the discretion of the student.

Results

Of the 93 participants that consented to my research, from a regional comprehensive university I had a total of 26 (28%) males and 67 (72%) females participate in the study. Of these 93 participants, 81(87%) of them filled out the SMALSI

form, 51 (54.8%) filled out the acceptability and Quality of Life survey's, and 56 (60%)

filled out all three survey's. Of those who consented, 7 students (.08%) did not fill out

either survey.

I utilized Pearson Product Moment Correlations to examine the relationship

between student acceptability of AT with perceived academic Quality of life, academic

performance and GPA. I found no significant relationship between acceptability and

quality of life, acceptability and GPA, or acceptability and self-reported weaknesses

(SMALSI). I found a significant relationship between perceived struggles reported on the

SMALSI and students academic quality of life ($r(50) = .432, p = .001$). This suggests that

the higher a student's total score is on the SMALSI (indicating more self reported

struggles) the lower academic quality of life is reported.

Supplemental Findings

I also utilized Pearson Correlations to examine individual SMALSI factors

(including the three liabilities) in comparison to acceptability and quality of life. I

visually examined plots of normality, and my variables appear to meet the assumption of

normality (see Table 1 for the intercorrelations between items). To control for family-

wise error, I adjusted the statistical significance level using Bonferroni correction, setting

the acceptable p value to .003. I also discovered a significant negative relationship

between a student's motivation level and their overall self reported struggles on the

SMALSI ($r(79) = -.348, p = .001$). The last significant relationship found implies a

positive correlation between a student's motivation level and their level of test anxiety

($r(79) = .518, p < .001$). Additionally, although according to the Family-wise error, the

relationship between the amount of test anxiety a student has and their acceptability to

to AT is not significant ($r(51) = -.379$, $p = .005$) I feel it is still a very strong and important relationship to mention.

Discussion

Originally, I intended this project to be a pre-test post-test design that would measure students self-reported academic struggles (SMALSI) over time while they also utilized AT. I immediately was confronted with the barriers that AT provided, and the resistance of students to learn any interventions. With this significant finding, I realized that I was jumping ahead by attempting to implement AT and was not looking at whether students were willing to try AT. This is when my project took a dramatic shift, and I decided to look at exactly what was contributing to the extreme resistance to intervention that I was witnessing (acceptability).

The primary objective of my research was to determine how accepting students are to AT and if any significant barriers exist that are creating resistance. In regards to my hypothesis I discovered; GPA, academic performance and quality of life did not have a significant effect on a student's acceptability of AT. However, I found that the more self reported academic weaknesses a student indicated (SMALSI), the decreased academic quality of life they reported.

I was surprised at my primary findings. I did not expect that there would be no significant primary findings in relationship to acceptability. With how much resistance I was discovering by simply trying to educate students on AT, I felt that there would be multiple factors that affected acceptability. These findings could relate to a variety of things such as the fact that students simply do not have time to learn something new in their already hectic lifestyles. There could also be multiple internal variables such as

mindset (i.e., A fixed mental attitude or disposition that predetermines a person's responses to and interpretations of situations (Mindset, 2013) that could be affecting whether a student is willing to try something new or not for fear of failing.

With the primary findings I did find a significant relationship indicating that academic challenges affected academic quality of life. This was not surprising because academia plays a substantial role in how much a student enjoys school. If a student is struggling to perform this may affect the way that they not only perceive themselves, but the way that they view their academic lives. I think that we can all agree that if you do not succeed at something, you may enjoy it less. Therefore, this finding simply confirmed this theory.

In the supplemental findings, I discovered a non-significant (due to family-wise error correction), yet interesting trend that indicates that, as the level of a student's test anxiety increases, his/her acceptability to AT decreases. A reason for this finding could be that students may be more prone to anxiety in other aspects of their lives also, and the thought of trying something new is overwhelming to them. It also could indicate a deeper struggle that could affect their view of receiving help, such as a personality trait or disorder. However, this information is very telling in the sense that of all aspects of the SMALSI this is the only category that strongly impacts student acceptability. It could be that of all the aspects that the SMALSI covers, test anxiety affects students academic lives the most.

The only significant supplemental findings were in regards to student motivation levels. I found that the lower a student's motivation level is, the increased test anxiety he/she reported. I also found that the more motivation a student indicates, the less self-

reported academic struggles he/she indicated and vice versa. Reasons for these findings could be that motivation may play a significant role in a student's academic life. Motivation can indicate how hard a student is willing to work and how persistent he/she is with his/her studies. When this is hindered, students may be more anxious simply because they are less prepared for the tests they take, causing them to do poorly on tests and causing an internal thought regarding their struggles and school performance. Overall, this could create a vicious cycle of academic failure.

A limitation to this study is that students were very uneducated on what assistive technology is. Although I provided a definition of assistive technology, students indicated that they did not fully understand what the intentions with the acceptability questionnaire consisted of. This also created a huge limitation to my study because students are resistant to learning about what AT is. Therefore, students may not have been thinking about appropriate devices when the survey was filled out. I also had a limited population that only included students who were receiving tutoring or are from an unrepresented population and were looking to further their education. A limitation also to consider is that the participants in this study were asked to partake when school was in session. If this study would have been implemented before school, I may have seen more compliance. Also, the acceptability survey was sent to student email around the end of fall quarter which also overlapped with finals.

Future research that would be beneficial for the next step of my research include further investigation on test anxiety to determine whether or not students also struggle with other forms of anxiety and what is provoking their anxiety. It will be important to understand student anxiety to help discover why this may be affecting acceptability to

AT. It would also be valuable to replicate this study in the general college population to determine whether students who are not receiving tutoring services have a different level of acceptance towards intervention. I would like to look at different aspects of a student's life to determine other significant factors that could be affecting student acceptability to AT. Factors that could be looked at are; how many classes a student is taking, whether or not the student has a job and different personality traits that may indicate more or less acceptability.

Overall, my research has potential to provide great benefits to society. AT is very important in the lives of students who struggle, but how can we help these students improve when we do not know what is preventing them from utilizing a helpful intervention such as AT? This study provides information that can help teachers understand how best to implement AT. Since I discovered that anxiety may be creating resistance to AT, we now know that by decreasing this test anxiety we can increase the acceptability of AT. Also, by increasing the use of AT we may be able to improve academic performance for those students that can benefit from any of these interventions.

By bringing awareness to the specific aspects of student learning styles that can affect their acceptability to AT we are one step closer to learning how to increase implementation of AT in the educational environment. This could encourage students to understand more about their own academic challenges, and how something like test anxiety can prevent them from seeking out devices that can actually help them improve their capabilities and in turn possibly reduce their anxiety. In a perfect world, every student would be utilizing the devices they need to get the greatest benefit out of their

academic career. For now, we can take it one study at a time hoping to one day terminate

this resistance to AT and open these doors for increased academic success.

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Table 1. Intercorrelations of SMALSI Factors, Acceptability, Quality of Life and GPA.

Variable	Accept	Qual	GPA	Study	Test	Note	Read	Write	Org	Time	Concen	Lomot	Tanx	SMALSI_R
Accept		.113	.125	.079	.072	-.023	.113	.274	-.048	.059	-.159	-.241	-.379	0.80
Qual			.126	.459*	.316	.351	.358	.295	.195	.444*	**-.**434*	**-.**445*	-.157	.432*
GPA				.449**	.295	.199	.106	.039	.183	.108	.047	-.181	-.155	.253
Study					.672**	.727**	.626**	.352*	.505**	.573**	-.174	-.286	-.018	.843**
Test						.572**	.564**	.368*	.390**	.463**	-.173	-.276	-.069	.749**
Note							.674**	.329	.624**	.593**	-.258	-.205	-.052	.866**
Read								.392**	.362*	.429**	-.133	-.155	-.074	.764**
Write									.299	.365*	-.313	-.374*	-.258	.554**
Org										.625**	-.419**	-.303	-.063	.730**
Time											-.450**	-.292	-.187	.779**
Concen												.564**	.539**	-.364*
Lomot													.518**	-.348*
Tanx														-.130
SMASLI_R														

Note: N= 93 for Variables. Accept = Acceptability of AT; Qual = Academic Quality of Life; GPA = Student Cumulative GPA; Study = Study Strategies; Test = Test-Taking Strategies; Note = Note-Taking Skills; Read = Reading/Comprehension Strategies; Write = Writing/Research Skills; Org = Organizational Techniques; Time = Time management; Concen = Concentration/Attention Difficulties; Lomot = Low Academic Motivation; Tanx = Test Anxiety; SMALSI_R= Total score of seven SMALSI strengths. *$p < .003$, **$p < .001$

APPENDIX A

Interpretive guide for scales

School Motivation and Learning Strategies Inventory (SMALSI) scales. By: Kathryn Stroud

Scale	Description
Study Strategies	Selecting important information, relating new to previously learned information, and memory strategies for encoding
Note-taking/Listening Skills	Discriminating important material when taking notes, organizing notes efficiency in note-taking
Reading and Comprehension Strategies	Previewing, monitoring, and reviewing texts, including self-testing to ensure understanding
Writing-Research Skills	Researching topics in a variety of ways, organizing writing projects as well as monitoring and self-checking for errors.
Test-taking strategies	Increasing efficiency in test-taking, including eliminating unlikely answer and strategic guessing
Organizational Techniques	Organizing class and study materials, structuring assignments including homework and other projects

APPENDIX A CONTINUED

Scale	Description
Academic Motivation	Level of intrinsic motivation to engage and succeed in academic tasks; tendency to set mastery goals.
Test Anxiety	Student' experience of debilitating symptoms of test anxiety, lower performance on tests due to excessive worry.
Attention/Concentration	Attending to lectures and other academic tasks, monitoring and adjusting attention to performance, concentrating and the avoidance of distractions.

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