A Phenomenological Qualitative Inquiry: Assistive Technology Use or Discontinued Use in the School Setting

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by

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ABSTRACT

This phenomenological qualitative inquiry was designed to explore the phenomenon of using assistive technology (AT) or putting AT "on the shelf" in the school setting. The purpose of this study was to identify factors involved in educators' use or discontinued to use AT in the school setting. The researcher wanted to learn more about educator efficacy with implementing AT and interviewed 10 participants of various stakeholder roles in the AT decision-making process. Participants shared their insight through one of two options: a live interview or a written questionnaire. Key findings were generated through emergent themes from the sample's responses. Findings indicated that participants used AT continuously when there was buy-in from IEP team members. AT was discontinued by this sample due to lack of buy-in and challenges with the technology. Further research stemming from this study includes the exploration of instructional coaching as an approach to support educators with the use of AT in the school setting.

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CHAPTER 1

INTRODUCTION

"For most people technology makes things easier. For people with disabilities; however, technology makes things possible" (Radabaugh, 1998, as cited in National Center on Accessible Educational Materials, n.d.). Assistive technology (AT) adds a layer to providing equal opportunities for students with disabilities in the educational setting. AT tools enable students to access the curriculum, read text, write, access their environment, and communicate. The Individuals with Disability Education Act (IDEA), passed in 1975, the governing law for special education, guarantees students with disabilities are guaranteed the right to a free appropriate public education (FAPE) in their least restrictive environment (LRE). These are fundamental principles in the law that afford students with disabilities the right to a sound public education at no cost to parents (Donovan et al., 2021; Stewart, 2021). Since 1975, there have been many amendments to the IDEA that have protected and expanded students with disabilities' rights to access public education. In the 1997 amendment to IDEA, AT was included (Davis et al., 2013) as a consideration for students with disabilities. In 2004, the IDEA was reauthorized and amended to include training on AT for parents and educational teams (Wright & Wright, 2017).

Students with disabilities who need specialized instruction to access the curriculum are provided with an individualized education plan (IEP). The IEP is the legal document that governs the student's educational programming and where that programming will take place. The IDEA states that special education is a service not a placement. Therefore, students are afforded the right to be educated in their least restrictive environment with their same-aged peers in the general education setting. They are provided access to the curriculum for academics,

communication, and functional life skills with the use of AT making opportunities in the school setting possible.

Topic

The topic of this research study is the use of AT tools by educators in the school setting. As specified in the IDEA, AT is a required consideration when developing an individualized education program for a student with disabilities in the public education system. AT is used to maximize that student's access to the curriculum (Individuals with Disabilities in Education Act of 2004, 2018; Wright & Wright, 2017), access to the environment, and access to communication. Furthermore, the goal of this research study was to explore how educators learn about AT, specifically how they learn how to use it and implement it, and to investigate their views on and experiences with AT. Students with disabilities benefit from AT by creating an accessible environment for learning, accessing, communicating (Edyburn, 2004). The purpose of this phenomenological qualitative study was to understand educators' use or discontinued use of AT in the school setting after the AT tool has been acquired.

The Problem

AT is inconsistently implemented in the school setting (Edyburn, 2004). This inconsistency often results in AT being implemented and then discontinued and ultimately abandoned. The opening quote of this chapter clearly indicates that technology makes life possible for people with disabilities. Technology provides access to information using closed captioning and computer text readers. It connects people. For some people, without it they would not have any control over their environment, their caregivers, or their independence. When technology is integrated in instruction, it affords all students access to learning in a way that may

be engaging. When it is available but not used, it can make life challenging for people with disabilities.

In special education, a phenomenon has been observed with AT. It is either used consistently and effectively or it is discontinued. Some IEP teams continue to use AT after it is acquired. Other IEP teams "put it on the shelf" and do not use it. Additionally, some forget to turn it on, take it out, plug it in, or do not to use it at all, which essentially means AT is discontinued and abandoned. Unfortunately, in these instances, it is the students who suffer, as they are left without the tool(s) for learning, communicating, and/or navigating daily life activities. The researcher was interested in gaining an understanding of educators' use or discontinued use of AT in the school setting after AT has been acquired. The researcher's intent was to learn more about educator efficacy with implementing AT.

The researcher chose to narrow down the phenomenon to focus on the point in time after the technology has been acquired because that is when the focus shifts from acquisition to implementation. During the initial phase of the AT process, teams are concerned with finding ways to get the tool. During the trialing phase, teams receive training, which often focuses on how the device works rather than how to implement it. This disconnect is typically evident in online, self-directed trainings and with AT vendors who create the trainings. Their focus is on how to use their product. They do not have a relationship with the viewer to guide them in implementing it specifically for their student. After the trialing, which may or may not include a training, there appear to be a few implementation scenarios. One scenario is that AT is purchased, and its implementation generalizes across environments and tasks. The second scenario is where AT is discontinued during the trialing phase. When AT is discontinued during trailing, the team explores other options, which is a natural part of the trialing process. The last

scenario is when AT is purchased and then later it's use is discontinued. In all three scenarios, the team may or may not contact their support person for follow up. The problem the researcher was interested in learning is why assistive technologies are used or are discontinued and what role educators' knowledge, perspectives, and efficacy play in implementing and generalizing AT after it is acquired.

Research Questions

This study sought to answer the following questions:

1. How do educators learn to use and implement assistive technology?
2. What are educators' perceptions of the value of assistive technology?
3. Why is assistive technology used by educators?
4. Why is assistive technology discontinued by educators?

Definition of Assistive Technology

The research study used the definitions provided by the IDEA to define AT and its uses in the educational setting. AT is categorized as a medical tool, an access tool, and a service in the school setting. The IDEA delineates what is covered by educational law and is required through educational funding (Individuals with Disabilities in Education Act of 2004, 2018).

First, AT is a medical tool. The World Health Organization (n.d.) defines AT: "devices and technologies are those whose primary purpose is to maintain or improve an individual's functioning and independence to facilitate participation and to enhance overall well-being. They can also help prevent impairments and secondary health conditions" (para. 1). Medical AT tools apply to pieces of equipment for mobility, life support or sensory needs. Examples include wheelchairs, arm and leg braces, feeding tubes, hearing aids, and cochlear implants. Medical AT tools are prescribed by a medical professional and purchased through insurance. These tools are

welcomed into the educational setting but are not purchased or maintained by the local educational agency.

Second, the IDEA 2004 defines AT as a device:

> 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 term does not include a medical device that is surgically implanted, or the replacement of such device. (Individuals with Disabilities in Education Act of 2004, 2018)

Third, IDEA 2004 defines AT service as "any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device" (Individuals with Disabilities in Education Act of 2004, 2018). AT in the educational setting is considered to be provided to a student with an identified disability under the IDEA as a part of that student's individual education program.

Assistive Technology Users

IDEA is the law that provides supports and protections to students with disabilities. IDEA 2004 Part B, Subpart A, §300.8 defines a child with a disability:

> …a child evaluated in accordance with §§300.304 through 300.311 as having an intellectual disability, a hearing impairment (including deafness), a speech or language impairment, a visual impairment (including blindness), a serious emotional disturbance (referred to in this part as "emotional disturbance"), an orthopedic impairment, autism, traumatic brain injury, an other health impairment, a specific learning disability, deaf-blindness, or multiple disabilities, and who, by reason thereof, needs special education related services. (Individuals with Disabilities in Education Act of 2004, 2018)

These disabilities are determined through an evaluation in which the school district's multidisciplinary team writes an evaluation report (ER) detailing the extent to which the disability affects the student's learning. The ER provides recommendations for special education programming, including the exploration and/or use of AT. AT is a part of each student's IEP and its use is to maximize that student's access to the curriculum (Individuals with Disabilities in Education Act of 2004, 2018; Wright & Wright, 2017). The IEP process requires the IEP team to address the student's need for AT in several areas of the document. For example, in the first section of the IEP, the considerations section, the IEP team must consider whether the student needs AT to access the general education curriculum or to meet the student's IEP goals. It is then described, listed, and connected to IEP goals or as a part of the student's specially designed instruction plan.

AT can meet educational and medical needs of a student with disabilities in the school setting. In order to qualify for AT, a student must have one or more of the 13 disabilities defined by IDEA which impacts that student's access to the general education curriculum, the environment, life skills, and communication. As an educational tool, it is used by students to access the curriculum and/or to participate with their peers. AT tools in the school setting are based on the IEP team's decision. The IDEA definition of AT excludes school districts or local education agencies (LEAs) from being responsible in providing medical AT that is surgically implanted. Examples of surgically implanted devices include cochlear implants, feeding tubes, and tracheotomy valves. While the IDEA provides a definition of a child with a disability, AT as a device, and AT as service, it does not provide information on how its implementation is documented.

Benefits of Assistive Technology

IDEA defines AT as a tool that supports, increases, improves, or maintains the functional capabilities of a child excluding surgically implanted devices (Individuals with Disabilities Education Act of 2004, 2018). AT is a tool for students with disabilities that enables them to access curricular materials, to have a voice, to read a book, and to write. Research on the use of text-to-speech programs to support reading and writing for students with learning disabilities yields positive outcomes in improving spelling, comprehension, and writing (Chiang & Liu, 2011; Courtad & Bouck, 2013; Missouri Assistive Technology, 2008; Svensson et al., 2019). Students' social skills can be enhanced by AT because it increases the quality and quantity of time students with disabilities spend interacting with their peers. Furthermore, AT supports students in building recreational skills, classroom skills, and communication skills (Zilz & Pang, 2019). Finally, AT supports spoken language when combined with devices that promote voice output. Romski et al. (2010) reported that children who had access to an augmentative device for both input and output communication produced more spoken words than those who used the device for input only. When implemented effectively, AT benefits multiple aspects of students' lives.

Assistive Technology Implementation

AT is a tool that gives the student access to curriculum, communication, and/or daily life activities. AT makes these things possible for students with disabilities. The issue identified in this proposed research is what happens with the AT after it is acquired. IEP team members are responsible for implementing AT for the student to access information, learn, communicate, and navigate their environment. However, when AT is not implemented judiciously, IEP teams discontinue to use it and thus limit or eliminate student access to what is supposed to be

guaranteed to them to receive a FAPE and achieve IEP goals. This research study looks at this issue in great depth.

Research indicates that AT is abandoned, or discontinued to be used, in the health care setting at a rate as high as 78% for hearing aids (Petrie et al., 2018) and as low as 19.09% for hearing aids and mobility devices (Federici & Borsci, 2016). However, the rate of discontinued use in the school setting is unknown (Edyburn & Smith, 2004; Satterfield, 2016; Watson et al., 2010). In a summary to the President and Congress of the United States in 1983, John A. Gannon and Sandra Swift Parrino delivered the results of their "Study on Financing AT Devices and Services for Individuals with Disabilities" on behalf of the members of the National Council in Disability. One of the reported findings indicated that there is not a national database to collect data on the use of AT and methods for seeking federal programs and funding for AT for individuals with disabilities. Currently, there remains no national or state database that manages use of AT by students in the public education system. Individual school districts may collect these data; however, they are not reported because reporting is not required. Therefore, it is difficult to ascertain a percentage of use and discontinuation that is representative in the educational setting. While these data are not yet required to be collected, what is required by law is that AT is provided to students and to persons with disabilities as a civil right.

AT is required to be considered for each student with a disability as a part of the IEP process in the public school system to make education, access, and communication possible. The IEP process is meant to be a collaborative process in which multiple stakeholders meet to develop the education plan for a student with a disability. During the IEP process, the need for AT is discussed in terms of a student's ability to access and/or participate in the general education curriculum and to participate in daily tasks such as communicating, self-care, and

access. Depending on the student, the consideration of AT can be brief or extensive during the development, review, and revision process of the IEP. Questions for the team may include whether the student needs access to AT to learn in that student's LRE, to participate in the curriculum and in activities, to access to materials including textbooks and printed materials, to access to computers, to access the environment, and to communicate (Pennsylvania Training and Technical Assistance Network [PaTTAN], 2019a).

Once AT is deemed necessary and written into the IEP, the team may then pursue options to acquire AT. Some local education agencies have tools readily available and can shift to trialing them with the student depending on their needs, while other IEP teams have students already using AT and are knowledgeable in obtaining tools to trial. Still other teams may not be aware of what AT is and how to obtain it. In some states, such as Pennsylvania, intermediate units (IUs) and other educational service agencies provide services such as training and consultation on assistive technology. Therefore, LEAs contact the training and consultation (TaC) coordinator for AT from their respective IU.

In the state of Pennsylvania, IUs are regional educational service agencies that act as liaisons with the Pennsylvania Department of Education. IUs provide specialized services that range from providing continuing educational credits to professional development to specialized services to instruction in special education. Each IU is defined regionally, and services are provided based on the need of the surrounding school districts. Training and consultation (TaC) coordinators are funded under IDEA 2004, Part B, Section 611 (Congressional Research Service, 2019; Pennsylvania Department of Education, 2019). The role of the TaC is to provide training and technical assistance to LEAs to build their knowledge to help students with disabilities succeed (Congressional Research Service, 2019; Pennsylvania Department of Education, 2019).

TaC coordinators who specialize in AT aid teams by making recommendations for AT, obtaining AT to trial, and providing training on the tool and implementation. Follow up consultations are provided to review the effectiveness of the tool when the student's needs, tasks, environment, and/or tool changes.

Summary

In summary, AT is a tool that is used to make life and education possible for students with disabilities. The IDEA, the governing special education law for public schools, guarantees that students with disabilities are provided a free appropriate public education with their nondisabled peers. It mandates that students with disabilities receive specialized instruction including academics, social skills, and life skills. As a part of that individualized education planning process, AT is to be considered for each student with a disability. The use of AT as a tool in the school environment enables access to curriculum, materials, reading, writing, the environment, and communication, enabling students to learn, grow, gain skills, and build relationships with their peers. The school setting provides a plethora of opportunities to implement AT; however, in some cases AT is abandoned and not used. This leaves a student with disabilities without access to their environment, to their academics, or to a way to communicate. The absence and abandonment of AT becomes a barrier to optimizing learning for students with disabilities.

Organizational Context

The researcher was interested in gaining insight on educators' experience with AT and how that translates into implementation or abandonment of the AT tool. When an AT tool is abandoned in the school setting, it poses two issues. One is an organizational issue where systems are either non-existent, unclear, or broken. The other issue is an ethical one.

First, when AT has been decided upon as necessary by the IEP team, the local educational agencies are required by IDEA 2004 to provide students with it (Individuals with Disabilities in Education Act of 2004, 2018). The IEP team is charged with implementing AT as documented in the student's IEP. This is the legal document that dictates the how the student will be provided individualized, specialized instruction. AT is included as a tool to access that instruction. Therefore, when AT is purchased but not used, it places an undue burden on the local education agency's organizational system and financial system. The local education agencies may not have a system in place to track AT and its use or to support teams with its implementation. The purchasing system may keep a record of its acquisition. However, there is not a universal system designed to track its use (Tucker et al., 2008), so many schools do not conduct any tracking. Currently, the most common communication device is the iPad with a communication app. The cost is roughly $1,550 for an iPad, communication app, and case as marketed by Augmentative Communication Consultants, Inc. The most expensive communication system purchased, an eye-gaze device with a mounting system, costs $15,000. Costs for a comprehensive literacy program such as textHelp's Read&Write for Google is $145 per student per year plus cost of the laptop or Chromebook. Added to the raw cost of the AT tool are costs incurred the trainings and/or professional developments, substitute teacher costs, and time allotted to learn to use, implement, and prepare materials. Financially when AT is abandoned, the investment in furthering the education of the student with disabilities in the educational setting is stalled.

Second, there exists an ethical issue of not providing a student with a tool that is needed to access curriculum, communication, and daily life activities. This diminishes the student's opportunity to use AT as a tool to continue to grow and develop academically, socially, and

naturally. Both issues yield a violation of the IEP and with no system in place, tracking its use is impossible. In reviewing existing research on AT abandonment, themes emerged to identify areas in the process that contributed to these break downs.

Existing Research

The rate AT tools and/or interventions are discontinued or abandoned varies across settings and studies. The phenomenon of "putting AT on the shelf" is concerning for individual students not being provided access, thus violating FAPE. Currently, there are no validated tools to quantify how AT services support outcomes. Data across studies have indicated that the rate of AT abandonment ranges from 19.09% (Federici et al. (2016) to 78% (Petrie et al., 2018) in the health care setting. Federici et al. (2016) conducted a survey to learn about AT abandonment in Italy. Italy's National Health Service conducted telephone surveys of users of the units of local health services (ULHS) to learn the extent to which AT is abandoned. Italy's healthcare system used 30% as the threshold rate for abandonment because this is the percentage of users who report AT abandonment after one year of receipt. Results from the survey indicated that 17.9% of people stopped using their AT devices within 7 months of receipt. 40% reported they did not use their AT at all. The most frequently abandoned AT included AT that had to be worn, sat in, or held (Petrie et al., 2018). The type of AT that was abandoned most were hearing aids with a 78% rate of abandonment (Petrie et al., 2018). These rates are typically used to describe the rate of abandonment. Data gathered from healthcare facilities or healthcare provider networks (Federici & Borsci, 2016) and are generalized from the healthcare setting to the education setting. They were not measured systematically or formally in the educational setting because there is no formal system or mandate to collect these data (Edyburn, 2015). Research in how AT becomes abandoned in the educational setting is limited to non-existent.

Edyburn (2015) provided a perspective that research in the outcomes of AT is limited because what is available is not enough of a base to support outcomes. Research has been limited to the discontinued use in the educational setting because there has been a lack of inquiry into the critical questions surrounding AT, delivery, implementation, and ongoing need. This begins to frame the purpose of this study: to learn why AT is used or discontinued in the school setting by exploring how educators learn about AT, implement AT, and their perspective on AT.

Additionally, Philips & Zhao (1993) identified four barriers to AT implementation: (a) changes in users' needs, (b) ease of acquiring the device, (c) the inclusion of the user's opinion in attaining the device, and (d) device performance. In Philips and Zhao's study, these factors led to the ability to predict the use or discontinued use of AT with respect to the user's personal characteristics and technology acceptance. Moreover, Copley & Ziviani (2004) included device procurement and management, and staff training and support as additional barriers. These two studies add two more concepts into the frame of this research: a), how educators are attaining information on device use, and b), how they learn to use it to implement it confidently.

Tucker et al. (2008) presented their research findings on the AT decision making process in four Pennsylvania school districts at the Northeastern Educational Research Association Annual Conference. Findings revealed that the technology needs differ between the special education staff and the general education staff. Three themes of note from their research included the use of educational assistants, the lack of monitoring procedures, and the overreliance on the use of the IU assistive technology consultant to provide teams with supports in AT. These key concepts may aid in learning about educator efficacy with implementing AT. As schools are becoming more inclusive and educators are supporting a diverse population of student, technology is more readily available to staff and students. Tucker et al. (2008) recommended that

schools ensure that all educators are prepared to use the proper technology for their students' needs.

The theme regarding overuse of a professional who is not a part of the local educational agency aids in building the conceptual framework for this research study. The theory underlying this study was that educators use or discontinue use of AT based on their level of comfort with the AT and their effectiveness in using it. Tucker et al. (2008) indicated that the IU AT consultant was able to address needs of students who were representative of low incidence disabilities and thus presented with the most needs, but these students' teachers often lack the knowledge and skill to implement. The authors indicated that the least trained person works most often with the student and is relied upon to use the AT. The conceptual framework is derived from the theory and works towards bringing together related concepts to aid in gaining an insight into the phenomenon (Bloomberg & Volpe, 2019). The researcher used a phenomenological qualitative inquiry with interviews to gain insights on the use and/or discontinued use of AT by educators with implementing AT in the school setting.

Research is new when delving into the areas of AT effectiveness beyond procurement (Watson et al., 2010). The process in determining AT for students will be discussed in the literature review, as that is not the central focus of the current research study. AT is a tool that benefits students with accessing the curricula especially as students are being educated more frequently with their nondisabled peers. The existing research supports and justifies the purpose of this research study, which was to gain insight on how educators use or discontinue to use AT in the school setting after it has been acquired.

Significance of Study

As more students are being educated in their LRE, the use of technology in instruction is more predominant. The findings of this research may be beneficial in providing information to districts seeking to implement technology as a part of the Universal Design for Learning (UDL) framework and/or within the Multi-Tiered Systems of Support (MTSS). UDL is an educational framework based on neuroscience research. It is designed to provide flexible options to removing barriers to the curriculum and enables students to gain knowledge and skills and engage in learning. It is a framework that addresses learner variability (CAST, 2018). UDL breaks down learning into three categories or principles: engagement, representation, and action and expression. It addresses learning by tapping into the students' motivation, interest, and learning needs, providing different ways to present information during instruction, and provides options for students to demonstrate what they know. UDL provides tools and supports to all students and may be a part of the MTSS framework.

Education systems have put forth efforts to address learner variance. UDL is a framework for providing access to tools and strategies that promote engagement, varying ways information is presented, and offering options to show what was learned. This is used within the MTSS framework where the three tiers are leveled to provided intense interventions based on the learner's needs. Within the MTSS framework, UDL may be used in tier 1, the foundational level provided to all learners. AT tools may be used with students who are included in the general education classroom for accessing the general education curriculum. AT is identified in the IEP as a support needed for the student to access the curriculum. It can and should be used in conjunction with UDL.

The distinction between what is considered AT and UDL has become blurred over the past number of years. As technology advances and becomes more readily available, its use within the general education setting is more consistent, especially during the COVID-19 pandemic, in which online learning became the instructional mode for most students. What was once considered AT, is now considered common. For example, voice dictation software was used primarily for students with writing challenges. Dragon Dictate was the only voice dictation software available for purchase in 1990. In 1993 it became available on Apple computers, and nearly a decade later, in 2002, Microsoft included it into their office products. In 2007 Microsoft incorporated voice dictation into Windows, and soon after, in 2008, Google added voice recognition to mobile devices, Apple introduced Siri as a digital personal assistant in 2011, and in 2014 Amazon released its own voice activated and controlled speaker, Echo (Kikel, 2021). This is one example in which a tool was originally developed for a small, targeted population. Next, it was adopted by people with disabilities as there was a great benefit for it. Then, it was integrated into systems for a larger audience of the general public to access. What was once considered assistive, used for a smaller group of persons, is now considered common and used by a wide range of users.

It is imperative that IEP teams consider students' needs for the use of AT. If the tool is readily available and without documentation on how the student will use it, it may get overlooked as AT. Also, without educators' awareness, knowledge of tool use, and understanding of how to implement it, it may get pushed aside. The significance of this study, therefore, in researching how educators use or discontinue to use AT in the school setting, is in the study's recommendations for training and implementation support for educators who work with students who use AT.

Delimitations

The delimitations the researcher considered in completing this study include selecting participants, excluding certain sensory disability categories, and eliminating the use of an initial survey. These choices were made to define the boundaries for the study. These were carefully considered because in qualitative research, relationship is key. The phenomenological qualitative inquiry gathered data from interviews, aiming to understand how educator efficacy works with providing continued AT use or discontinuing its use.

The first delimitation includes participant selection. The researcher is a training and consultation coordinator for AT for the Allegheny Intermediate Unit in Allegheny County, Pennsylvania. Allegheny County is comprised of 42 school districts, six career and technical and special education center schools, and 15 charter schools. There are three AT coordinators at the Allegheny Intermediate Unit who provide AT services to these educational entities. Each AT coordinator provides services to 14 districts and one special education center school, and the charter schools are divided up as support requests are received. The researcher chose a sample of eight school districts based on the number of new consultations and follow up consultations over the 2017-2018, 2018-2019, 2019-2020 school years. This allowed the researcher to ascertain which districts moderately utilized AT services. The researcher chose not to include the remaining 28 districts, which are supported by the other two AT coordinators. The researcher deduced that by including districts not served by her would occlude the findings. Qualitative inquiry is based on relationships. The researcher’s purpose for not including the other districts in the sample was to prevent unnecessary comparisons to be made between AT coordinators from being made. This also aids in reducing any unforeseen and unintended consequence of collegial rivalry. The students remain in the forefront of every professional's scope. Therefore, the

researcher reasoned that it would be best to include teams with whom she has established working, professional relationships.

The second delimitation involved excluding districts where AT services for students with vision needs were exclusively supported by an AT consultation. The AIU has a separate vision department with an AT specialist who focuses on AT for students who are visually impaired or Blind. The vision AT specialist and the TaC AT coordinators collaborate on consultations when the student's needs surpass the scope of vision only. The researcher chose to not include districts where vision was the primary category as to not confuse the results. The vision AT specialist is a teacher of the visually impaired who works directly with students and is responsible for delivering instruction directly to students. By contrast, the TaC AT coordinator works to provide teacher professional development and build educators' capacity and does not work directly with students. The exclusion of the sensory area also provided the researcher the opportunity to focus on AT for learning and communicating without competing service delivery models.

The third and final delimitation of this proposed research is the elimination of an initial survey to invite participants. The choice was to narrow down the districts in which the researcher has a strong professional relationship within the district. By including an initial survey, the function of the survey questions would have rendered the interview questions redundant. The aim for the study was to gain an in-depth insight of why AT is used or discontinued after AT is acquired, preferably after an educator received instruction on the tool as well as its implementation. The researcher chose to further narrow the focus to interviewing teachers from select districts to support a qualitative inquiry.

The researcher evaluated three areas of delimitations: participants, AT for learning and communicating, and redundancy. The scope of the research study was to compare IEP teams'

experiences with AT in a single district. Therefore, the participants needed be considered with respect to delivery of AT service, working relationship with the teams, reducing the complexity of the student's needs, and being respectful of their time by reducing redundancy.

Summary

This study was designed as a phenomenological qualitative inquiry using interviews as the approach to gain information. Its aim was to acquire an understanding on how educator efficacy works with providing continued AT use or discontinuing its use altogether. AT is an iterative process. It is identified in special education law to be considered for each student with a disability as a part of the IEP process. As both a device and a service, AT provides a foundation for how to address students' needs through access to curriculum, activities, and communication. This study sought to answer the following questions: How do educators learn to use and implement assistive technology? What are educators' perceptions of the value of assistive? Why is assistive technology used by educators? Why is assistive technology discontinued by educators? The significance of this study may impact how educators implement AT on a daily basis. It may aid the community of assistive technology providers to strengthen the area(s) of need in the AT delivery of service. It may provide ideas to support the use of AT with students, thus increasing implementation and continued use and decreasing rates of abandonment. The next chapter will provide a detailed review of literature, including barriers to AT that have impacted its discontinued use.

Definitions of Terms

Accessible educational materials (AEM) – technologies and materials used to provide for students with disabilities access to instructional materials in a format that best suits their needs (electronic, audio, Braille, large print, and video).

Americans with Disabilities Act (ADA) – the law that provides regulations for entities receiving federal funding which affords persons with disabilities rights and protections.

Assistive technology –

> 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 term does not include a medical device that is surgically implanted, or the replacement of such device. (Individuals with Disabilities in Education Act of 2004, 2018)

Augmentative and alternative communication – electronic and non-electronic devices and/or software that is used to provide a student a voice when their speech is limited, non-existent, and/or impaired.

Case study – a method of qualitative research that is used to gather data, analyze, and interpret from a sample within a shared context or phenomenon.

Education for All Handicapped Children Act (EAHCA) – P.L. 94-142, known as The Individuals with Disabilities Education Act. This act mandated that school districts educate students with disabilities, including those with complex disabilities.

Elementary and Secondary Education Act (ESEA) of 1965 – the act that awarded grants for textbooks, books, special education centers, and scholarships for low-income students. The law provided resources for educating students with disabilities.

Educational Assistant – a professional who is in the position to support a student with special needs in the educational setting. Also referred to as a paraeducator, classroom assistant, and/or one-to-one aide.

Educator – in this research, an educator is any professional in the school setting who is directly in charge of educating a student, including special educator, general educator, educational assistant, nurse, occupational therapist, physical therapist, and speech therapist.

Evaluation report (ER) – initial report that is used to determine if a student who has a disability is eligible for special education in public education. A multidisciplinary team completes observations and assessments to determine eligibility.

Free appropriate public education (FAPE) - the legal concept used to describe the educational program of students with disabilities in public schools.

Human Activity Assistive Technology model (HAAT) – a model used for determining assistive technology for users that includes the interrelationships among the human-technology interface, the activity, and the environment.

Individualized education program (IEP) – the written educational plan for a student with a disability.

Individuals with Disabilities Education Act (IDEA) – the federal law on special education that mandates how students with special disabilities are afforded the right to a free appropriate public education with an individualized education program with their nondisabled peers to the maximum extent.

Instructional technology – technology that is used in the process of delivering instruction or teaching students a skill.

Intermediate unit (IU) – educational agency in the state of Pennsylvania that provides cost-effective, highly skilled instructional, technological, educational, and operational services to regional school districts. IUs provide continuing education to educational professionals, professional development trainings, and services to districts to support their needs with educating students with disabilities. In Pennsylvania, there are 29 intermediate units.

Least restrictive environment (LRE) – LRE is required by the Individuals with Disabilities Education Act. It mandates that students with disabilities need to be educated in an environment with their same aged, nondisabled peers as much as possible with supplementary aids and supports.

Local education agency (LEA) – the school district or educational agency.

Multi-tiered systems of support (MTSS) – a data-driven framework that is used to provide problem solving outcomes for students in areas of curricula and behavior. Evidence-based practices are used to support all students with the materials, instruction, and strategies they need in order to achieve positive outcomes. It is a framework used to address the needs of students who are struggling prior to receiving special education services.

Phenomenological qualitative research – an approach of qualitative research that seeks to answer what the meaning or essence is of a lived and shared experience. The focus is on how individuals or a group makes sense, internalizes, and interprets the meaning of a shared experience, the phenomenon.

Picture Exchange System (PECS) – an augmentative and alternative communication system. It is a protocol for teaching communication to students with autism using principles of behavior analysis.

Qualitative research – research that uses natural approaches in collecting, analyzing, and interpreting non-numeric data to understand an experience in a specific context and is concerned with understanding human behavior. Data do not generalize to a larger sample. Data are collected from interviews, observations, surveys, and reviews of records and are used to interpret the lived experience. The researcher is the data collection tool.

Reevaluation report (RR) – the report the multidisciplinary team writes that details assessment data, student needs, and suggestions to support students with disabilities in receiving specialized instruction. It includes the IEP team's decision on the academic programming for students with disabilities.

SETT – a person-centered framework used to assist with determining assistive technology based on the Student's needs, in single or multiple Environments, to complete Tasks, and matched Tools to complete the tasks.

Specially designed instruction (SDI) – adaptations to materials, to the educational environment, and to the delivery of instruction. These are unique to a student with an IEP and assist in achieving their IEP goals. These are identified by the IEP team and documented in the student's IEP.

Supplementary aids and supports – services and supports provided to students with disabilities while in the educational setting (regular education class, educational-related settings, and nonacademic and extracurricular settings). It is a requirement under the Individuals with Disabilities Education Act to enable them to be educated with their nondisabled peers to the maximum extent.

Text to speech (TTS) – a software program that speaks typed text in the electronic/digital platform.

Training and consultation (TaC) coordinator – a professional who provides trainings and consultations to districts, schools, and individual student teams who support educating students with disabilities in Pennsylvania under the IDEA.

Universal design for learning – an educational framework used to remove barriers to instruction and curriculum by providing flexible options in ways to motivate and engage students, represent information, and give options for students to show what they know.

Voice typing, voice recognition, speech dictation – a software program that types what a person speaks into the computer or tablet.

Wisconsin assistive technology initiative (WATI) – an initiative that was funded to develop materials and deliver services related to assistive technology for educational agencies and schools. Materials created by this initiative are highly used to support the provision of assistive technology supports and services.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

Assistive technology (AT) is a tool that supports the functional capabilities of those with disabilities. AT is used in the educational environment to afford students with disabilities access to grade level curricula, to enable students to show what the know, to serve as a vehicle for communication, and to interact with the environment. The researcher is interested in learning about the use or discontinued of AT by educators and educator efficacy with the implementation of AT. This study sought to answer the following research questions:

1. How do educators learn to use and implement assistive technology?
2. What are educators' perceptions of the value of assistive technology?
3. Why is assistive technology used by educators?
4. Why is assistive technology discontinued by educators?

Technology helps makes life easier and more manageable for most people. For people with disabilities, it is a necessary tool to make life accessible, navigable, and possible. Chapter 2 reviews the background information surrounding the discontinued use of AT in the educational setting. The purpose of this literature review is to establish the legal foundation of AT, to define AT in the school setting, to discuss barriers to implementation, and to review adult learning. These factors play a role in the implementation of AT and its outcome. First presented is a brief history of the laws that support AT, followed by the special education process, then the process for choosing AT, and ending with barriers that impact implementation.

Special Education History

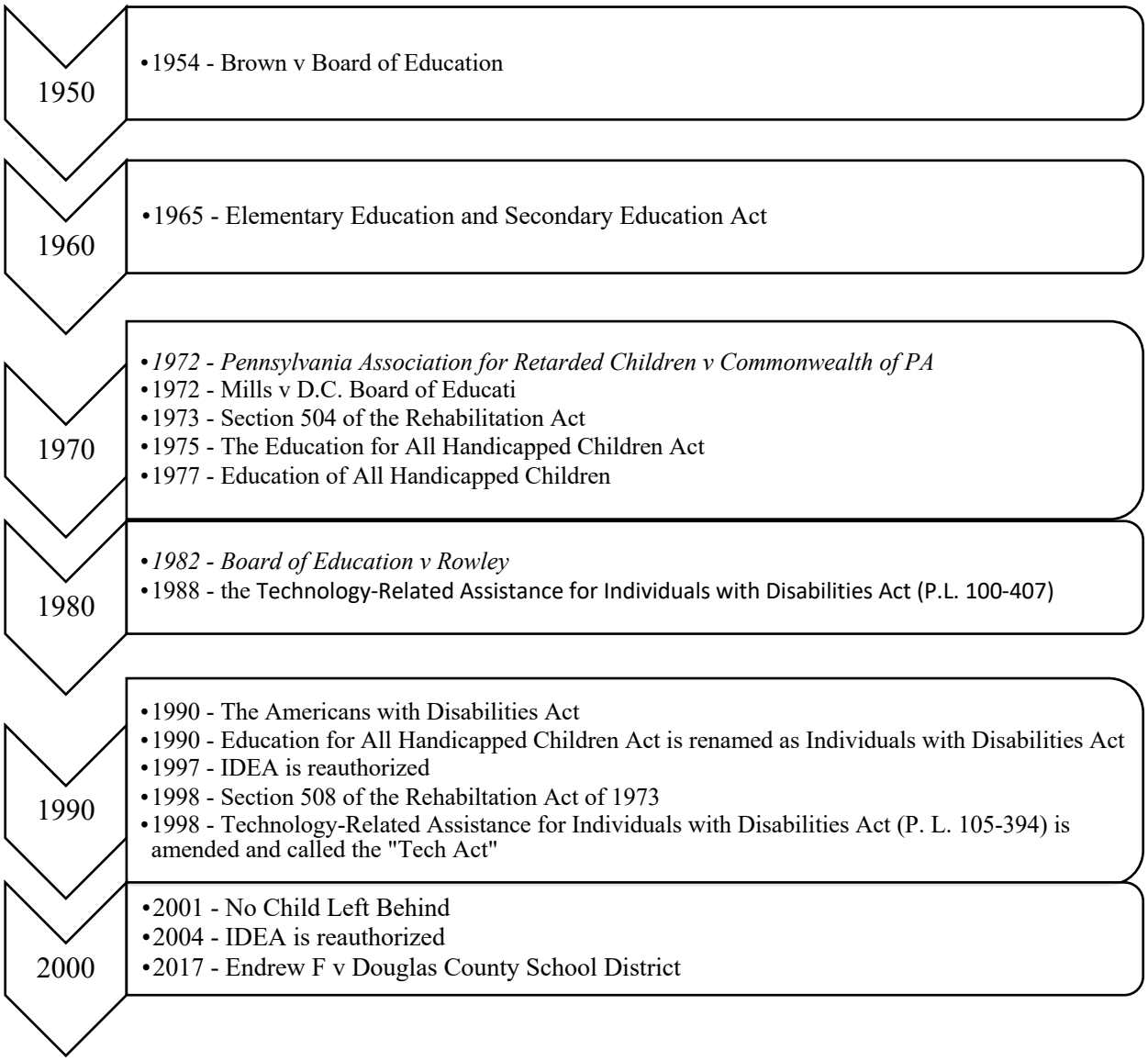
Legal Foundations for Persons with Disabilities

The history of special education is grounded in civil rights laws and court cases that span decades. The outcomes of these groundbreaking legal precedents increased the assistive technology provided to support persons with disabilities in and out of the classroom. AT is intertwined in the laws and court cases. It progressed with the changing times to support persons with disabilities across platforms, across means of connecting with others, and across access to every-day life functions. The laws that have been passed built the foundation for AT in the educational environment. The purpose of this section is to illustrate the history of protecting persons with disabilities, the rights afforded to them to receive a public education, and the evolution of AT as a tool to make life possible for persons and students with disabilities.

The timeline in Figure 1 identifies the key cases and events that shaped special education and the use of AT. Appendix A expands the timeline along with brief descriptions of the events.

Figure 1

Timeline of Special Education Laws, Acts, and Court Cases



In support of students with disabilities, the following laws will be addressed specifically as they have the most pointed and direct influence on students with disabilities: P.L. 94-142 Education for All Handicapped Children Act (EAHCA), P.L. 100-407 Technology-Related Assistance for Individuals with Disabilities Act of 1988, the Americans with Disabilities Act (ADA), the Individuals with Disabilities Act 1990, and Section 508 of the Rehabilitation Act of 1973.

First, in 1975, P.L. 94-142, Education for All Handicapped Children Act (EAHCA) was enacted. This was signed by President Gerald Ford and mandated that all students with disabilities be educated in schools, including students with severe disabilities. Public schools that received federal funds were required to provide equal access to education to students with both physical and mental disabilities. It mandated that students with disabilities be provided an individualized education program, be educated in that student's least restrictive environment (LRE), and that the education be at no cost to the parents (U.S. Department of Education, 2019). Data show the impact this law had over the past 44 years. In 1975, 1.8 million children with disabilities were excluded from receiving a public education. In 2018-2019, 7.5 million students with disabilities received special education in the public school (U.S. Department of Education, 2019). The significance of this law is that it was the first to provide students with disabilities the right to a free and appropriate public education. It enabled students with disabilities to be educated in their neighborhood public schools with individualized education programming, which led to identifying the needs of the student, and set the path for the use and implementation of assistive technology in the educational setting.

Second, in 1988, P. L. 100-407, Technology-Related Assistance for Individuals with Disabilities Act of 1988, also known as The Tech Act, was established to ensure that states have a way to provide AT to those with disabilities through statewide, comprehensive programs. This act defined an AT device and AT services, and its definition, "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 functional capabilities of individuals with disabilities" (Assistive Technology Act of 1988, P.L. 100-407, Section 3. Definitions, para. 1) became the federal definition used in IDEA. Additionally, this legislation established the groundwork for

providing persons with disabilities access to AT tools. The major purposes that impacted educating students with disabilities included:

- Increasing the knowledge of the needs of persons with disabilities who need AT devices and services, their families, employers, and other appropriate entities to ensure AT devices and services are received;
- Increasing policies, practices, funding, and procedures in the provision of AT devices and services;
- Coordinating state, public, and private agencies that provide AT related services;
- Providing training and technical assistance to persons with disabilities, their families, employers or others who are involved in the life functions of the person with disabilities (Assistive Technology Act of 1988, 1988).

Programs funded by state and federal money were required to provide AT devices and services. It created AT device reutilization programs to exchange, maintain, repair, and recycle AT devices. Device loan programs were established to provide short-term loans and device demonstration programs and services because many individuals and/or states did not have these programs. It was reauthorized in 1998 as P. L. 105-394, the "Assistive Technology Act of 1998."

In 1990, the third influential legislation for students with disabilities, the Americans with Disabilities Act, prohibited persons with disabilities from being discriminated against in who were employed in state and local government jobs. It also guaranteed access to public and commercial facilities, transportation, and telecommunications. This civil rights law extended into the school systems to provide students with disabilities the right to an education. ADA was divided into four sections or titles. Of those four titles, Title II applied to giving equal opportunity for those with disabilities access to public education. Title IV included the

requirement for telephone companies to provide the necessary services for people who are deaf or hard of hearing access to telecommunication devices. Both titles affected educating students with disabilities in the educational environment with respect to AT. Title II enabled students to have access to public education and Title IV addressed the need for technology for access to communication channels. This civil rights law remains as the foundation for rights provided to persons with disabilities inside and outside of the education setting (Americans with Disabilities Act of 1990, 1990).

Fourth, in 1990, as part of a reauthorization of EAHCA, the law was renamed as the Individuals with Disabilities Education Act (IDEA). It guaranteed the right for a free appropriate public education (FAPE) for all students. Under this law, the Individualized Education Program (IEP) became the legal document that mapped out a student's specialized instruction according to that student's needs (Individuals with Disabilities Education Act of 2004, 2018). Many revisions occurred since 1975 to align with the changes in educational law. The amendments to IDEA in 1997 included the addition of AT as a device and service, stating the IEP team must consider its use as a part of the process in providing FAPE (Zabala et al., 2000).

The final major legislation impacting students with disabilities is Section 508 of the Rehabilitation Act of 1973, which was amended in 1986 and again in 1998. The original Section 508 required electronic and information technology be accessible to persons with disabilities. This amendment included providing supports for persons with vision needs such as large font, audio, and Braille. It also included providing appropriate formats for persons who are deaf or hard of hearing. In 1998, it was amended again to reflect the expanding electronic environment. It required that agencies receiving federal funds be in compliance and make text in the electronic environment accessible to all users. Private companies that do not receive electronic funds did

not have to comply with the accessibility standards (U.S. General Services Administration, 2020). Schools fell under this requirement since they received federal funding to support students with disabilities. Therefore, school became responsible for providing access to media and electronic resources to those with an identified need. The significance of this amendment is that it set the stage for schools' responsibility to provide accessible instructional materials.

In 2004, the IDEA was revised to align with No Child Left Behind (NCLB). Under NCLB, the IEP included language that defined AT. The revision charged the educational team with considering the AT needs of students as a part of the IEP process. It added language that required access to electronic text in a timely manner. It stated that the educational team needed to identify how a student gained access to information in a format that matched the student's needs (Reed & Giearch, 2009). No laws or regulations were provided on how to implement AT; however, an educational definition of AT was provided to clarify what AT means in the educational setting. The definition of AT used in the IDEA is the same definition of AT that the Technology-Related Assistance for Individuals with Disabilities Act of 1988 established with one addition. The IDEA's definition of AT does not include medical devices that are surgically implanted (Individuals with Disabilities in Education Act of 2004, 2018). This clarified the responsibilities the IEP team has to considering and providing students with AT (Reed & Giearch, 2009).

Summary of Legislative Impact

In summary, the above laws emphasized the need for AT in the educational environment. AT's necessity is predicated on providing students with access to information in a variety of formats that meets the individual's needs to be afforded the right of a free appropriate public education. Schools receive federal funds for special education, which places them under the

federal guidelines for providing students access by not discriminating against them because of their disability. The IEP is the legal document for students with disabilities where AT is recorded. According to the Individuals with Disabilities Education Act of 2004, AT is defined as both a device and service for students with disabilities in the educational system. The IDEA is an educational law that was enacted to assure that students with disabilities are "provided with equality of [educational] opportunity, full participation, independent living, and economic self-sufficiency" (Saleh, 2019, p. 1). Special education laws have evolved over the decades to refine processes for educating students with disabilities. This section identified the legal foundation of AT and how AT is required to be provided to persons with disabilities. Additionally, the laws mandate that a person with a disability cannot be discriminated against based on having a disability. This extends to entities receiving federal funds and entities that are servicing the public. The ADA is the overarching law for persons with disabilities. In the public education system, the IDEA is the prevailing law. Students must have a disability to be afforded these rights under the IDEA. The following section outlines the special education process.

Special Education Evaluation Process

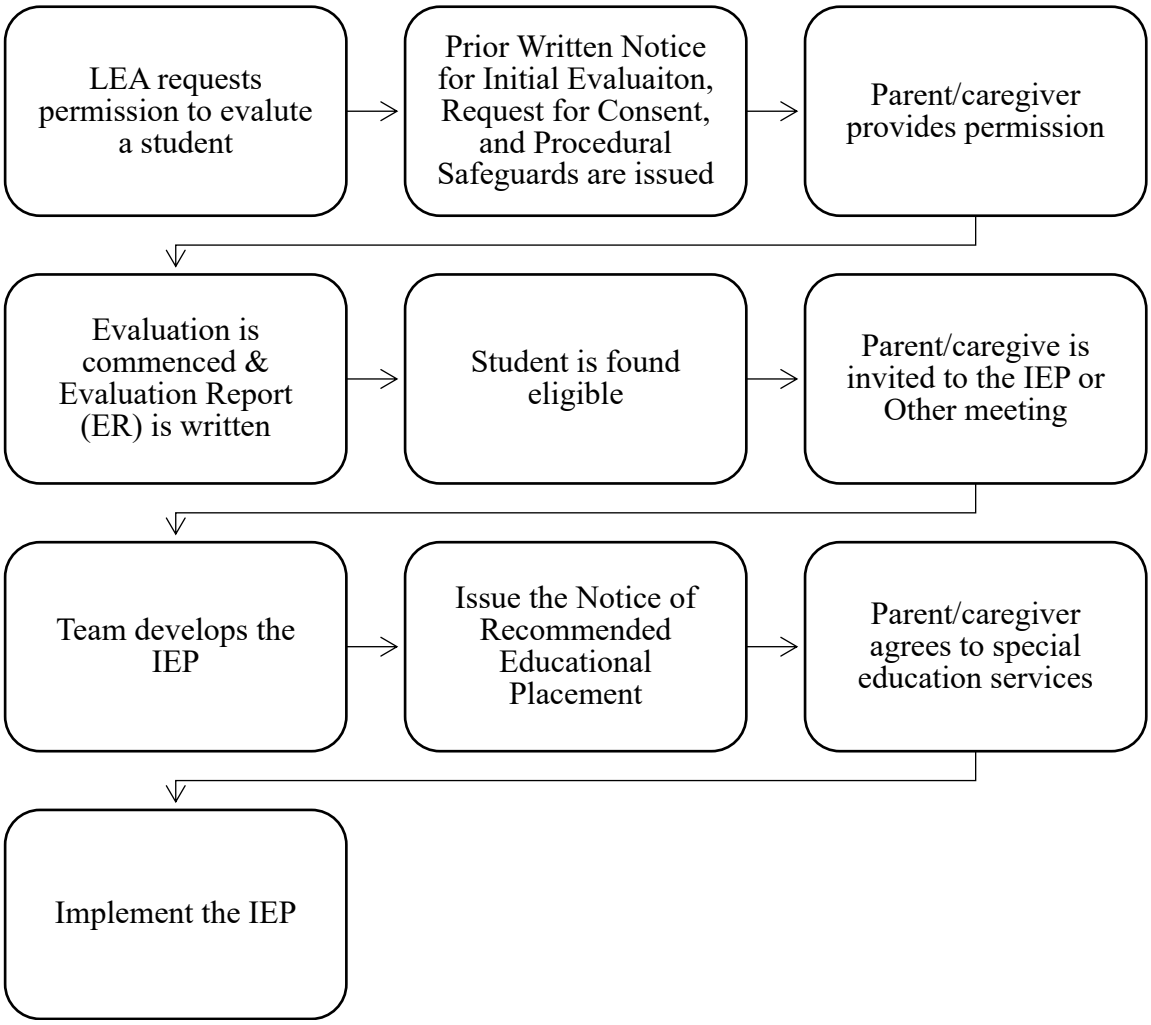
In the public school system, the IDEA protects students with disabilities. First, the student must be identified as having a disability and that it impacts learning. If the student's disability does not impact learning but the student requires adaptations to instruction, then the student may receive a 504 Service Agreement. This document lists the accommodations and adaptations needed. If the student's disability affects learning such that the curriculum needs to modified and individualized, then the student is eligible for special education services. This section discusses the processes for obtaining special education services and then the assistive technology process. The purpose of this section is to highlight the existing processes in place to

ensure students with disabilities are afforded the right to an education and the right to an assistive tool to access that education.

Students with suspected disabilities are identified via the evaluation process. The evaluation is conducted by a multi-disciplinary team of trained evaluators who administer non-discriminatory assessments. AT is decided upon by the multi-disciplinary team and is implemented in the educational environment by educators. The purpose of this literature review is to establish a foundation of the students who use AT, to define AT, to discuss barriers to implementation, and to review adult learning. These factors play a role in the implementation of AT and its outcome. Figure 2 shows the special education evaluation & IEP process when the parent/caregiver approves (Pennsylvania Training and Technical Assistance Network, 2019c).

Figure 2

Special Education Process with Parent Approval



First, a student needs to be evaluated to determine if a disability is present, the type of disability, and how that disability impacts the student's learning and social abilities. A referral can be made by a parent/caregiver, teacher, administrator or other school official suspecting that a student might have a disability ("Understanding Special Education," 2019). According to the IDEA, Part B, Subpart A, Section 300.8, a child is evaluated for having

> an intellectual disability, a hearing impairment (including deafness), a speech or language impairment, a visual impairment (including blindness), a serious emotional disturbance

> (referred to in this part as "emotional disturbance"), an orthopedic impairment, autism, traumatic brain injury, other health impairment, a specific learning disability, deaf-blindness, or multiple disabilities, and who, by reason thereof, needs special education and related services. (Individuals with Disabilities Education Act of 2004, 2018, § 300.8)

The parent/caregiver must consent to an evaluation and the school district has timelines to complete the evaluation to which they must adhere to be in compliance with federal regulations. Specifically, according to Chapter 14 - Special Education Services and Programs in Pennsylvania and Federal Regulations Part 300 of the IDEA (Pennsylvania Training and Technical Assistance Network, 2019c), the local education agency (LEA) must provide a *Permission to Evaluate-Evaluation Request* form to the parent/caregiver within ten calendar days from the initial request, whether orally or in writing. The LEA completes the initial evaluation and provides the parent/caregiver with a copy of the evaluation report (ER) within 60 calendar days. The evaluation includes information to determine if the student has one of the disabilities listed in IDEA's definition. A school psychologist may administer tests to determine skills and skill deficits. A hearing specialist administers hearing assessments for students with a suspected hearing loss to determine if a hearing loss is present and, if so, how it affects the student's learning. An evaluation from the doctor of the student with a health concern may be used. Reports from professionals in the areas of speech and language, physical therapy, occupational therapy, and/or vision may also be included if these are applicable (Pennsylvania Training and Technical Assistance Network [PaTTAN], 2018). Evaluation tests are dependent upon the needs of the student as they apply to the student's education. All information gathered from the evaluation process is included in the ER. The ER states the student's strengths; the student's needs; the presence of any disability; the need for special education; and recommendations about

the types of services needed to support the student with academics, communication, and access to daily life activities. The parent/caregiver receives the copy of the ER and a written notice including the parent/caregiver's right to agree or disagree with the findings. Then, within ten school days of the ER's issuance, a meeting to develop the student's Individualized Educational Program (IEP) occurs. The IEP must then be implemented immediately, no later than ten school days after parental/caregiver consent (Pennsylvania Training and Technical Assistance Network, 2019d). The evaluation process, along with the IEP process, is conducted at no cost to the parent/caregiver. Figure 3 presents a breakdown of the actions, responses, and timelines (Pennsylvania Training and Technical Assistance Network, 2019d).

Figure 3

Special Education Timeline

Action	Response	Timeline	
		School Days	Calendar Days
Parent **orally** requests an evaluation	LEA provides *Permission to Evaluate-Evaluation Request* for to the parent		10 days
Parent provides a written request for an evaluation	LEA agrees LEA provides *Permission to Evaluate-Consent* form & *Notice of Recommended Educational Placement/Prior Written Notice*		Within a reasonable amount of time, considered 10 days
LEA receives parental consent	LEA completes the initial evaluation, provides a copy of the *Evaluation Report* to the parent, & meets to present the report		60 days (the day after the last day in the spring term up to and including the day before the first day of school in the fall term are not counted)

Parent receives *Evaluation Report*	Individual Education Program (IEP) meeting is held and the IEP is developed	10 days unless parent signs a waiver	

Individualized Education Program Process

Once a student is identified as having a disability and that the disability impacts their access to the curriculum, communication, and daily life activities, then an individualized education program (IEP) is developed. The IEP is a plan that affords a student with a disability the right to a free and appropriate public education (FAPE). The delivery of instruction takes place in the student's least restrictive environment (LRE) where education can occur with non-disabled peers to the maximum extent possible. A multi-disciplinary team develops the IEP. The multi-disciplinary team consists of required team members: parent/caregiver, at least one special educator, at least one general educator, special education administrator/LEA representative, and related service providers as necessary (Pennsylvania Training and Technical Assistance Network, 2018). This is a legal document that must be followed because defines the student's individualized education. The IEP is organized into eight sections:

I. Special Considerations
II. Present Levels of Academic Achievement and Functional Performance
III. Transition Services
IV. Participation in State and Local Assessments
V. Goals and Objectives
VI. Special Education / Related Services / Supplementary Aids and Services / Program Modifications
VII. Educational Placement

VIII. Educational Environment Data (referred to as Penn Data in the state of Pennsylvania) (Pennsylvania Training and Technical Assistance Network [Pennsylvania Training and Technical Assistance Network], 2020a).

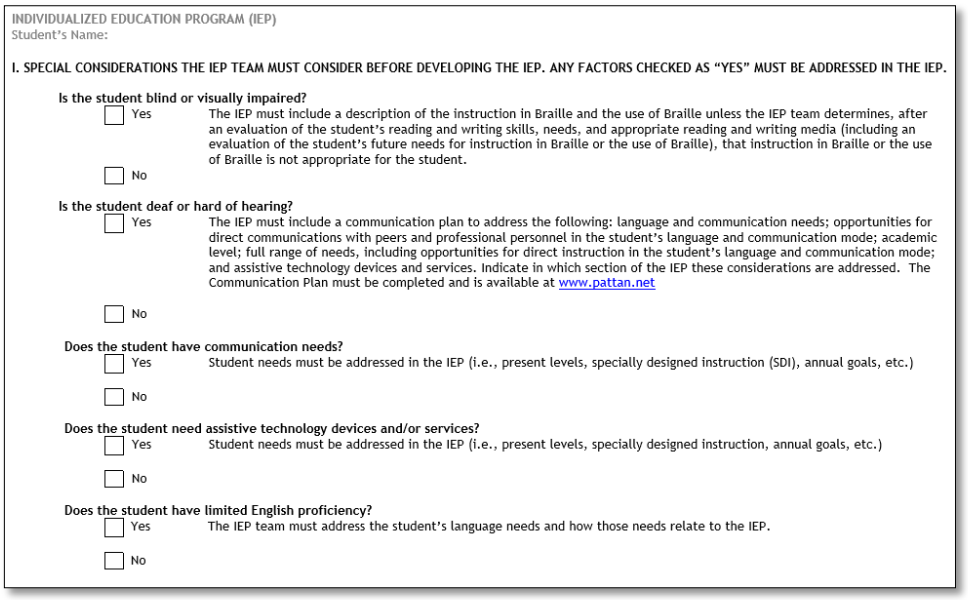
AT may be addressed in any and often appears in many of these sections.

The IEP process requires IEP teams to consider the use of AT to support the student in the Special Considerations section. See Figure 4 for an example of this section of the IEP. The IEP teams are procedurally required to respond with a *Yes* or *No* answer (Pennsylvania Training and Technical Assistance Network, 2020b). This is one area in which the researcher has observed confusion that can result in a disconnect across districts when answering this question. This compliance procedure presents a two-pronged barrier. The first prong of the barrier is in the compliance of checking the box for AT considerations. "The law does not define or describe what constitutes 'consideration' for any of the special factors or provide any guidelines on conducting a consideration process" (The QUIAT Leadership Team & CAST, 2015, p. 16). IDEA does not mandate which systematic procedure to use in determining the consideration and paperwork is not required to support the consideration (Edyburn, 2004). The second prong in the barrier is the inadequate training of professionals to be knowledgeable in AT consideration (Edyburn, 2004). There are misconceptions about AT tools, cost, implementation, and requirements. LEAs have indicated a misunderstanding that by checking the box they are responsible for providing AT, whether or not the student qualifies for and needs AT. In actuality, checking the box indicates that the team considered it. Therefore, interpretations of this section of the IEP vary and the *No* box is often checked by default. The result of this barrier is that students who need AT to be successful may not get it due to vague requirements and lack of

professionals' knowledge. When an LEA's IEP team is knowledgeable, the *Yes* box is checked, and the AT consideration or determination is included in a combination of IEP sections.

Figure 4

IEP - Special Education Considerations



INDIVIDUALIZED EDUCATION PROGRAM (IEP)
Student's Name:

I. SPECIAL CONSIDERATIONS THE IEP TEAM MUST CONSIDER BEFORE DEVELOPING THE IEP. ANY FACTORS CHECKED AS "YES" MUST BE ADDRESSED IN THE IEP.

Is the student blind or visually impaired?
☐ Yes — The IEP must include a description of the instruction in Braille and the use of Braille unless the IEP team determines, after an evaluation of the student's reading and writing skills, needs, and appropriate reading and writing media (including an evaluation of the student's future needs for instruction in Braille or the use of Braille), that instruction in Braille or the use of Braille is not appropriate for the student.
☐ No

Is the student deaf or hard of hearing?
☐ Yes — The IEP must include a communication plan to address the following: language and communication needs; opportunities for direct communications with peers and professional personnel in the student's language and communication mode; academic level; full range of needs, including opportunities for direct instruction in the student's language and communication mode; and assistive technology devices and services. Indicate in which section of the IEP these considerations are addressed. The Communication Plan must be completed and is available at www.pattan.net
☐ No

Does the student have communication needs?
☐ Yes — Student needs must be addressed in the IEP (i.e., present levels, specially designed instruction (SDI), annual goals, etc.)
☐ No

Does the student need assistive technology devices and/or services?
☐ Yes — Student needs must be addressed in the IEP (i.e., present levels, specially designed instruction, annual goals, etc.)
☐ No

Does the student have limited English proficiency?
☐ Yes — The IEP team must address the student's language needs and how those needs relate to the IEP.
☐ No

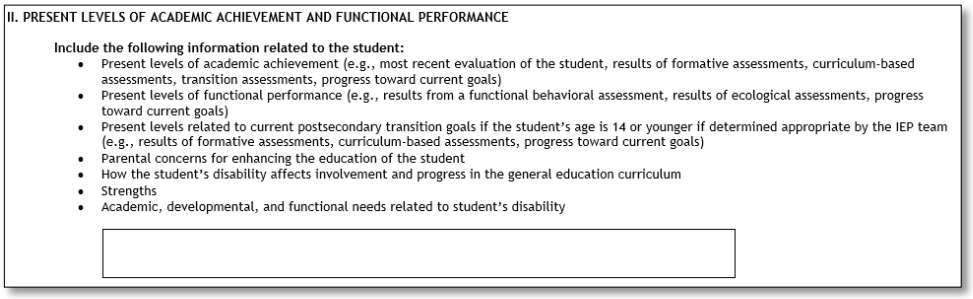
(Pennsylvania Training and Technical Assistance Network, 2020a, p. 5)

AT can then be addressed in section II, Present Levels of Academic Achievement and Functional Performance. In this section, documentation of the type of AT, outcomes, and implementation are listed. AT can next be documented in section III, Transition Services. Secondary transition planning and goals are included when students reach age 14. These goals are necessary to support the student in preparing for life beyond school to be successful in continuing education, vocation, living independently, and/or participating in activities (Pennsylvania Training and Technical Assistance Network, 2018; Pennsylvania Training and Technical Assistance Network, 2020b). Following this section, AT is identified as a support for local and state assessments. This leads into section V, Measurable Annual Goals. AT is entered into the IEP goal as a condition of the goal. The condition describes the situation under which the

goal will be achieved. AT is not the goal; rather, it is what the student will use to achieve the goal. It may also be included in section VI; Supplementary Aids and Services /Program Modifications. Here is where IEP teams can identify how and when the AT will be used throughout the day to support the student. AT is typically not included in the final two sections that address educational setting and the data for inclusion in the general education setting. Figures 5 through 8 show the IEP sections where AT can be documented.

Figure 5

IEP – Present Levels of Academic Achievement and Education Functional Performance



II. PRESENT LEVELS OF ACADEMIC ACHIEVEMENT AND FUNCTIONAL PERFORMANCE

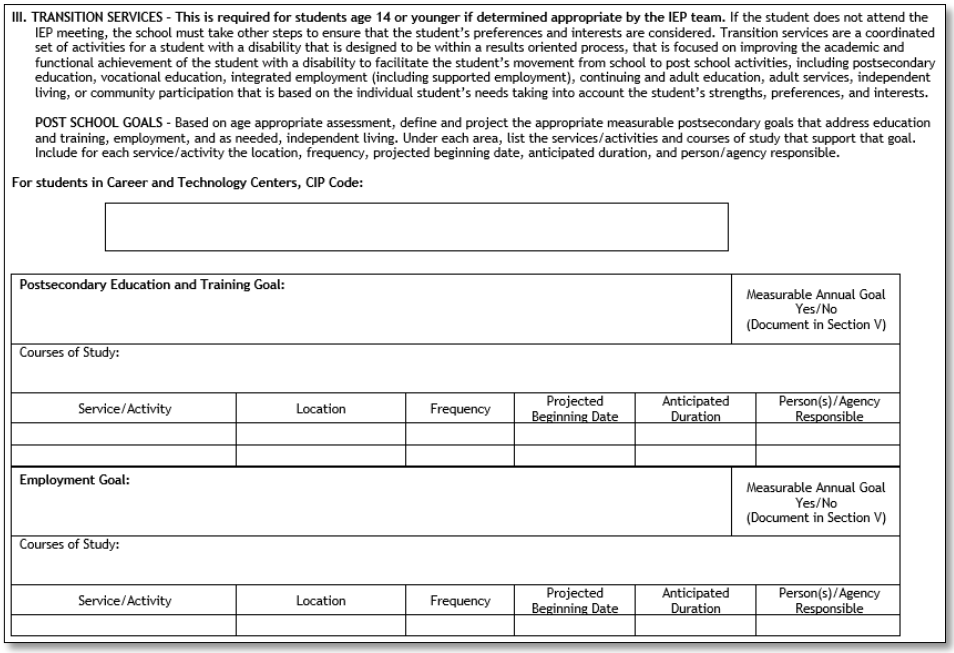
Include the following information related to the student:

- Present levels of academic achievement (e.g., most recent evaluation of the student, results of formative assessments, curriculum-based assessments, transition assessments, progress toward current goals)
- Present levels of functional performance (e.g., results from a functional behavioral assessment, results of ecological assessments, progress toward current goals)
- Present levels related to current postsecondary transition goals if the student's age is 14 or younger if determined appropriate by the IEP team (e.g., results of formative assessments, curriculum-based assessments, progress toward current goals)
- Parental concerns for enhancing the education of the student
- How the student's disability affects involvement and progress in the general education curriculum
- Strengths
- Academic, developmental, and functional needs related to student's disability

(Pennsylvania Training and Technical Assistance Network 2020a, p. 5)

Figure 6

IEP – Transition Services



III. TRANSITION SERVICES - This is required for students age 14 or younger if determined appropriate by the IEP team. If the student does not attend the IEP meeting, the school must take other steps to ensure that the student's preferences and interests are considered. Transition services are a coordinated set of activities for a student with a disability that is designed to be within a results oriented process, that is focused on improving the academic and functional achievement of the student with a disability to facilitate the student's movement from school to post school activities, including postsecondary education, vocational education, integrated employment (including supported employment), continuing and adult education, adult services, independent living, or community participation that is based on the individual student's needs taking into account the student's strengths, preferences, and interests.

POST SCHOOL GOALS - Based on age appropriate assessment, define and project the appropriate measurable postsecondary goals that address education and training, employment, and as needed, independent living. Under each area, list the services/activities and courses of study that support that goal. Include for each service/activity the location, frequency, projected beginning date, anticipated duration, and person/agency responsible.

For students in Career and Technology Centers, CIP Code:

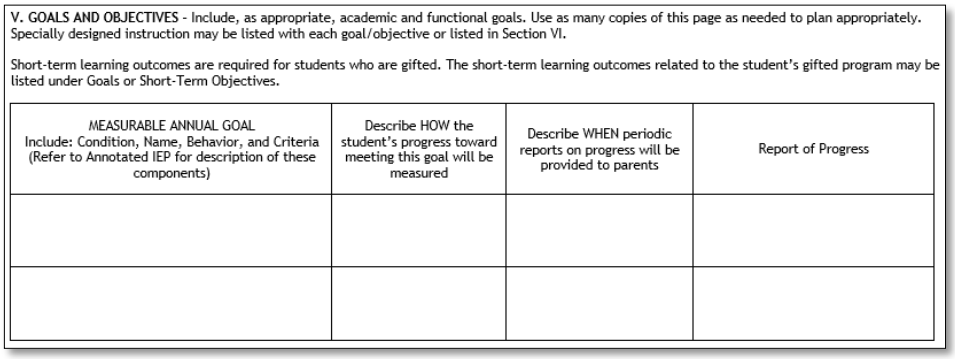
Postsecondary Education and Training Goal:					Measurable Annual Goal Yes/No (Document in Section V)
Courses of Study:					
Service/Activity	Location	Frequency	Projected Beginning Date	Anticipated Duration	Person(s)/Agency Responsible

Employment Goal:					Measurable Annual Goal Yes/No (Document in Section V)
Courses of Study:					
Service/Activity	Location	Frequency	Projected Beginning Date	Anticipated Duration	Person(s)/Agency Responsible

(Pennsylvania Training and Technical Assistance Network, 2020a, p. 7)

Figure 7

Goals and Objectives



V. GOALS AND OBJECTIVES - Include, as appropriate, academic and functional goals. Use as many copies of this page as needed to plan appropriately. Specially designed instruction may be listed with each goal/objective or listed in Section VI.

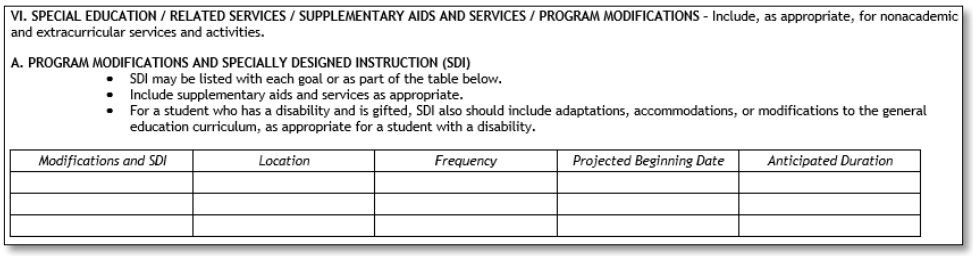
Short-term learning outcomes are required for students who are gifted. The short-term learning outcomes related to the student's gifted program may be listed under Goals or Short-Term Objectives.

MEASURABLE ANNUAL GOAL Include: Condition, Name, Behavior, and Criteria (Refer to Annotated IEP for description of these components)	Describe HOW the student's progress toward meeting this goal will be measured	Describe WHEN periodic reports on progress will be provided to parents	Report of Progress

(Pennsylvania Training and Technical Assistance Network, 2020a, p.14)

Figure 8

IEP – Special Education/Related Services/Supplementary Aids and Services/Program Modifications



VI. SPECIAL EDUCATION / RELATED SERVICES / SUPPLEMENTARY AIDS AND SERVICES / PROGRAM MODIFICATIONS - Include, as appropriate, for nonacademic and extracurricular services and activities.

A. PROGRAM MODIFICATIONS AND SPECIALLY DESIGNED INSTRUCTION (SDI)

- SDI may be listed with each goal or as part of the table below.
- Include supplementary aids and services as appropriate.
- For a student who has a disability and is gifted, SDI also should include adaptations, accommodations, or modifications to the general education curriculum, as appropriate for a student with a disability.

Modifications and SDI	*Location*	*Frequency*	*Projected Beginning Date*	*Anticipated Duration*

(Pennsylvania Training and Technical Assistance Network, 2020a, p. 15)

In summary, the initial evaluation and IEP process are designed to provide students with a free appropriate public education at no cost to the parents in the student's least restrictive environment with disabled and non-disabled peers. Individualized student programming incorporates supports to address needs with academics, social skills, and functional, daily living skills. Modifications, accommodations, and supports are included as a part of the IEP to ensure the student has access to tools needed to be successful. The IEP is implemented by educators who monitor goals and is reviewed no less than once a year to ensure educational benefit. As a part of the IEP process, AT needs to be considered for each student as a tool to support the student's access to curriculum, communication, and daily life and school activities. The consideration of AT in section I, Special Considerations, poses a barrier to AT. The barrier is in the interpretation of checking the *Yes* box indicating that the team considered AT. Confusion lies in the assumption that by checking the *Yes* box, the LEA is responsible to provide AT even if the student does not need AT. The intention of this section is for the team to have a discussion about the student's needs. If AT is not needed, then this information is documented in section II. Present Levels of Academic Achievement and Functional Performance. If AT is needed and the

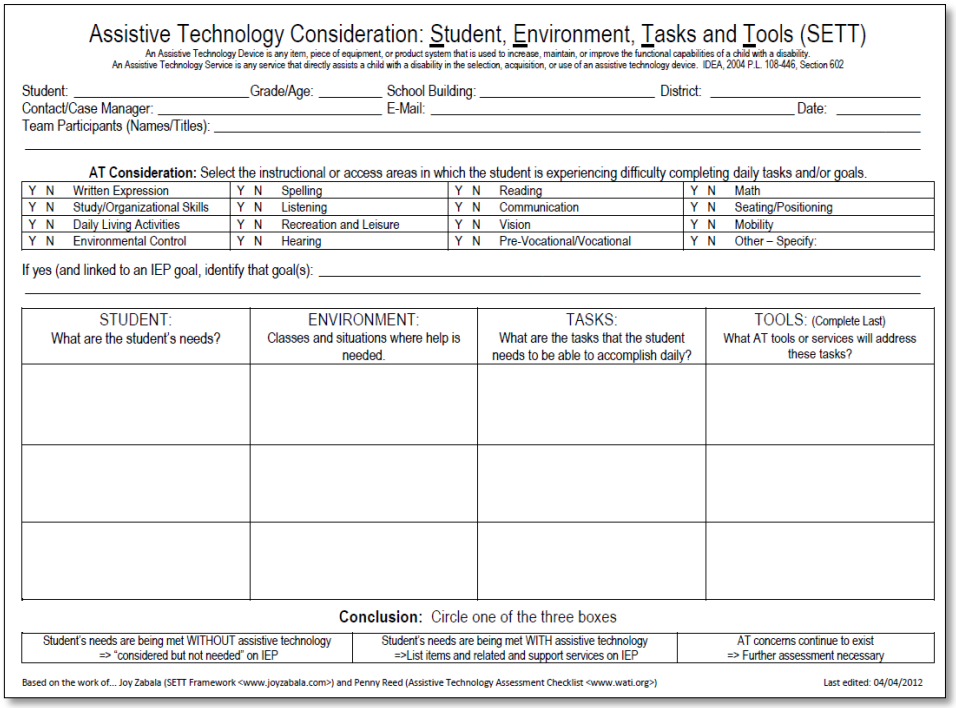
IEP team needs to explore AT options, then the IEP team proceeds to initiate the AT consultation with their district or through the training and consultation services provided by the county's intermediate unit.

Assistive Technology Process

The purpose of this section is to establish the process that is in place and used to determine AT. This study is not seeking to understand the effectiveness of the AT process. This study is seeking to gain insight into AT implementation after the device is acquired. The AT process widely used in the proposed research study's region, Allegheny County, is the Student, Environment(s), Tasks, and Tools (SETT) framework. SETT is a framework used to assist teams in gathering student information and organizing the data to make informed decisions. The SETT was created by Joy Zabala (2005). See Figure 9 for an example of a SETT document. SETT is supported by Pennsylvania's Training and Technical Assistance Network (PaTTAN) as an assessment tool to guide teams when making AT considerations and decisions (Pennsylvania Training and Technical Assistance Network, 2018; Pennsylvania Training and Technical Assistance Network, 2020b). The framework is sectioned into four parts, which guide decisions based on a broad range of tools and needs. Each area is broken down to collect specific pieces of related information that together provide the student with tools appropriate to his/her needs, strengths, abilities, and access. It is a student-centered, team-based approach that allows for flexibility in providing options because needs in one or more areas may change (Zabala, 2005).

Figure 9

Modified SETT Example



Assistive Technology Consideration: Student, Environment, Tasks and Tools (SETT)

An Assistive Technology Device is any item, piece of equipment, or product system that is used to increase, maintain, or improve the functional capabilities of a child with a disability.
An Assistive Technology Service is any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device. IDEA, 2004 P.L. 108-446, Section 602

Student: _____ Grade/Age: _____ School Building: _____ District: _____
Contact/Case Manager: _____ E-Mail: _____ Date: _____
Team Participants (Names/Titles): _____

AT Consideration: Select the instructional or access areas in which the student is experiencing difficulty completing daily tasks and/or goals.

Y N Written Expression	Y N Spelling	Y N Reading	Y N Math
Y N Study/Organizational Skills	Y N Listening	Y N Communication	Y N Seating/Positioning
Y N Daily Living Activities	Y N Recreation and Leisure	Y N Vision	Y N Mobility
Y N Environmental Control	Y N Hearing	Y N Pre-Vocational/Vocational	Y N Other – Specify:

If yes (and linked to an IEP goal, identify that goal(s): _____

STUDENT: What are the student's needs?	ENVIRONMENT: Classes and situations where help is needed.	TASKS: What are the tasks that the student needs to be able to accomplish daily?	TOOLS: (Complete Last) What AT tools or services will address these tasks?

Conclusion: Circle one of the three boxes

Student's needs are being met WITHOUT assistive technology => "considered but not needed" on IEP	Student's needs are being met WITH assistive technology =>List items and related and support services on IEP	AT concerns continue to exist => Further assessment necessary

Based on the work of... Joy Zabala (SETT Framework <www.joyzabala.com>) and Penny Reed (Assistive Technology Assessment Checklist <www.wati.org>) Last edited: 04/04/2012

(Greater Prairie Education Agency, 2012)

Each section of the SETT framework encourages teams to retrieve valuable pieces of data and information specific to that area for the student. When gathering information about the student, the team should consider the functional area of concern that may be addressed with assistive technology and the student's interests/preferences. In analyzing information about the environment, the IEP team should consider that the student may have different needs and/or strengths in different rooms/classes. The IEP team considers how the environment is physically arranged. Then they identify any concerns with the materials and note the expectations, perceptions, instructional styles, instructional needs, and attitudes of the people engaging with the student. The IEP team discusses the tasks, lessons, and activities related to communication, access, reading, and writing that the student is required to complete in all school environments.

Finally, the tools are the last area to explore as this is the area where the devices, services, strategies, accommodations, and trainings are discussed and implemented (Zabala, 2005).

Determining the appropriate AT tool requires a team effort with shared knowledge, collaboration, communication, and multiple perspectives (Zabala, 2005). An AT provider may support the teams by helping to identify appropriate tools and providing training and technical assistance. Selecting a tool is based on matching the tool's features with the student's immediate and long-term needs (DiGiovine et al., 2012). There are various ways the IEP team acquires the AT including renting or loaning from companies, loaning from state lending libraries, and/or downloading free trials. The AT process is ongoing as the team collects data, reviews it, and reaches a decision based on the outcome (Jones, 2014). Intervention plans, action plans, and reports may be used to document the results. Teams document the AT in the IEP ensuring that the needs are identified, and goals are created to address the needs with the use of the assistive technology (Georgia Department of Education, n.d.a).

The SETT provides the frame for gathering information, organizing information, and guiding teams with creating a plan of action. When documenting AT in the IEP, the educational term "intervention" is used instead of "treatment" because intervention implies an application of a strategy (Lenker et al., 2012). AT may include strategies as well as the tool. The use of the term "treatment" indicates a systematic protocol that is administered in a clinical setting. In the educational setting, action plans are used to map the steps, interventions, and outcomes when deciding on AT.

While AT research is plentiful, research supporting a single universal plan, protocol, or tool that captures all the critical elements met with a common theme does not seem to exist. Lenker et al. (2012) indicated that "there are no validated tools for quantifying the attributes of

AT services in a manner that will support outcomes research" (p. 60). Many models exist including the Human Activity Assistive Technology (HAAT), International Classification of Functioning, Disability and Health (ICF) (DiGiovine et al., 2012), Quality Indicators for AT (QIAT), Participant Assessment Framework (PAF), Wisconsin Assistive Technology Initiative (WATI), and Georgia Project for Assistive Technology (GPAT) (Jones, 2014). However, none of these is a universal tool that would work for all AT decisions, mainly due to the situational nature of individual student needs. Lenker et al. (2012) identified four successful domains in a conceptual framework when identifying AT: human, activity, AT, and environment. Each of these domains are reflected in the SETT framework, which is flexible enough to cover most aspects of the AT decision-making process. The domains work in unison to provide a well-rounded plan for implementing the AT in the educational setting. This proposed research study is not seeking to explore the effectiveness of the AT process. Rather, it is seeking to understand what happens after the process is completed and an AT tool is purchased.

Assistive Technology Tools in the School Setting

Definition of Assistive Technology

This section is dedicated to providing background information on AT devices, services, and technical assistance. The purpose is to describe the process for determining AT. This frames the proposed research in establishing that there are supports in place to enhance knowledge about AT and implementation. AT devices are tools that support students with disabilities with access to the curriculum and functional daily activities. It is decided upon by IEP teams on a case by case basis to read, write, communicate, and access the environment. Under IDEA 2004, AT is considered for each student with an IEP. The following section addresses the continuum of AT tools and areas of needs along with the AT tools.

The IDEA 2004 defines AT as a device:

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 term does not include a medical device that is surgically implanted, or the replacement of such device. (Individuals with Disabilities Education Act of 2004, 2018, § 300.5)

Also, The IDEA 2004 defines AT as a service:

(a) Assistive technology service means any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device.

(b) the evaluation of the needs of a child with a disability, including a functional evaluation of the child in the child's customary environment;

(c) purchasing, leasing, or otherwise providing for the acquisition of assistive technology devices by children with disabilities;

(d) selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or replacing assistive technology devices;

(e) coordinating and using other therapies, interventions, or services with assistive technology devices, such as those associated with existing education and rehabilitation plans and programs

(f) training or technical assistance for a child with a disability or, if appropriate, that child's family; and

(g) training or technical assistance for professionals (including individuals providing education or rehabilitation services), employers, or other individuals who provide

> services to, employ, or are otherwise substantially involved in the major life functions of that child. (Individuals with Disabilities Education Act of 2004, 2018, § 300.6)

AT tools have options for flexibility. AT runs along a continuum from no-tech to high-tech options. No-tech AT include procedures, strategies, and services such as occupational, physical, and speech therapy (Blackhurst, 2001). Lo-tech tools do not involve a lot of training. They are less expensive tools and may be those that are readily available. Examples of no-tech tools include post-it notes, large print text, specialized pens or pencils, paper-based communication boards, and page turners (Blackhurst, 2001; Georgia Department of Education, n.d.a). Mid-tech AT devices requires some amount of training and have basic moving parts which are mostly battery operated. These tools include books on CD, MP3 files, or on the computer; alternate keyboards; hand-held text scan pens; electronic organizers; and single or multiple message communication devices. High-tech AT tools include computer programs, communication devices that speak, and programs that turn printed text into speech and allow you to type on them (Blackhurst, 2001; Georgia Department of Education, n.d.a).

One barrier to properly defining AT is in the understanding of how a tool that can be used with all students is considered AT for a particular student. For example, a computer with a word processor and voice typing may be available to all students. For a student with an IEP and an identified need in writing, this widely available tool can be listed as the AT tool for that student when it is determined by the IEP team as an AT tool. Why? Because without that tool, the student is not able to demonstrate what they know at the level expected of them (Courtad & Bouck, 2013; Georgia Department of Education, n.d.a; Sullivan, 2019; The Understood Team, n.d.). This example illustrates the support the AT process and the SETT provide to the team in gathering data and determining how the tool and its function meets the needs of that student with

an IEP. Feature matching the tools capabilities to the student's needs is an aspect of the SETT framework which can assist with overcoming this barrier.

It is recommended that IEP teams consider a range of AT options, from no/low-tech to high-tech, to support a student's academic needs, communication needs, and/or access to the environment. Academic needs are identified in the IEP and can cover areas for reading, writing, communicating, and accessing the environment. See Appendix B for a comprehensive explanation and examples of AT tools for reading, writing, communicating, and access to the environment.

Training and Technical Assistance

This section aims to describe the process in place used to support IEP teams with AT needs. It demonstrates that there is an evidenced-based process in place, as well as support from a local education agency, which narrows the focus of the proposed research to the events after the tool is acquired.

In Pennsylvania, intermediate units provide training and technical assistance to local education agencies in selection, acquisition, and implementation of AT free of charge. This service was identified in the Technology-Related Assistance for Individuals with Disabilities Act of 1988. The researcher currently is one of three training and consultation coordinators for assistive technology (AT coordinator) for the Allegheny Intermediate Unit. As a part of the technical assistance offered to local educational agencies, the AT coordinator aids IEP teams by recommending AT tools and strategies and training IEP team members in the use of the AT. The AT process provided to IEP teams in Allegheny County, Pennsylvania entails using the SETT framework that focuses on the student, the environment, the tasks, and the tools. As previously explained, it is a person-centered process for collecting and analyzing information from the IEP

team about the student's needs in one or multiple environments to complete tasks with the use of a tool.

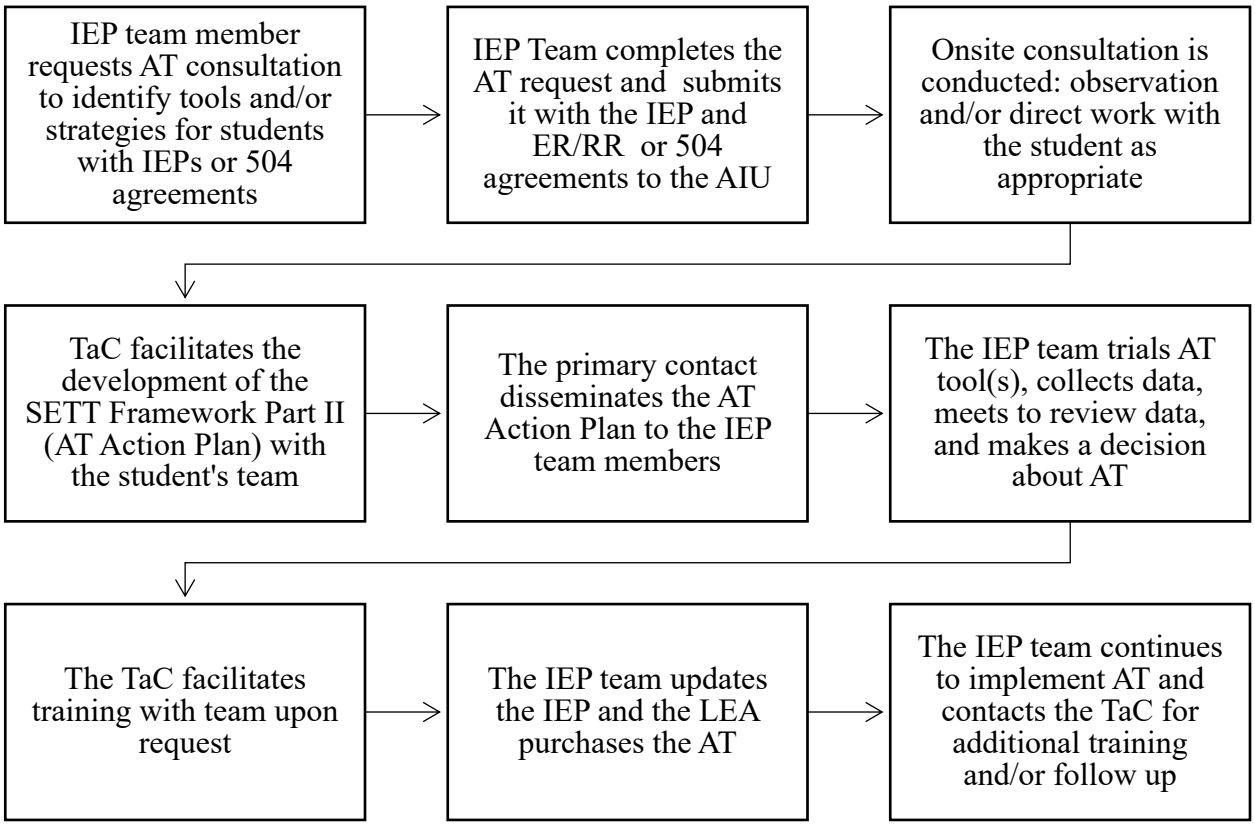
While there is a process in place, it is imperative to point out that researcher's role as an AT coordinator does not include providing direct services to the student. The primary role of the AT coordinator is to provide services to the IEP team members and build their capacity in the implementation of AT as a part of the IDEA, Part B, Section 611, Grants to States program (Office of Special Education Programs, 2019, 2020). Additionally, the requirement of training and technical assistance is identified in the Technology-Related Assistance for Individuals with Disabilities Act.

Figure 10 shows the AT process, which is initiated by the IEP Team. They complete the AT request form created by the Allegheny Intermediate Unit AT coordinators. This form is a modified SETT. The form is sent to the special education director, who sends it to the AT coordinator along with the student's IEP and evaluation report (ER)/re-evaluation report (RR) or a 504 service agreement. This process is discussed in more depth in Chapter 3. The AT coordinator then schedules the consultation. The AT coordinator reviews educational documents such as the IEP, ER/RR, the 504 service agreement, and/or other applicable documents. The AT coordinator observes the student in the subject where the area of need is present and then meets with the IEP team to develop a plan of action. The plan consists of the IEP team choosing tasks in the student's area of need (communicating, reading, writing, and/or accessing the environment), with the AT coordinator providing recommendations for tools and identifying strategies and resources as needed. Next, the IEP team members review the plan and choose a tool to trial. The IEP team determines the training that best meets their needs. Training options include training by the AT coordinator, formal training by the device company, training by the

local educational agency's technology staff, and/or self-directed training. Then, the IEP team trials the tool by implementing it. They collect data, meet to discuss the data, and reach a decision. Finally, the IEP is updated with information to support the need of the tool. It is then the local educational agency's responsibility to acquire the tool (Pennsylvania Training and Technical Assistance Network, 2019a). The AT coordinator provides the training and technical assistance to the team by making recommendations for AT, training on the use and implementation of AT, and providing follow up services. Using the SETT framework, the AT coordinator assists the team with identifying the student's needs in the environment in which the task is performed and tool(s) which can aid the student (Pennsylvania Training and Technical Assistance Network, 2019b). This is an iterative process because changes in any one of the four areas (student, environment, task, or tool) may necessitate a change in the AT. Therefore, follow up support is an essential part of the AT service provided by the AT coordinator at the request of the IEP team.

Figure 10

Special Education Evaluation Process



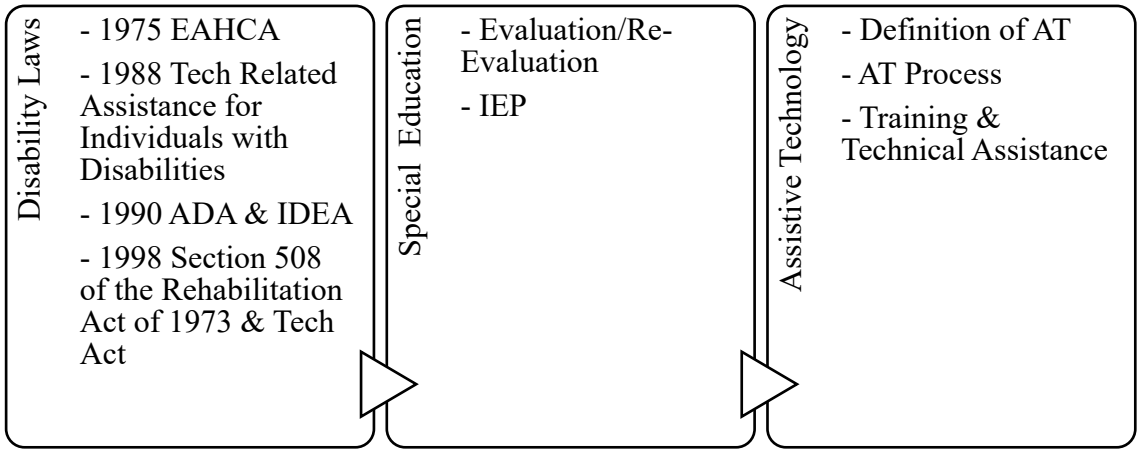
One note, local educational agencies may have their own staff who provide any and all of the services provided by the AT coordinator. They are not required by the law to use the intermediate unit's AT coordinator. It is a local education agency's decision on how to provide the AT services and tools to support students with special needs as identified and defined in the IEP. Through IDEA funding, the US Department of Education provides financial assistance to increase involvement of individuals and their families in the decisions related to the provision of AT devices and services, increase coordination among state and local agencies that are involved in carrying out activities involving AT, and increase and enhance skills and competencies of those who are involved in providing AT services (Assistive Technology Act of 1988, 1998).

Summary

AT is defined in education by the IDEA 2004 as both a tool and a service. Selection of the tool is based on the student's needs to access learning, communicate, and navigate their environment. AT services are as critical a component in the successful implementation and continued use in the educational setting as the tool itself. These training and technical assistance services are supported by the Assistive Technology Act of 1998 and the IDEA in the educational setting. The information presented in this section demonstrated how AT is infused in a variety of acts and laws that support persons with disabilities both in and outside of the educational setting. Moreover, there are educational processes in place that further enhance the implementation of AT in the educational setting. The IEP is the legal document that maps out the students individualized education programming and includes consideration of, provision of, and implementation of AT. There is an AT process that is evidence-based to support AT decision making. Figure 11 provides a visual of how these laws, acts, and processes are connected.

Figure 11

Laws, Special Education, and Assistive Technology



Barriers to Assistive Technology

The rate of AT abandonment ranges from 19.09% (Federici & Borsci, 2016) to 78% (Petrie et al., 2018) in the medical setting for hearing aids and mobility devices. The previous sections established the laws that require AT to be considered, purchased, and implemented as a part of the IEP process in the public schools. AT devices vary from no-tech to high-tech options. These are trialed and determined based on the data collected and reviewed by the IEP team. AT is also a service in which professionals provide various supports to IEP teams. Determining and purchasing an AT tool are aspects that have been researched. This study is seeking to understand what happens after the tool is acquired and how it is implemented to promote the student's access. Observational data have revealed that some educators discontinue the use of AT, that it gets abandoned, thus limiting the student's access to curriculum and hindering attainment of IEP goals. For other educators, it has been observed that they implement it. AT consideration is a requirement of the IEP process which is supported by a number of laws. These two observations are why this study is being proposed.

Research by Philips and Zhao (1993) and Copley and Ziviani (2004) acknowledged barriers to AT implementation as user's needs, user's changes, acquiring the device, inclusion of the user in the decision-making process, device performance, user's personal characteristics, acceptance of technology, procurement and management, staff training, and staff support. The following barriers are discussed further: User's needs, user's input, AT device, staff training and support, and preparation models.

User's Needs

Philips and Zhao (1993) noted in their study that abandonment occurred when the user's needs were no longer met by the device. The assessment process continues to be a barrier 13

years after it was stated in this study. Inadequate assessment and a planning process resulted in a mismatch between the user's needs, the environment in which it is used, and the tool (Federici & Borsci 2016; Copley & Ziviani, 2004). Assessment issues that arose included the lack of team involvement in the process, which resulted in the team discontinuing the use of the AT (Copley & Ziviani, 2004).

Factors that result in lower rates of abandonment included a well-designed process centered on the person, quality service delivery, and professional service on the use of AT (Federici & Borsci 2016). AT models have embedded elements of person-centered planning to address one or many of the barriers. The SETT (Zabala, 2005), Human Activity Assistive Technology (HAAT) model (Geisbrecht, 2013), Quality Indicators for Assistive Technology (QIAT) (Zabala et al., 2000), and the Wisconsin Assistive Technology Initiative (WATI) (Assistive Technology Consideration to Assessment, 2018) provide questions that address the areas of the user's needs. The SETT process is used with the school districts in the sample for this proposed research. As a part of the process the IEP team discusses the student's needs. When the needs change, the team is encouraged to request a follow up consultation.

User's Input

The inclusion of the user's opinion about the device was identified as a strong predictor of implementation success by Philips and Zhao (1993). Users tended to use the device more when their input was valued. When the user was not a part of the decision-making process, including adding an opinion or partaking in the process, then they were less likely to use the tool (Reimer-Reiss & Wacker, 2000). The user's perspective greatly affected the use or discontinued use of AT which can be explained using Rogers' theory of diffusion (Reimer-Reiss & Wacker, 2000).

Diffusion of innovation theory is a social science theory that asserted an "individual's perception(s) of the benefits and costs (relative advantages) of using an innovation will affect its rate of adoption or discontinuance" (Reimer-Reiss & Wacker, 2000, p. 48). When applied to AT, it suggests that when AT is implemented and yields success, then momentum continues. It is diffused through the team as a success and is adopted. When AT implementation does not meet with success, then the momentum is stalled, and the AT is abandoned or discontinued (LaMorte, 2019). The four stages to the diffusion of innovation theory correlate with implementing AT in the school setting: (a) awareness for the need of the innovation, (b) decision to adopt or reject, (c) initial use to test, and (d) continued use (LaMort, 2019).

An innovation can be defined as a technology, strategy, tool, design, and/or behavior (LaMorte, 2019; Sahin, 2006). "A technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome" (Sahin, 2091, p. 14). AT is inclusive in this definition as it can be a tool, software, hardware, and/or an intervention. Therefore, the user needs to have input in the decision to realize the tool's benefit and adopt it. The adoption of the tool by the user occurs when something different is done and his/her opinion was respected in the decision-making process (Sahin, 2006). Adoption of the tool may then spread from the team to a broader range of people by informing them of the advantages or disadvantages of the tool. According to Sahin's (2006) "Detailed Review of Rogers' Diffusion of Innovations Theory and Educational Technology-related Studies Based on Rogers' Theory," the consequence of the innovation can be classified as functional (adoption) or dysfunctional (discontinued use or abandonment). The communication channels through which the information is disseminated in the educational environment are interpersonal. Higher rates of adoption by a larger group of people occurs when the people share beliefs about the tool and its purpose in

education. Rejection occurs when there is a dissonance of ideas. The diffusion of innovation takes time, which factors into the process. Finally, the social system affects the outcome when a vision or goal is shared. In the school setting, this process is experienced when a new innovation is introduced into the environment. The initial and continued use is predicated on several factors, such as the are the opinions of the user, educators, and parent(s). If failure of the tool was experienced previously, then the likelihood of it being successful is low. If the tool was successful, then the likelihood of it being successful is high. The communication channel in the school bears information from teacher to teacher about the failure of a tool more so than the success (Sahin, 2006).

The inclusion of the user's opinion, when possible, can aid in the use or discontinued use of AT during the trialing stage and/or when a decision is made. It is not only the user's buy-in, it is also the team's perception of the tool and the tool itself that may affect the outcome.

AT Device

Various factors with the tool can contribute to its use or discontinued use. Factors include obtaining the tool to trial, performance of the tool, appropriateness of the tool, availability of funds to purchase, management and maintenance, and utilization. In the educational environment, under the provision of the Technology-Related Assistance for Individuals with Disabilities Act of 1988, states were mandated to provide options to deliver AT and to establish statewide AT loaning programs. This barrier has not entirely been removed as statewide lending libraries may experience lag times in providing requested tools. Furthermore, high costs and lack of funds became additional barriers (Copley & Ziviani, 2004). Device companies instituted lending and renting programs for trial devices with the incentive of deducting the cost for the rental from the purchase price of the device. Educational agencies may not use the claim that

they lack the funds to purchase a tool, as this is a violation of ADA. This was supported in a court decision in *Mills v D.C. Board of Education* (Donovan et al., 2021). The court ruled that education should not be denied due to student deficiencies and that the lack of funding was not an excuse. Therefore, educational agencies may not use this as an excuse to not provide what is needed.

Once the device has been procured, Copley and Ziviani (2004) found that managing the tool was a barrier for some teams because the focus was solely on the procurement and not on the student's ability to use it. Neither AT assessment tools nor data collection tools include criteria for how it is used across daily activities and/or environments. Teams may also experience difficulty with the AT's interaction with other tools and operating systems. Hidden costs can also add to the budget strain as a device is purchased. The educational agency may not be aware of or see the necessity of a warranty. Costs to maintain the device, such as subscription renewals or upgrades required, may not be accounted or planned for at the time of purchase. Device customization such as adding on additional tools to access the technology may not have been considered or identified during a trial phase.

Trialing the tool may lead the team to discover customizations and reveal the need for additional equipment or not. This depends on the design and features of the device and how it matches with the user's needs and abilities. Considerations noted during the trial may include the portability of the device, limits on its adaptability, complexity of the device, and its compatibility with the educational environment's hardware and software (Copley & Ziviani, 2004). These discoveries can uncover hidden costs for customization. Another barrier during the trial is when teams fall short with assessment tools if there is no systematic approach for assessing AT. Federice and Borsci (2016) applied the strengths, weaknesses, opportunities, and threats (SWOT)

assessment and provision process in their study of AT in the clinical setting. This approach, common in business and industry, was used in rehabilitation centers to analyze the tool, situation, and program. Federice and Borsci (2016) administered a SWOT analysis in health care centers one week after the AT was delivered, presented, and trained. The researchers determined that when the user was involved in the process, the abandonment rate was lowered. Their research concluded that there was strong data to support device functionality and user interaction when the user was included in the process. A contributing factor to the discontinued use of AT was not including the user in the decision making process. A consistent type of evaluation system such as the one used in Federice and Borsci's (2016) study is not evident in the educational setting. Decisions may be made inaccurately when there is not a reliable process in place to address the effectiveness or lack of effectiveness of the tool.

Two themes emerged thus far in barriers to effective AT implementation: the lack of a systematic process for assessment and decision making and the importance of the user's involvement in the process. Once the device is decided upon for trialing or use, it needs to be implemented. The environment in which it is utilized includes the physical space as well as the staff within it. The perceptions, attitudes, and knowledge of AT by the staff attribute to the acceptance of the device or its discontinued use and thus the diffusion of the innovation as positive in the former case or rejection in the latter.

Staff Training and Support

Training and technical assistance for professionals is identified in the federal definition of AT service, part F, for individuals who provide services to students who use AT. Training staff on the use of AT is a tri-fold barrier. First, teams are not afforded the amount of time necessary to learn the tool. Second, educator attitudes prohibit the implementation process. Third, the

content of the training is multi-faceted where time must be divided among addressing the student's needs, knowledge of the disability, hardware, software, access, applicability into daily routines, and data collection (Copley & Ziviani, 2004; LaMorte, 2019; Sahin 2006). One way to overcome this barrier is to use implementation science to aid with establishing a practice or protocol to for training.

Schedule constraints limit teams in blocking off time for training on the device, implementation, and student usage. Time also becomes a barrier when issues arise and troubleshooting malfunctions, compatibility issues, and breakage (Copley & Ziviani, 2004). Time is an issue in the learning process when educators are not allotted enough to fully learn the tool.

Educator attitudes affect outcomes when their needs are not fully met. Factors contributing to negative staff perspectives include lack of training suitable for school personnel. Training that does not encompass the purpose of the device as it relates to the student's goal(s) minimizes the ability to integrate and generalize skills (Copley & Ziviani, 2004). Training a limited team, with hopes that the team member will carry over the training to additional members, is a barrier. The key people who work with students daily often get the least amount of guidance with the AT. In addition to classroom teachers, educational assistants (EA) require the training to aid with implementation and use (Binger & Kent-Walsh, 2010), but they are often not included in AT training sessions. EAs' perceptions and knowledge of AT affects the outcomes as they are utilizing the supports with the student or for the student to provide access (Duffit & Weigert, 2018).

Content of training is vast and with limited time, critical components are eliminated. Professional development on the student and disability are key, but often times content is

reduced to how the device operates. Formal trainings may not always provide information on the skills needed to effectively use the technology. Educators' requests for on-going, on-site support are not made and therefore, not delivered. Eliminating key components of training and not providing assistance as requested fosters another barrier to the adoption of the innovation. Barriers to training, time, content, and key personnel lead to discontinued use of AT in the educational setting. Preparation programs and ongoing delivery service models available to teachers and EAs are insufficient even with the knowledge of evidence-based practices (EBP) and coaching.

Preparation Models

There are several models for AT consideration, each including evidence-based practices that can be implemented in training on how to use and implement the assistive technology. The coaching model and collegiate preparation courses offer opportunities to introduce and enhance knowledge and skills with implementing AT. This is an area in which the opportunity has been available but failed, thus contributing to high AT discontinuation.

Evidence-based practices (EBP) are specific focused intervention strategies (Odom, Cox & Brock, 2013), practices, interventions (Fixsen et al., 2005), and programs that yield effective outcomes (Cook & Odom, 2013). In order to be labeled EBP, they must meet and adhere to dimensions in research quality, design, and quantity. EBPs are used in instruction to facilitate learning. In this section, EBPs are referring to programs. Evidence-based programs operate within parameters and are used to interpret ways to converge several intervention practices within an organization (Fixsen et al. 2005). Evidence-based programs and EBPs share similarities as they have produced positive results when implemented as intended. In the educational organization, EBPs have been used by educators as well as administrators. Core

components in education include selecting high quality staff and providing them with preservice and in-service training (Fixsen et al., 2005) to ensure they are highly qualified, as mandated by NCLB (Lee, n.d.).

Limitations exist with EBPs, as they do not always work for everyone. There is not a "one size fits all." Therefore, when choosing an EBP for a program, IEP teams must choose those that work best for them. Noting that there exists a shortage of research into EBPs, therefore, a practice may not be as effective as the IEP team might hope because of the lack of research on that particular practice (Cook & Odom, 2013). EBPs that have results in the field of education that are underutilized in AT include coaching, vision, and leadership.

Coaching. Coaching is one practice that directly relates to teaching practice outcomes (Odom et al., 2013; Wise & Hammack, 2011). The purpose of coaching is to expand the capacity of a group or individual and facilitate the group or individual's development. Educational coaching has been recognized as successful in teaching and leadership practices as it has yielded improvements in student achievement (Wise & Hammack, 2011). It is one approach to provide continuing support to teams during the AT process, but the coaching model is not readily used in schools for AT. Rather it most often falls in the domains of literacy, mathematics, and curriculum. The outside expert model of AT training is widely used, but because the expert is not on staff and easily accessible in the building, employing this model alone rarely builds team capacity (DeCoste & Bowser, 2020). In contrast, coaches provide supports through regular communication and follow up with the educators as well as with the team (Wise & Hammack, 2011). This practice can serve to aid teams with answering questions about the device, implementation support, and having conversations about attitudes (Odom et al., 2013, Wise & Hammack, 2011). Jim Knight (2017) states that effective coaches have communication skills,

ability to assist with lesson planning, model practices, and have ongoing, reflective conversations with educators. A possible barrier to the coaching model is when a plan for professional development, feedback, and on-going supports are not mapped out clearly. Another limitation that coaching presents is that coaches are rarely utilized to train and support AT implementation.

Vision. Creating a common goal or a shared vision is a critical step in implementing an educational initiative (Knight, 2017; Leithwood et al., 2008; Odom et al., 2013). Once a common AT goal is established, teams can then begin to identify the student's needs, address how the AT will support that need, and monitor the progress across environments. The team uses planning meetings to review the data and make decisions. Without a shared goal or shared vision, the team can break down and AT is often abandoned.

Leadership. Classroom teaching is the primary influence on student learning, and school leadership is second (Leithwood et al., 2008). Staff motivation is influenced by school leaders. Furthermore, leadership impacts the effectiveness of the AT and the AT process. When leaders are not present in the AT process; are not involved in creating a shared vision; do not provide adequate time for training; are not reviewing student achievement data with teachers; and do not uphold the beliefs, values, and shared goals, then the risk to AT discontinued use is high (Leithwood et al., 2008; Wise & Hammack, 2011).

Educator Preparation Programs

Increasing teacher knowledge, practice, and skills in AT has been identified as a priority (Bausch & Hasselbring, 2004; Edyburn, 2015). Familiarity with AT, its use, and integration experience all aid in increasing teacher confidence (Van Laarhoven et al., 2012). However, there is a lack of certification programs in AT, and few preservice teaching programs include it in their course of study. In addition to special education degree programs, educational assistant (EA)

college programs also vary in the courses they offer on AT, specifically augmentative and alternative communication (AAC). Some classes that are offered are not taught by a professional in the field and are not using up-to-date information, according to research by Duffit and Weigert (2018). Lack of sufficient programming in preparation programs hinders the success of AT use by students with disabilities because lack of educator knowledge and skill results in relying on the expert model of AT services (DeCoste & Bowser, 2020). The expert model is inadequate in providing the number of services and supports needed in the educational setting. Due to the high number of services needing AT, services provided are limited to those students with the most significant, low incidence disabilities. The need for integrating AT into educator preparation programs has been established, yet another barrier presents itself: lack of qualified teachers and therapists in the AT field to deliver the instruction with confidence (Van Laarhoven et al., 2012).

Purpose

The purpose of this dissertation was to identify what factors are involved in using assistive technology in the school setting through a phenomenological qualitative inquiry. The researcher was interested in exploring educator efficacy with implementing assistive technology. The researcher sought to learn about practices that enable educators to continue to use AT or discontinue to use it. The researcher was interested in gaining an understanding of and insight into the practice of putting AT "on the shelf" after acquiring it in the school setting, thus the AT abandonment phenomenon.

Research Questions

The research questions this study addressed include:

1. How do educators learn to use and implement assistive technology?
2. What are educators' perceptions of the value of assistive technology?

3. Why is assistive technology able to be used by educators?
4. Why is assistive technology discontinued to be used by educators?

Need for the Study

The need for this study is to fill a gap in research by determining why assistive technologies are discontinued after trialing, training, and/or purchasing. The findings of this research may provide insights on the phenomenon putting assistive technology "on the shelf" and/or successes on how it is implemented. On a larger scale, the findings will be beneficial in providing information to districts seeking to implement technology as a part of the Universal Design for Learning (UDL) framework and/or within the Multi-Tiered Systems of Support (MTSS).

MTSS is a framework used to provide struggling students with supports and interventions for academics and behavior. It is designed to support students in catching up with their peers (Rosen, n.d.). MTSS is organized into multiple tiers. Tier 1 typically includes the whole class. Research-based methods and strategies are used with all students at this level. Students are screened to determine who is and who is not making progress with the supports put into place at this tier. Tier 2 includes students who are not making progress with the tier 1 supports. In addition to tier 1 supports, students in tier 2 are provided with small group instruction to target skills in need of further development. Tier 3 is intensive individualized supports. This is for students who are not making progress with tier 2 interventions and tier 1 supports. At this level instruction and intervention to support the targeted skills is delivered to small groups of students or individuals. If students are demonstrating a lack of progress in the three tiers, they may then be directed to be evaluated for special education. MTSS was designed to screen students early

and to deliver focused instruction quickly to those demonstrating difficulties with skill acquisition as opposed to addressing their needs after they fail (Rosen, n.d.).

Woven in the MTSS framework is the Universal Design for Learning Framework (UDL). UDL is a framework for providing access to tool and strategies. The UDL guidelines frame instructional planning so teachers can provide students multiple means of engagement, representation of information, and action & expression (CAST, 2018). These guidelines intend to remove barriers to the curriculum by offering options for the student to engage in their learning. UDL allows students to interact with information in a format that meets their interest. Finally, UDL supports learners with ways to show what was learned in a format that meets their interest and level of challenge. Implementing technology according to one or multiple principles of UDL within the MTSS framework aids in removing barriers by offering all students the opportunity to engage. This UDL and MTSS-based implementation is significant because it empowers the community of assistive technology providers to shore up the area(s) of need to ensure students are provided with the tools they need. Additionally, the significance might include what educators need for implementation, assessment, and continued use.

Summary

The legal mandates related to AT do not include specifics on how the information is gathered, provided, and implemented (Reed et al., 2009). The only legal provision in education is that AT be considered for each student and is documented in the IEP as a part of the IEP process. The team indicates that they considered it for the student. Then it is recorded in one or several areas of the IEP document including the Present Levels of Academic Achievement and Functional Performance, the Transition Plan, as a part of the IEP goal(s), Supplementary Aids and Services, Testing Accommodations, State-wide and District-wide Assessments, and/or

Instructional Modifications or Supports for School Personnel (Georgia Department of Education, n.d.a). Best practice recommends documenting the IEP with the features of the AT tool that has been chosen to support the student's need(s) rather than the specific tool name. It should include how it will be integrated into instruction, information about who is responsible for implementing, the supports needed to facilitate implementation, and how the effectiveness will be monitored within the appropriate area of the IEP (Georgia Department of Education, n.d.a). The IEP is the legal document that is implemented in a timely manner. Therefore, listing who will be responsible for maintaining and implementing AT is one way to reduce the chance it will be abandoned. This is one outlined process based on the SETT framework, which includes the areas necessary to provide quality AT services to students with disabilities.

This literature review set out to identify the barriers to successful assistive technology implementation within the process as well as within the procedures that are followed in the educational setting. Providing AT to students with disabilities in the educational environment requires a change in provision. The research reveals that it needs to move towards a capacity-building model and educators need to receive quality, effective instruction. The discontinued use of technology for a small number of students impacts how technology is used for a larger number of students. As the field of education shifts towards a multi-tiered support system, where technology tools are being infused into the foundational structure for all, what is learned from the provision of AT may provide insight on how to implement technology on a larger scale. The literature review supports the purpose of this dissertation, which was to identify what makes an educator effective in delivering assistive technology in the school setting through a phenomenological qualitative inquiry.

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this dissertation was to explore educator efficacy with implementing assistive technology (AT) in the school setting. The researcher posed the following questions to learn:

1. How do educators learn to use and implement assistive technology?
2. What are educators' perceptions of the value of assistive technology?
3. Why is assistive technology used by educators?
4. Why is assistive technology discontinued by educators?

The researcher's purpose was to learn why some educators continued to use and implement AT and others discontinued AT use and implementation in the school setting. She conducted a phenomenological qualitative inquiry using interviews with multiple participants. She was interested in finding the essence of a common phenomenon, use or discontinued use of AT, and understanding its meaning (Bloomberg & Volpe, 2019). This chapter includes an explanation of the research study including methodology, data collection, data analysis, site permission, presentation of results, and limitations.

Methodology

Phenomenological Qualitative Inquiry

The researcher conducted a qualitative inquiry using a phenomenological method of interviewing multiple participants. The qualitative inquiry design focused on an interpretive approach in which the researcher studied subjects and phenomena in their natural environment. The researcher's focus was on making sense of a phenomenon or experience and how it is

interpreted by the people who experienced it (Bloomberg & Volpe, 2019; Patton, 2015). Patton (2015) describes qualitative research as a design that studies how people make meaning out of experiences. Qualitative analysis is dedicated to determining what is meaningful to each person from an experience. It does this through interpretation of surveys, interviews, observations, and documents. The researcher chose this design because she sought to gain insight into the common phenomenon of using AT or discontinuing use of AT. Qualitative inquiry in research is about making sense of complex social situations, interpreting them, and gaining an understanding. It is concerned with examining social situations, cultures, interactions, and situations to attain a universal understanding of the event or phenomenon (Bloomberg & Volpe, 2019; Patton, 2015).

The core question of a phenomenological approach is "What is the meaning, structure, and essence of the lived experience of this phenomenon for this person or group of people?" (Patton, 2015, p. 115). This approach seeks to understand what individuals take away from an experience and how those takeaways vary from one person to another. The "essence" is the commonality of the experience, which is present in the phenomenon (Bloomberg & Volpe, 2019). Phenomenology may be either a philosophy or a method. Phenomenological qualitative inquiry is concerned with studying the meaning of a shared or lived experience in which the researcher is interested in learning about the essence of the experience. It is a way to examine what occurred with the underlying assumption that there is a commonality or essence of their experience. Each person shares the experience yet makes their own meaning. The researcher chose the phenomenon of the use or discontinued use of AT in the school setting by educators in multiple school districts. The researcher interviewed multiple participants to gain an insight into the multiple perspectives of phenomenon (Bloomberg & Volpe, 2019; Patton, 2015).

AT Acquisition

The purpose of this phenomenological inquiry was to understand why educators use or discontinue to use AT in the school setting after the AT is acquired. The researcher sought to describe how and why some educators used AT and others discontinued it, thus leading to abandonment. The AT acquisition process was not in question; however, it is valuable to know how AT is acquired prior to being used or discontinued. This section provides information about the AT process used by the researcher in determining AT and how the phenomenon occurs after acquisition and training.

Typically, the student and/or family goes through a process to determine the student's needs and what tool(s) is needed to address those identified needs. Students acquire AT in one of three ways. First, they may acquire it from an outside therapist using the student's or family's medical insurance. This process ensures that student or family owns the tool, and ideally, the outside therapist supports the family with using the tool. Second, the IEP team or school district already may already have an appropriate tool and knowledge of how to use it. Therefore, the IEP team implements it without requiring additional support in selecting a tool. Third, IEP teams may go through an AT process with the intermediate unit (IU). For background knowledge about this study, it will be helpful to understand the AT process the researcher uses, which is the SETT process.

The SETT Process

The process in determining AT used by the researcher in Allegheny County, Pennsylvania is the SETT framework. SETT is an acronym which stands for student, environment, tasks, and tools. SETT was developed by Joy Zabala (2005) as a person-centered process for collecting and analyzing information from the IEP team about the student's needs in

one or multiple environments to complete task(s) with the use of one or multiple assistive technology tools. In Allegheny County, the SETT process is a part of the AT consultation conducted by one of three AT coordinators for the Allegheny Intermediate Unit (AIU). SETT is used as a tool to facilitate the IEP team's discussions about the student's needs in completing one or multiple tasks across single or multiple environments. It is a team-based, person-centered approach used to answer questions about the student, environment, tasks, and tools. As the purpose of this research is to gain insight into why some educators are able to use AT and others discontinue it, it is valuable to know how AT is acquired prior to being used or discontinued.

AT Request

First, the team acquires and completes the AT request form. Please see Appendix C - Allegheny Intermediate Unit AT Consultation Request, SETT Part I. The AIU AT request (Bittner, Dougherty, & Tachoir, 2018) includes a modified SETT framework that begins on page 6 of the AT request form. It includes a table with three columns and five rows. The first column identifies the area (student, environment, task, and tools). The second column is labeled "What We Know" and the third column is labeled "What We Want to Know." Figure 11 shows the format of the modified SETT framework.

The team completes the form together and sends it to the special education director for an electronic signature. The special education director reviews the request, signs the request, and sends the request to one designated AT coordinator at the AIU along with the student's IEP and re-evaluation report (RR) or evaluation report (ER). That designated AT coordinator then forwards it to that district's AT coordinator and schedules the consultation. The AT coordinator reviews the AT request with respect to the areas identified in the SETT.

SETT Framework: Student

As shown in Figure 12, the first section of the AT request form requires the IEP team to identify the student's needs, what the student has difficulty doing independently, and the area(s) of need in academics, communication, functional skills, transition, and living skills. The team is encouraged to include information directly from the student about their preferences, limitations, expectations, and/or concerns. This guides the AT coordinator in learning about the student. Some of this information may be ascertained from the IEP, knowing the student, and asking the student. The goal is for the team to identify what the student has difficulty doing in the day-to-day interactions within the educational and/or home environments.

Figure 12

SETT–Student

SETT	WHAT WE ***KNOW*** ABOUT OUR STUDENT	WHAT WE ***NEED TO KNOW*** ABOUT OUR STUDENT
STUDENT **What does the student need to do but independent completion is difficult?** e.g. special needs& current abilities (related to areas to be addressed), expectations & concerns, student interests & preferences		

SETT Framework: Environment

The second section includes the environment, as shown in Figure 13. AT is an ongoing support because the student's needs change across environments. Barriers exist in varying environments. Barriers include physical arrangements of classrooms, materials, and the people involved in the student's education and interactions. The student's needs may include access to materials and equipment. These have the propensity to change from one class to another, which is why it is important to note them. Staff expectations and attitudes affect the student's

interactions with materials, content, instruction, and communication with peers and adults. Identification of the needs in particular environments provides information on where the student's needs occur and the barriers the student encounters when completing the task.

Figure 13

SETT–Environment

SETT	WHAT WE ***KNOW*** ABOUT OUR STUDENT	WHAT WE ***NEED TO KNOW*** ABOUT OUR STUDENT
ENVIRONMENTS **What is the impact on student performance across different environments?** e.g. instructional & physical arrangements, supports of staff & student, materials & equipment, access issues, attitudes & expectations of staff and family		

SETT Framework: Tasks

The tasks include specific events, activities, and/or lessons that the student needs to do in the natural environment. These are different from the IEP goals. IEP goals address annual outcomes for a student with special needs. Tasks are the day-to-day activities within a lesson or routine in which the student must communicate, participate in instruction, and/or demonstrate what was learned. When it comes to deciding on the AT tool, these areas are used to make recommendations on technology that best fits the routine tasks for which the student will be using the AT. See Figure 14 below for the Tasks section of the SETT framework.

Figure 14

SETT–Tasks

SETT	WHAT WE ***KNOW*** ABOUT OUR STUDENT	WHAT WE ***NEED TO KNOW*** ABOUT OUR STUDENT
TASKS **What SPECIFIC tasks occur in the student's natural environment to enable progress toward mastery of goals? What SPECIFIC tasks are *required* for active involvement?** e.g. communication, instruction, productivity, and participation		

SETT Framework: Tools

Tools are considered last in the SETT process because the tool supports the student within the environment to complete the task. The focus should be on the task, not the tool. As a part of the information collecting process, the teams are asked to list the no, low, and/or high-tech tools they have tried and/or have access to in the district. The intent is to gather information on what has already been tried and did not yield positive outcomes. The information gleaned from the Tools section of the SETT framework (Figure 15) enables the AT coordinator to ask further questions about the tool, its features, how it was used, and what is available. The team is responsible for investigating what is currently available in the district that can be used.

Figure 15

SETT–Tools

SETT	WHAT WE ***KNOW*** ABOUT OUR STUDENT	WHAT WE ***NEED TO KNOW*** ABOUT OUR STUDENT
TOOLS **By SPECIFIC name list all "NO-LOW-HIGH" tech options that have been trialed.** **Explain how they have or have not yielded positive outcomes.** *NOTE: Refer to the AT Considerations Checklists to complete this section*		

AT Consultation

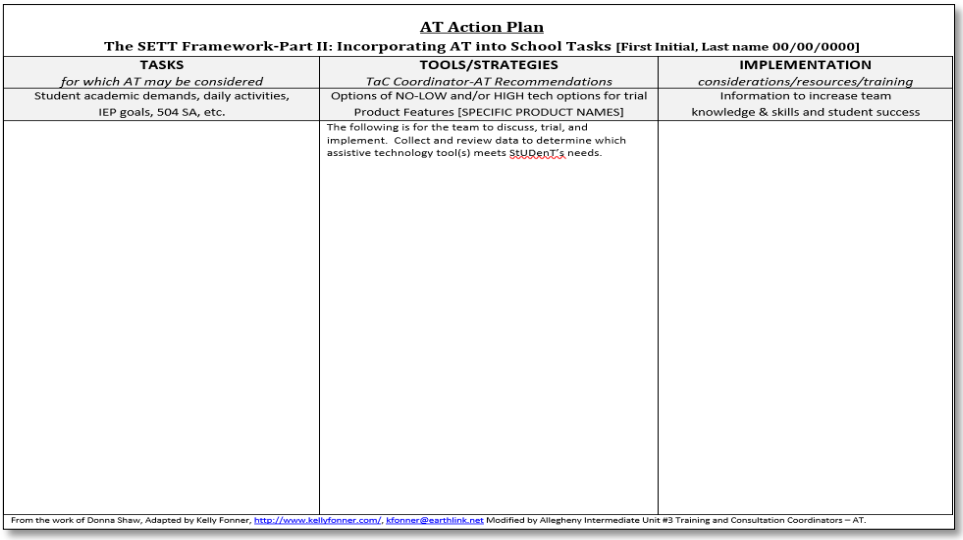
Upon receipt, the AT coordinator reviews the AT request, contacts the primary person, identified as the single point of contact, for the team, and schedules the initial consultation. The consultation consists of an observation of the student in the class where a need is present. The AT coordinator may also work with the educator by providing an AT tool to use within the lesson. The AT coordinator meets with at least two IEP team members to develop a plan of action. This is the same process described in Chapter 2.

AT Action Plan

IEP team members assemble for a meeting facilitated by the AT coordinator. During the meeting, the AT coordinator discusses the information gained from the request and observation. AT tools are discussed based on the student's needs and the features of the tool(s). The IEP team together with the AT coordinator completes an action plan. The AT coordinator writes up the action plan with the specific tasks identified by the team based on what the student needs to do. See Figure 16, Assistive Technology Action Plan. The AT tool to support the student with each task is listed, described, and linked to the vendor. In the Implementation column, the AT coordinator includes strategies for implementing the AT tool. The AT action plan is delivered to the identified primary contact and special education director by the AT coordinator in an encrypted email. Resources identified in the action plan are shared as an attachment and/or as a link in the email. The IEP team reviews the action plan and decides what tool(s) to trial. The IEP team is responsible for contacting the AT coordinator for training on using and/or implementing the tool.

Figure 16

Assistive Technology Action Plan



AT Action Plan

The SETT Framework-Part II: Incorporating AT into School Tasks [First Initial, Last name 00/00/0000]

TASKS *for which AT may be considered*	**TOOLS/STRATEGIES** *TaC Coordinator-AT Recommendations*	**IMPLEMENTATION** *considerations/resources/training*
Student academic demands, daily activities, IEP goals, 504 SA, etc.	Options of NO-LOW and/or HIGH tech options for trial Product Features [SPECIFIC PRODUCT NAMES]	Information to increase team knowledge & skills and student success
	The following is for the team to discuss, trial, and implement. Collect and review data to determine which assistive technology tool(s) meets StUDenT's needs.	

From the work of Donna Shaw, Adapted by Kelly Fonner, http://www.kellyfonner.com/, kfonner@earthlink.net Modified by Allegheny Intermediate Unit #3 Training and Consultation Coordinators – AT.

IEP teams are encouraged to contact the AT coordinator to schedule a training. The training is customized for the specific team. Consequently, they may attend a group product training, view a webinar, take an online learning from the company, view videos from YouTube or the company's website, use in-house staff such as the instructional technology staff, and/or ask the occupational therapists, speech language pathologists, and/or other teachers or administrators. Trainings may come at the time of trial or purchase depending on the needs of the IEP team. If the team is in the trialing phase, they implement it, collect, review, and reach a decision based on the data review.

Finally, the team reaches a decision and documents the student's IEP. This can be in various sections of the IEP including the Present Levels of Academic Achievement and Functional Performance (PLAAFP), as a part of an IEP goal, and/or as a specially designed instructional strategy. Once the IEP is documented, the AT is required to be procured and implemented. The AT coordinator is not responsible for decision making, implementation, and

purchasing. The AT coordinator supports the IEP team with training on the tool, training on implementation, and follow up on the student's needs per the IEP team's request to determine additional tools as requested, while maintaining a professional relationship and communication with the team. The school district has the responsibility to uphold the IEP, provide the tool (IDEA, 2004), and request the support of the AT coordinator.

In conclusion, AT procurement is a process that requires the IEP team to work together collaboratively. The SETT framework is one tool used to guide teams in figuring out what tool(s) the student needs within an environment to complete a task. The AT coordinator in the educational setting guides teams by making recommendations for tools and strategies, providing training and technical assistance, and supporting the team as requested. This research study was designed to gain insight into IEP teams' experience with AT. The significance of this research is in learning why a team used AT or abandoned AT for students who need AT to access their world. Without the AT, the student may not be able to participate in class discussions, learn, show what was learned, communicate, or engage in daily life activities.

Reflexivity & Bracketing

Qualitative inquiry includes the researcher as the tool to collect data (Cresswell & Poth, 2018). The researcher noted that she provides training and technical assistance to the districts from which the participants were selected. The researcher was aware that she needed to evaluate her personal biases and preconceived notions to avoid misinterpreting data, twisting the data, or making biased interpretations (Flipp, 2014). Thus, the researcher was aware that she needed to practice reflexivity and bracketing. Reflexivity is evaluating oneself while bracketing involves the process of setting aside one's own biases, preconceptions, and personal experiences on the topic (Flipp, 2014). The intent of bracketing is to be able to interpret the data objectively to

prevent the researcher's biases from making the data fit into the research topic and leading to a presupposed outcome. The researcher must remove or set aside her own past experiences, knowledge, and information gained about the research topic. The purpose is to view the data and reach conclusions based on the data collected and not through the lens of background knowledge, experiences, and/or biases.

Flipp (2014) introduced a three-step process on how to bracket using dialoguing, journaling, and reporting. Flipp (2014) recommends that the first step, dialoguing, should be for the researcher to have a conversation with other colleagues and/or researchers to discuss their experiences, knowledge, and biases. In the second step, journaling, the researcher captured her personal experiences with the participants, knowledge of the teams, and biases about the research topic in a journal. The researcher documented her biases that may have arisen during the data review, interpretation, and reporting of the data in the journal. This helped to keep the biases in check, thus ensuring that the interpretation was based on data and not on the researcher's thoughts. Third, the researcher documented this information in the dissertation to make the audience aware of her experiences, knowledge, and biases as the data were reviewed.

This phenomenological inquiry was built upon relationships made with the participants. The qualitative inquiry approach using interviews allowed the researcher to engage in conversations to gain an understanding. Therefore, it was essential that the researcher was the tool to gather the information. Furthermore, the research needed to ensure that her biases were controlled when interpreting the data.

Phenomenological Qualitative Inquiry

This research study was a phenomenological qualitative inquiry using interviews with multiple participants to learn more about the phenomenon of educator use or discontinued use of

AT. The researcher used semi-structured interviews to gain data to answer the following research questions about the phenomenon:

1. How do educators learn to use and implement assistive technology?
2. What are educators' perceptions of the value of assistive technology?
3. Why is assistive technology used by educators?
4. Why is assistive technology discontinued by educators?

An interview approach with multiple participants allowed the researcher to learn how IEP team members find out about AT and why AT is fully and sustainably implemented or discontinued. Multiple participants and multiple districts allowed for the various perspectives from IEP team members who experienced the same phenomenon. It provided insight and aided in generating an understanding of implementation practices at the IEP team level (Bloomberg & Volpe, 2019).

The researcher used the phenomenological qualitative inquiry approach and synthesized data from school IEP team members' interviews to identify common themes among educators' use and discontinued use of AT. The opportunity to interview participants from multiple districts provided depth and breadth to the research results. The researcher weighed other options, such as distributing surveys with an open request for educators to volunteer for an interview. Upon further review, this approach would not suit the intended research because the questions in the survey and interview would be redundant and detract from the relationships. Consequently, the researcher considered the challenges of instruction during the COVID-19 pandemic and chose an approach that was respectful of the educators' time.

The phenomenological qualitative inquiry with interviews allowed the researcher to gain insights into a common phenomenon, use or discontinued use of AT. The researcher provides

technical support to the participant districts for AT and has therefore established a professional working relationship with the IEP team members. The phenomenological qualitative inquiry approach allowed the researcher to focus on why AT was used or discontinued after the AT was acquired. Interviewing multiple educators from multiple districts allowed the researcher to discover themes and identify commonalities among multiple participants. Note that the results filtered into themes, patterns, and relationships. Results are not generalized across settings and participants (Cresswell & Poth, 2018) which is why a hypothesis was not supplied. The outcome of a phenomenological qualitative inquiry is to discover the essence of the phenomenon.

Location of the Research Study

The research was conducted live via Zoom meetings from the researcher's house in Westmoreland County, Pennsylvania. Participants were offered the option to be interviewed live via Zoom or complete the questions independently in writing via a Google Form. The questions for both platforms were the same. The participants indicated their preference when they agreed to participate in the research study. The researcher offered virtual options to be in compliance with their school district's health and safety plans because of the COVID-19 pandemic. The study included selected school districts in Allegheny County, Pennsylvania, where the researcher provides AT support.

Participant Selection for the Research Study

The phenomenological qualitative inquiry approach was determined to be the best approach to gain insight into the common phenomenon of AT use or discontinued use. The choice to interview multiple participants from multiple school districts enabled the researcher to learn about the common experience of multiple participants. The common experience included acquiring AT, learning how to use AT, and the decision to continue to use it with the students or

to discontinue it. The participants in the sample included educators who the researcher supports as an AT consultant for the use and implementation of AT for communication and/or literacy. The participants invited to participate were educators who were involved in AT implementation. The criteria to participate included four elements.

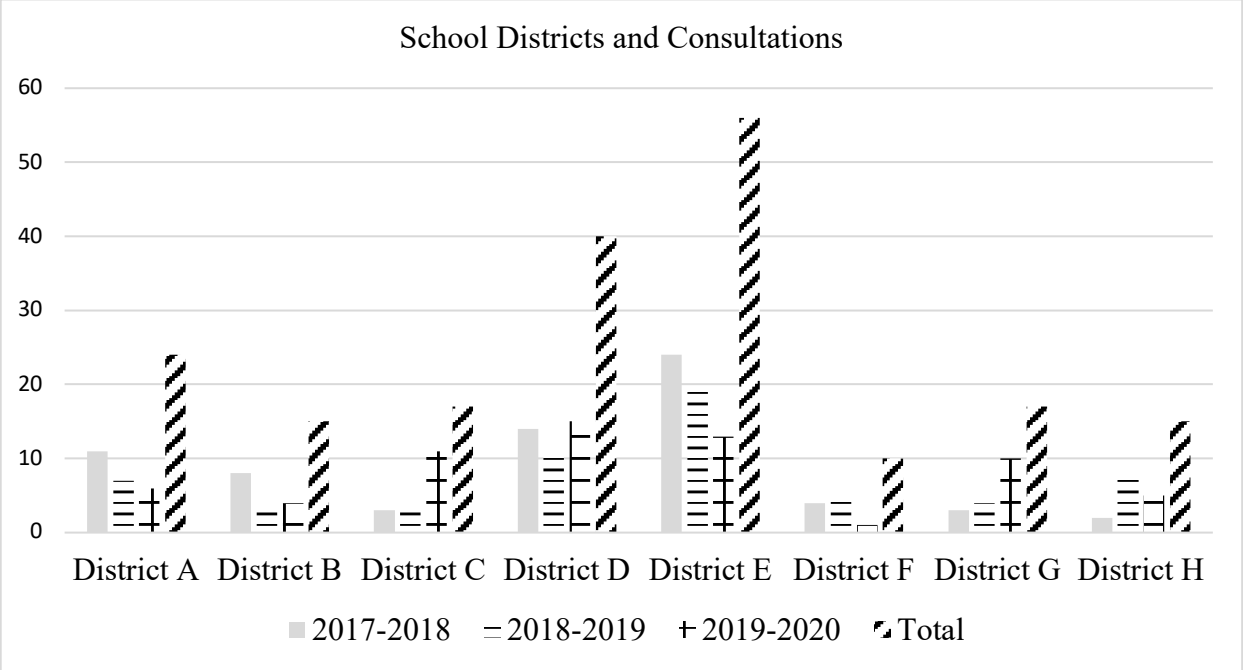
The first criterion was that the participants must be in Allegheny County, Pennsylvania and supported by the AIU. Allegheny County is comprised of 42 school districts. There are three AT coordinators at the AIU. The researcher provides AT training and technical assistance to 15 school districts. The researcher contacted eight school districts from the 15 districts served. The eight districts were selected based on technical assistance provided across multiple grades for three school years. The data were gathered from the 2017-2018, 2018-2019, and 2019-2020 school years. A school year is defined as beginning July 1st ending June 30th. It is noted that in the second half of the 2019-2020 school year, the number of consultations decreased due to school closures and the move to remote learning as a result of COVID-19. It is also noted that the AT process changed in the 2020-2021 school year which is why the range of school years was selected, to provide a larger scope of AT use, rather than just one year.

Criteria data included educators who were involved in the AT process for new consultations, follow up consultations, and/or received professional development. Educators are defined as special education teachers, general education teachers, para-educators/educational assistants, speech language pathologists, occupational therapists, and physical therapists. A new consultation is defined an initial consultation with the IEP team per the SETT process described earlier in this chapter. Follow up consultations are defined as supporting an IEP team with training on the AT tool, implementation, and/or reviewing of the student's needs. Follow up consultations are conducted in the school years after the school year when the initial consultation

was completed. Professional development includes district group trainings on AT or other topics requested by the school district. The districts varied in the number of new consultations, follow up consultations, and professional development sessions. The range of total services for new consultations, follow up consultations, and professional development sessions across the eight districts was from 10 to 56, as shown in Figure 17, School Districts and Consultations. For anonymity purposes, each district was assigned a letter for identification.

Figure 17

School Districts and Consultations



The demographics of the eight districts varied in the total number of students, percentage of students in special education (SE), and percent of students in the regular education class more than 40%. Information gained from the 2019-2020 Penn Data, the special education reporting system in Pennsylvania, disclosed that in the eight school districts, the total number of students enrolled ranged from 4,564 to 747. The percent of students in special education ranged from 14.2% to 28.8%. The percentage of students educated inside the regular education classroom

80% or more ranged from 83.4% to 55.9%. Additionally, the percent of African American (AA)/Black students in special education ranged from 2% to 68.5%. Table 1 shows the 2019-2020 Penn Data for the eight school districts included in this study's sample.

Table 1

2019 2020 Penn Data

SD	Total	SE	SE%	AA Black/ SE	Multi-racial/ SE	White/ SE	Inside regular ed more than 80%	Inside regular ed less than 40%
A	1,369	254	18.6%	11.2%/ 15.7%	11%/ 13.4%	70%/ 65.4%	55.9%	9.6%
B	2,339	525	22.4%	8.9%/ 11/8%	10.8% 11.8%	76.9%/ 72.6%	70.3%	8.4%
C	747	215	28.8%	66.4%/ 68.4%	1.9%/ 0	18.7%/ 221.4%	57.7%	9.6%
D	4,503	655	14.5%	3.6%/ 4.9%	4.6%/ 4.4%	85.1%/ 86.4%	79.5%	2.6%
E	4,564	660	14.5%	1.3%/ 2.0%	2.0%/ 3.3%	88.3%/ 88.8%	76.4%	9.6%
F	1,924	274	14.2%	3.7%/ 6.6%	6.7%/ 10.2%	84.5%/ 78.8%	69.7%	
G	3,311	826	24.9%	64.2%/ 67.2%	5.8%/ 5.0%	25.9%/ 24.2%	67.3%	20.1%
H	3,341	477	14.3%	2.7%/ 3.8%	4.5%/ 5.7%	88.1%/ 87.6%	83.4%	4.2%

Schools in the sample have IEP teams at the elementary and secondary school levels who support students with the implementation of AT. They have experiences with successful AT implementation and discontinued use. The researcher developed professional relationships with teams in each district. This is a critical element in qualitative inquiry. She weighed the pros and cons of expanding the invitation to participate to other districts not served by the researcher. She

rejected the idea because she does not have relationships with the other districts, which would negate a qualitative inquiry method. The researcher also decided against this option because she did not want to jeopardize the relationships the other two AT coordinators have with their districts. Relationships are hallmark in qualitative inquiry; therefore, the participants chosen included those served by the researcher and not her colleagues.

Second included the criteria for the type of AT used in the school setting. The researcher decided to invite participants who have experience with AT for communication, reading, and/or writing. The researcher decided to use these categories of AT due to their high rates of use in the school system. AT for vision only, such as Braille machines, closed circuit TVs, and screen readers, is supported by the vision department at the Allegheny Intermediate Unit. These technologies are taught to students by the teacher of the visually impaired as a part of a direct service. The AT coordinator does not provide direct services to students. Rather, the AT coordinator teaches the educators how to use and implement the AT. Therefore, relationships with student IEP teams who use vision technology exclusively are not established. Relationship is at the core of qualitative inquiry, and vision AT was excluded from this research because those relationships with educators have not been established.

Third required that the educators invited to participate varied in their roles and must work or have worked directly with the student and their AT. Invited educators included general education teachers, special education teachers, educational assistants, speech therapists, occupational therapists, and/or physical therapists. These educators were invited to participate because they work directly with the student, have worked with the AT coordinator, and support AT implementation. The researcher invited eight out of 15 school districts in Allegheny County

whom she supports by providing training and technical assistance to participate in the study. The participants were explicitly informed that participation was voluntary.

Phenomenological qualitative inquiry is strengthened through the researcher's relationship with the participants. The varied roles of participants in the districts provided depth of data collected and breadth on the phenomenon of using or discontinuing to use AT. Four out of eight school districts responded positively. They were identified as Districts A, B, C, and D.

Proposed Research Study Process

Sampling Process

The researcher conducted the phenomenological qualitative inquiry using semi-structured interview questions. Participants from consenting districts who used AT, who support elementary and/or secondary classes, were invited to be interviewed. A multi-step process was used to invite and interview teams, as described in the previous section. Four districts confirmed their consent to participate in the study. The research process is described in this section.

First, the researcher mailed a written correspondence to the eight districts' superintendents. The correspondence included a cover letter that introduced the researcher and the study, two copies of Slippery Rock University's Invitation to Participate and Informed Consent forms, and a self-addressed stamped returned envelope. See Appendix D, District Correspondences – Invitation to Superintendent. Four districts confirmed their participation, Districts A, B, C, and D.

Second, an electronic thank you for confirming their participation in the study was emailed to the superintendent or designee. When the Internal Review Board (IRB) approved the research, the researcher emailed the superintendent or designee with the names of the educators selected for interviews. See Appendix D, School District Correspondences – Acceptance to the

Study. Third, the researcher sent an informative email to the principal(s) and special education director including information them about the study, superintendent's approval, and included educators' names as a courtesy. See Appendix D, School District Correspondences – Information to District Personnel.

Fourth, the invitation to the participants was emailed out. It included a description of the study, an attachment with Slippery Rock University's Invitation to Participate and Informed Consent, requested scheduling information, and asked their preference for the interview should they choose to participate. Out of 35 invitations emailed, 11 participants responded that they wanted to participate.

Fifth, upon receipt of the participants' consent, they were thanked and confirmed the interview. Several who were missing information were asked for details such as scheduling a date/time, preference for the interview format (Zoom for a live interview or Google Form for independent completion), and/or to return Slippery Rock University's Invitation to Participate and Informed Consent. Participants were informed that they would receive a small token of appreciation (a gift card to a retailer or restaurant). Appendix D, District Correspondences – Invitation to Participants contains the participant informed consent form.

Sixth, the researcher contacted the participants via their chosen option and conducted a semi-structured interview with a set of questions and probing questions (Appendix E). Seventh, the researcher mailed the participants a thank you and the token of their choosing. See Appendix D, District Correspondences – Thank You to Participants. Finally, the researcher sent a thank you to the participating school's superintendent, principal, and special education director.

Interview Process

The semi-structured interview structure was used to provide opportunities to explore the experience in more detail. The interview protocol (Appendix E) included a set of questions to gain demographic information about the number of years in education, number of years working with AT, types of AT, grade level, and number of students using AT currently and in the past three school years. In-depth questions delved into topics relevant to answering the study's research questions. Appendix F provides a matrix of research questions and corresponding interview questions to demonstrate how the interview questions align with the research questions.

The researcher provided the participants with two options to participate. The first option was a live interview via Zoom with a recording of the audio. The researcher recorded the Zoom call on her personal computer, which is password protected and only accessible to the researcher. The audio recording was transcribed by the researcher, assigned a code to identify the participant, and deleted. The second option was to complete a questionnaire via a Google Form. The questionnaire included the interview questions and probing questions. The researcher used an extension, Mote, to audio record the questions and directions then embed the recording in the Google form. This allowed the participant to hear how the researcher asked the questions and gave an opportunity maintain a personal connection.

The participants' privacy was protected. Each participant was given an alpha-numeric identifier. The letter indicated the educator's district, and the number identified the participant based on the order in which the interview was scheduled. For example, A1 was given to the first person interviewed in District A. All personal and identifiable information was omitted from the transcripts. Recordings were transcribed, and the participant had the opportunity to rescind their

interview at the close of the interview. During the live interviews, the participants were provided the opportunity to stop the recording at any point and asked if they wanted to remove any comments.

The researcher chose to use interviews because they allowed the participants to engage in a meaningful conversation in which they would have the opportunity to share their experiences. Interviews are a way to understand people's perspectives about the experience (Patton, 2015). Educators are key stakeholders in this research and in instructing students. Their insight gained from the interview or questionnaire provided valuable information.

Timeline for the Research Study

The timeline for this research study required that data collection be completed by the end of August 2021. The researcher completed two IRB classes offered through the online CITI Program in July 2020. The Human Subjects Research, Students Conducting No More than Minimal Risk Research, 1-Basic Course was completed on July 6, 2020. The Revised Common Rule, 1-Basic Course was completed on July 9, 2020. See Appendix G for IRB Certificates. In accordance with Slippery Rock University's IRB process, the researcher invited the eight school districts to participate to secure their commitment in February 2021. The researcher successfully defended her proposal and applied for an Expedited IRB approval in May 2021. IRB approval was received in June 2021. The researcher contacted the districts and began recruiting participants on June 22, 2021. Interviews were conducted between the end of June 2021 and the end of August 2021.

Data Collection

The researcher used semi-structured interview questions to gather data. Interviews were conducted live, via Zoom and from the Google Form. The interview protocol was comprised of 14 questions that related to the proposed research study's questions:

1. How do educators learn to use and implement assistive technology?
2. What are educators' perceptions of the value of assistive technology?
3. Why is assistive technology used by educators?
4. Why is assistive technology discontinued by educators?

The interview and questionnaire questions, created by the researcher, were identical. The researcher asked three AT coordinators to the questions and made changes based on their feedback and suggestions to broaden the reach of the data collected, as the questions were originally too narrow in scope. The interview questions are located in Appendix E. The following section will discuss the rationale behind the questions and how they are related to the research shared in the literature review from Chapter 2.

The interview began with an overview of the topics. The first set of questions addressed gaining demographic information including their area of concentration, years in education, and information on working with assistive technology. These questions eased the participant into the interview and reduced stress and anxiety. The purpose was to ground the participant by asking them for background information and then their reason for working with students with special needs. Open-ended questions were used to gather this information.

The second set of questions addressed their experience with the AT process, their role in it, the student and family's role in it, and the type of support they received from their administrator. These questions related to the research on the user's needs and user's input when

determining. The questions asked about inclusion of the AT user and their family in the process. Administrator support was also included in the questions, as this was threaded all through the AT process, the IEP process, logistical support with procuring the device, securing staff training and support, and overall functioning within the school setting, and leadership.

The third group of questions explored the participants' learning experiences and learning preferences. These were used to connect to the research about the AT device and staff training and support. The researcher was interested in learning how the participant learned to use and implement the AT, what type of learning experience worked best for them, and how they defined AT. Learning opportunities were identified in the research as lacking in the higher educational system. Therefore, by asking these questions, the researcher was aiming gain an understanding of the participant's learning process and what preparation model works best when delivering support.

The fourth set of questions delved into the participants' perspectives on AT. These questions were aimed at the participant sharing their thoughts and voice on the advantages and disadvantages of using AT with their students. Probing questions asked for more details about what affected the outcomes of the use or discontinued use of AT. These questions directly relate to the study's research questions about learning why educators use or discontinue to use AT in the school setting.

Finally, the fifth set of questions invited the participant to share their thoughts, concerns, comments, and to add additional information. These were provided to invite the participant to share any other information that may be relevant to the study or to their experience. They afforded the participant the opportunity to have their voice heard, which is at the heart of phenomenological qualitative inquiry.

The researcher interviewed the participants to hear about their experiences to learn why they as educators use or discontinue to use AT in the school setting. The interviews were recorded, transcribed, and deleted after they were labeled with a participant code. The interview process was approximately 50 minutes. The time to complete it was based on the participant's level of detail in responding to the questions. The information was collected from each question and added to one main document for coding and analysis.

Data Analysis and Interpretation

The interviews were transcribed, and the written responses were added to one main document for the data analysis. The main document included the question and each participant's answer to that question. The participant was identified by their code (District letter and interviewee number, e.g., A1). The researcher used a four-step procedure to process and analyze the data. Data analysis is an iterative process which is the purpose the researcher used the four-step process mapped by Bloomberg and Volpe (2019):

Step I: Review and explore data for big ideas. The researcher read the transcripts line by line and took notes using a deductive coding approach to identify the big ideas. The big ideas from the answers aligned with the interview questions. The researcher used an in vivo coding system to take notes as opposed to summarizing in her own words. The researcher recorded the participants' own words, to capture and identify the essence of each question. This approach was chosen to reduce the researcher's bias when interpreting the data. Using the words from the participants allowed the researcher to avoid making assumptions about what the participant was or was not saying. Therefore, reducing the risk of misinterpreting the data. The quotes were transferred to a word processing document, categorized into the big ideas derived from the deductive coding approach, and labeled.

Step II: Re-read and examine data. In this step the researcher color coded responses to derive themes for each interview question. An inductive data coding approach was used to ascertain themes from the responses. While most of the responses answered the questions, overall themes began to emerge in response to each question. The themes helped reduce the data into manageable chunks. Themes were determined based on the number of times a similar response was recorded. The researcher identified the theme when the response was repeated three or more times. The researcher tallied and identified the themes, which will be presented in Chapter 4.

Step III: Report findings by formulating statements with the findings, quoting participants, and summarizing key findings. The results of the first three steps are expanded in Chapter 4.

Step IV: Interpret findings. Interpretations of the data is discussed further in Chapter 5. This is where the researcher synthesized findings and will link them to the literature.

Tools used for coding included physical highlighters. The researcher printed out the transcripts and read them initially to establish common categories and themes. The participants' words were used exclusively. For each question, responses were color coded based on a common category. They were tallied and then themes were noted when the response repeated more than three times. The researcher also used a spreadsheet to categorize the answers electronically. This part of the data analysis was dedicated to identifying recurring patterns. Themes were coded, data from interviews were triangulated with students' AT Action Plans and professional development, and then linked to the research presented in the literature review.

Site Permission

Permissions were ascertained from the district superintendent or a designee via a written correspondence prior to Slippery Rock University's IRB review per their designated process. The researcher sent out a packet that included a cover letter with a brief explanation of the research, two copies of Slippery Rock University's Invitation to Participate in a Research Study and Informed Consent form, and a self-addressed, stamped envelope to return the signed copy. Upon IRB approval, an email was sent to the superintendent indicating that the research would commence. An additional email was sent to the director of special education and the building principal informing them of the study and approval by the superintendent. Finally, an email was sent to invite the participants. Appendix D, School District Correspondences houses the communications.

Presentation of Results

Research results will be presented to the dissertation committee in narrative form with tables and figures to represent themes, if appropriate. Districts and participants were informed that they may have access to the results upon request. They were also informed that the information gained from the study will be used for educational purposes including the dissertation, presentation of the dissertation, and publication of the dissertation. Participant names, school names, and student names were removed to keep the participants' identity anonymous, ensuring that their honest responses will not impact their jobs. Results shared will include the themes discovered from the qualitative inquiry. Results will also be shared with the AIU AT coordinators, per their request, to enhance adult learning ensuring students will have access to their AT to participate in their educational programs.

Limitations

The researcher chose to use the interview method to elicit personal experiences from the participants in using or discontinuing the use of AT. The researcher recognizes the limitations of the outlined method. First, the participating districts would have received training and technical assistance from the researcher. This could include consultations, individual trainings, team trainings, school trainings, and/or large group trainings. The limitation is that the researcher has past experiences with team members and knowledge of their skills and abilities. The researcher addressed this in the bracketing section. The researcher included team knowledge, perspectives on tools, experience with the variety of tools, use and discontinued use in the bracketing journal to prevent misinterpreting data collected from the interviews. The researcher also recognized that she needed to maintain a professional relationship with the participant beyond the research study. Therefore, the researcher ensured the participant that the information received will be secured and that anything said in the interview will not be used against the participant in any way to jeopardize their employment or professional relationship with the researcher in the future.

Summary

This chapter set forth to describe the step by step process the researcher used to gain insight into the phenomenon of using or discontinuing the use of AT post training. The researcher chose to do a phenomenological qualitative inquiry using interviews with multiple participants. Because qualitative inquiry is built on relationships, the researcher chose to interview participants with whom she has a working relationship. The interview is a vehicle to enhance established relationships with the participants. The conversation with a known person allows both the researcher and participant to expand upon a professional rapport and provides the opportunity for the team member to be heard. Information gained from the interviews were

manually coded for common themes which will be used to gain an insight on why some educators use or discontinue to use AT post acquisition. The intent is to identify those patterns and learn how to best support adult learners with learning how to implement technology on a wider scale to support access for all students. The next chapter will discuss the results of the data collected from the outlined procedure.

CHAPTER 4

FINDINGS

Introduction

The purpose of this phenomenological qualitative inquiry was to learn why AT is used with students or discontinued and abandoned in the school setting. Chapter 4 is dedicated to reporting the findings from the semi-structured interviews and questionnaire. Data were analyzed and organized into categories and themes to provide insights into the phenomenon of AT abandonment in the school setting. Themes emerged that detailed the role the educator plays in the AT process, explained how they gained skills and knowledge to implement AT, conveyed their perspectives, and addressed their efficacy in implementing AT. The themes supported the four research questions this project posed to answer:

1. How do educators learn to use and implement assistive technology?
2. What are educators' perceptions of the value of assistive technology?
3. Why is assistive technology used by educators?
4. Why is assistive technology discontinued by educators?

The main findings for each question are represented in tables. As the research methodology is qualitative in nature, the table provides a visual display of the themes generated from the findings. The tables do not suggest quantitative data.

Phenomenological Qualitative Inquiry Findings

The researcher reviewed the data per the four-step process identified by Bloomberg & Volpe (2019):

- Step I Review and Explore for Big Ideas
- Step II: Re-read and Examine the Data

- Step III: Report Findings
- Step IV: Interpret the Findings (presented in Chapter 5).

The researcher reviewed the interview transcripts and noted key ideas for each interview question as described in Step I. In vivo coding was used to document the participants' responses. The researcher used the participants' own words in the coding process instead of paraphrasing or summarizing, which reduced researcher bias due to the researcher's professional history with the participants. It prevented the researcher from projecting her knowledge of the situation, adding details, or interpreting meanings that were not stated.

Step II included examining the data several times because data analysis in qualitative inquiry is an iterative process. Responses were re-examined multiple times, color coded, and grouped based on their commonalities with respect to the research questions. Data from each interview question were examined and reduced into categories and themes.

In Step III, the findings are presented in as major and minor themes that correlate to the research questions. A major theme in this research study was determined when five or more similar responses appeared. A minor theme was determined when a response appeared three or four times. Themes were developed using a deductive approach based on the content of the interview response. The researcher used in vivo coding, the participants' words, to identify the themes. This aided in reducing the likelihood that of the researcher misinterpreting the data and thus reducing the researcher's bias. The themes were then grouped into a common category. The inductive approach was used to label the category for the themes. The categories and themes are presented in tables to provide visual representations of the data. The findings reported throughout this chapter are presented in a narrative using participant quotes to support the key themes.

In summary, the researcher analyzed the data using a four-step process. Data were examined multiple times, themes were generated, and categories were created in relation to the research questions. The remainder of the chapter will detail the participant demographics and themes that emerged from the research to provide insights in the role educators play in the AT process, how they gained skills and knowledge to implement AT, their perspectives, and why they use or discontinue to use AT.

Description of the Participants

Eight districts in Allegheny County, PA were invited to participate in the study. Four districts agreed to participate. One district expressed interest in participating and asked for the educators' names to obtain school board approval to participate. The researcher indicated that IRB approval was required before providing the educators' names; otherwise, their voluntary participation would be invalid. The researcher thanked the district for their interest and offered to contact them after IRB approval. The district did not respond to the follow-up invitation to participate. Two districts declined in writing because they wanted their teachers to focus on the students. One district did not respond.

From the four participating school districts, the researcher individually invited 35 educators to participate in the study via email. Educators invited included special education teachers (SE), general education teachers (GE), speech language pathologists (SLP), occupational therapists (OT), physical therapists (PT), and para-educators. Of those invited, 11 educators indicated their interest in participating, and 24 educators did not respond. Ten of the 11 educators who expressed initial interest committed to an interview. One educator indicated their interest and was unable to participate due to a major life event. Nine educators completed a live

interview. One educator completed the questionnaire. All four school districts were represented in the sample.

The interviews were conducted from the researcher's home and the participants' homes. School was not in session during the interview phase of the research, which occurred in June and July of the 2021 summer break from school. The interviews took an average of 50 minutes. Participant who elected to complete the questionnaire submitted their responses in August 2021.

The 10 participants supported grades kindergarten through 12. The educational roles of the participants consisted of three speech language pathologists, three autistic support teachers, two life skills teachers, and two learning support teachers. There were nine female participants and one male participant. Their years of teaching experience ranged from 5 years to 22 years with an average experience of 14 years. The range of students supported by the participants who used AT from September 2017 to June 2020 was from two students to 15 students. The types of AT used were augmentative and alternative communication (AAC) devices, text to speech (TTS), and a comprehensive literacy software (CLS). Table 2 details the educators' demographics.

Table 2

Participant Sample Table

District and Participant Number	Profession	Grade(s) Taught	Years in Education	Number of Students Who Used AT	Type of AT*
A1	Learning Support	4-6	19	3	AAC & TTS
A2	Learning Support	4-6	15	3	TTS & CLS
B1	SLP	K, 5-8	12	7	AAC

B2	SE - Autistic Support	9-12	15	6	AAC, TTS, & CLS
B3	Life Skills	1-4	15	6	AAC
C1	Life Skills	6-8	22	2	AAC & TTS
D1	SE – Autistic Support	6	7	4	AAC
D2	SE – Autistic Support	6-8	13	15	AAC
D3	SLP	K-3	5	3	AAC
D4	SLP	K-5	17	15	AAC, TTS, & CLS

Note. * AAC - augmentative and alternative communication, TTS - text to speech, and CLS – comprehensive literacy software

Participants' Experiences

The participants relayed that they entered their respective fields for three reasons. First, participants indicated they chose this field because they have a passion to "advocate for the students in special education" (Participant D2), or to help students communicate. A second common reason participants relayed was that they have a disability or have a family member who has a disability. For example, Participant C1 explained:

> I went into teaching special ed because I was paralyzed when I was 12 no wait, 11, and there's a huge difference in the way that you're treated whenever you are "a normal" functioning person as opposed to falling outside of that norm. And that was pretty much my inspiration to show the kids that you don't have to be normal in order to be successful. You can do things and learn things and try things in totally different ways. And you can have a good life while you're doing it, Participant C1.

Or third, both reasons combined:

> I guess I chose special education and speech language pathology because I really like to help people if I can. My sister, who I am very close with when we were kids in school, she struggled. She went to speech therapy for a long time. She had math support, reading support and she really worked hard, and it was always a struggle. But I just I watched her, and I couldn't understand how it was so difficult for her and she tried so hard, and I wanted to be able to be a person who could help those kinds of kids. (Participant D4)

The participants in this study have extensive of experience in the number of years teaching, the span of grades, their experience in AT use, and passion for choosing the field of special education. The next section will include the role they played in the AT process as well as the role the parents and administrators played.

Participants' Roles in the Assistive Technology Process

The participants played various roles in the AT process, which included implementing the AT tool that transitioned with the student or initiating the AT process. Additionally, they were charged with the management of the different aspects in the AT process. Finally, they were a part of determining the AT.

A number of participants reported that the AT transitioned with the students from their previous setting. "It actually came up whenever the student came to the district. It was already in their IEP," Participant C1 stated. Other participants reported that the AT process should have been conducted prior to the grade, such as Participant D3, who said, "It should have started before they reached me by 6th grade, but it was just, maybe, they had had one and then it was lost or forgotten that was that's pretty common."

Most of the participants stated that they initiated the AT process with the Allegheny Intermediate Unit (AIU) for the students in need of AT. Their responsibility included addressing

the need with either a colleague or the parent. Participant B1 shared, “It would kind of start as you know, me and the special ed teacher having a conversation about the student’s communication skills and kind of brainstorming and problem-solving options. So, we know what could help them to improve.” When the team decided to pursue AT, “We would have an AT evaluation that we would initiate with the AIU,” explained Participant A1. Next, a trial would commence, and data would be collected. “Then I was the one that would take the data, schedule the meetings with the AIU, as well as the parents,” said Participant D2. Parent involvement will be discussed in a later section.

Finally, a few of the participants relayed that they would oversee the logistics of the AT process. Participant D2 explained, “I would primarily be like a point of contact person for the device and its maintenance and all of that. I was typically the only one that would really encourage them to use it.” The findings about educator involvement demonstrate their differing roles in the management of the AT, data collection, and communication with the team. After the team acquired the AT, the next part of the process is learning how to use and implement the tool.

How Educators Learned to Use Assistive Technology

The interview questions were structured to investigate how participants learned to use AT and how they learned to implement AT. Each question further inquired about the participants’ learning preferences. Appendix F, Research and Interview Questions Matrix, shows the alignment of the interview questions with the research questions. Educators reported that they learned to use and implement AT in a variety of ways. Findings for research question 1 were divided into two categories, Education and Learning Style Preferences. The open-ended, semi-structured nature of the interview questions allowed participants to provide multiple answers based on their experiences. Therefore, more than one answer was provided which addressed how

they learned about AT and their preferences in learning. The researcher tallied and recorded the most frequently recurring answers. Table 3 provides the categories, major themes, minor themes, and number of participants' responses for the first research question.

Table 3

Research Question 1 Themes

Category	Major Theme	Responses	Minor Theme	Responses
Education	Learned from the AIU	9	Learned from outside agency	4
	Learned on own trial and error	8		
	Learned from colleagues	7		
	Learned from social media	6		
Learning Style Preferences	In-person	9	1:1	3
	Small group	5	With the student	3

Education

Four major themes and one minor theme in the education category emerged to describe how participants learned to use and implement AT. Multiple sources outside of higher educational institutions were reported to extend learning. These included learning from the AIU, learning on their own, learning from colleagues, and learning from social media. Participants described learning on their own described as through exploration or trial and error. Learning from social media entailed learning from YouTube, Facebook, Instagram, and/or blogs. The two most frequently referenced types of AT the participants used were AAC and TTS. These sources were combined for learning how to use and implement into one category to provide insights in how they learned about AT.

Findings from nine of the 10 participants indicated that the AIU was the main source of their continuing education with the implementation and use of AT. Eight participants reported that they learned on their own. Participant A2 relayed a combination of different learning opportunities:

> I was provided with instruction from the intermediate unit and also had access to the intermediate unit to ask questions when needed. Most of my training involved trial and error and searching the web for support (but that's my personality). I know the administration would have provided me with more training had I needed it.

Seven participants explained how they learned from colleagues. Participant A1 reflected on an experience teaching outside of the public school system and learning from others. This was included as it encompassed the participant's journey with learning to use and implement AT.

> I taught in an approved private school which is a fully special education school in which your classroom had a designated speech therapist and they sorta typically led all of those trainings and they also provided 5 days of professional development every year. And paras were in those trainings. And paras and teachers were getting the same training. There was a lot of continuity in relation to use of devices and among others like OT, PT, and all types of supports. And that was what I thought that was much more effective and really a luxury as opposed to the public school setting.

Six participants reported that social media supported their learning. Participant D4 demonstrated several types of resources to support their learning, explaining that they used "Social media videos, trial and error, in-person in the classroom, calling my resource person-you, and working with other speech therapists in other buildings."

One minor theme that appeared was learning from an outside agency, company, and/or from a graduate program. Three of the 10 participants received a master's degree in speech language pathology. Their educational backgrounds focused language development and expressive communication from their higher educational institution. Two of the three speech language pathologist participants indicated that they did not receive education in AAC from their higher educational program. Participant B1 reported,

> To be completely honest, I think my graduate school class was very lacking. So, I don't feel like I took a lot from that experience. Specifically, I think most of what I learned I learned from you and then also, you know, just like exploring it on my own, kind of trial and error. On how to edit something or how to add something, I used some blogs. There's been some different bloggers that I've looked at their information and the materials you've given me from the company.

The third speech and language pathologist participant and one special educator indicated that their educational institution provided a class focused on AAC. Participant D3 specified that,

> Most of my background information on assistive technology came for my graduate-level courses credit course. We had a whole course on just assistive technology, and we had it in our second year, I think it's the second semester. We have one course that's just all on AT. It was dedicated to AAC. We had to create our own device and create our own patient. Our own device we had to create with word boards or picture boards and stuff like that. We had to do a lot of research I got a lot of resources that I kept forever.

Learning Style Preferences

The second category of findings for the research question one detailed the participants' learning style preferences. Two major themes and two minor themes were identified from the

participants' responses. The major themes were reported as in-person trainings and small group trainings. Nine out of 10 participants indicated that they preferred in-person trainings, including Participant D2, who stated:

> Well, I like being shown how to do something so definitely that model, either in-person or on video. Then I liked how we would go through our training because it was specific to the student and whatever device he/ she was using. So, then it was like really like learning how to implement.

The two minor themes identified were one-to-one trainings and trainings with the student. Participant B1 indicated their preference as

> Definitely in-person. I think small group has its benefits, because somebody else might ask something that I didn't think of. Definitely in person and that way you can also see if there's other professionals there you can kind of bounce ideas off of each other or find out, "This is how I did this, and this is how I presented this." So, networking that way I think that's the best in person.

In summary, the themes that surfaced in response to how educators learn to use and implement AT included learning from outside sources such as the intermediate unit, colleagues, social media, and companies. Participants preferred to learn in-person rather than virtually. They indicated that learning in a small group and with the student were valuable formats. Participant D1 shared this about working together, "I also sat down with the speech therapist and student and kind of watched her do it a couple sessions. Then kind of playing around with it and seeing how I can connect with my students with the use of it."

Educators' Perspectives on Assistive Technology

Research question 2 explored educators' perspectives on the value of AT. Educators unanimously shared their perspectives that AT can show you what the students could do. One category was created and labeled Student Potential, with two major themes. The two major themes expressed that with the use of AT students can show you what they know and that AT is their voice. Table 4 shows the categories, themes, and number of participants' responses for the second research question.

Table 4

Research Question 2 Themes

Category	Major Theme	Responses	Minor Theme	Responses
Student Potential	Student shows you what they know	10		
	It's their voice	10		

Student Potential – Students Show What They Know

The first major theme addressed how AT is a tool that students use to show what they know. Five participants used a combination of AAC with TTS and/or CLS. Participant A1 shared their view about AT to complete tasks: "It's just going to help the child access their environment. So, whether we're talking about physical ability to access their environment and/or AT in relation to completing assignments academically, they need a method in which they can produce that work." Participant A1 reported how a student was able to provide more information with the use of the AT,

> A student struggled with open ended (constructed response/essay) questions… An AT device was used to transcribe the student's dictated response in a Google Form… Not only was this student providing me with a more accurate response that reflected his true potential, but he was practicing his speech skills with the transcription, practicing his reading skills by re-reading his response, practicing his editing skills by correcting errors in the transcription, and then practicing his technology skills by sharing the document with me.

Student Potential – It's the Student's Voice

10 out of 10 participants who used AAC with their students reported that AT gives students a voice and allows them to express themselves to show their potential. "I like to call it their voice, just because I know not all kids are completely non-verbal, they do have multi-modes of communication whether it be gestures or vocal output," explained Participant D3. Likewise, Participant 4 shared, "I think it enables you to have a better picture of what the kid's interests are and how smart they really are. Like you cannot tell when verbal expression is diminished."

In summary, participants shared their perspectives on AT as two ways to support the student's potential. First, AT is a tool to demonstrate what they know. Second, AT is their voice. Participant A1 summed it up:

> Because my experience has also been that every student with special needs typically knows more than most people think they know, and they just need a way to communicate that. So, we were taught fairly early on, that that's that child's voice. So even if the child was playing around on it, which was a common thing, you don't take their voice. Kids talk out in class all the time. Well, if you're talking out on your device and you can

address the behavior, you don't remove the device because it's like removing their voice which we would not be able to do with a verbal child.

Educators' Use of Assistive Technology

The third research question sought to answer why educators use AT in the school setting. Findings from multiple interview questions were divided into two categories, Buy-in and Adult and Peer Support. Two major themes developed from the buy-in category with one minor theme. Two major themes appeared from the adult and peer support category. Table 5 displays the data to support these findings.

Table 5

Research Question 3 Themes

Category	Major Theme	Responses	Minor Theme	Responses
Buy-in	Team buy-in supports success	10	Student's motivation	4
	Parent Involvement	9		
Adult and Peer Supports	Administrator supported the process	7		
	Reciprocal interactions	5		

Buy-in

All 10 participants' responses created the buy-in category. The major theme that occurred frequently was how team buy-in supports the successful use of AT in the school setting. Interview question 11 asked participants to talk about the advantages of using AT with the students. Participant D2 responded, "Oh man so many! Whenever you do get that buy-in, and you do have the plan in place and everyone's following it consistently it's that A-HA moment!" Participant B3 expressed that, "The main thing is that really does allow them to show you who

wants to use it, has the capability, the drive, the adult support, then buy-in is to have them continually use it. It really is their voice."

The second major theme consisted of the importance of parent involvement. Participant D3 stated, "I think it was extremely important for parents to see it in action. At least you would hope that it would make it even the smallest difference." Parent involvement was evident throughout the interviews. It began with including parents as a team member from the beginning of the AT process. "Parents were involved in the process from the very first step to the very last step," explained Participant D2. Specifically, parent involvement included gathering information from them related to their goals, as stated by Participant B3: "I asked the parents what their goal is for the speech and then we kind of go from there. When we like a device used, then we have a meeting, an IEP meeting, and we discussed it." One participant shared that parents were actively involved in the trialing process by gathering information. "Parents are pretty involved. They usually attend meetings and they're educated, and they look for information and they pose questions, and they want to be a part of the team," said Participant D4. Finally, their involvement as a team member aided in success. "It was all of us, speech therapist, parents, paraprofessionals in my classroom, and myself really using that device all throughout the day and then also with peers," concluded Participant D2.

Student Motivation

The minor theme in the buy-in category includes the student's motivation as a finding to support why educators use AT in the school set. Four participants shared tales of students initiating and using their AT. Participant C1 explained about a student using his AT to support his access to the curriculum: "He just wanted to do it. I think it was his personal drive." Participant D1 expressed that their student had

> …the ability to want to communicate before having anything. I mean she just would go up to anybody and everybody and hugs them and tries to say stuff. Even like typical kids her age, she just wants to talk with them all the time. She goes out there takes her device so that she can actually talk with us. I think that that had a lot to do with why she is so advanced at using it because she has that natural ability to want to communicate.

Adult and Peer Supports

The second category that emerged from the data encompassed the support by the administrators, peers, and adults. Two major themes were evident. One was support received by the administrator and the second was reciprocal interactions.

Administrator support included support both at the supervisory and building levels. “On the building level, when I explain the rationale behind the decision I want to make or the processes I go through, I feel it gains more support than if I didn’t include the building administrator from the beginning,” said Participant D2. The level of support varied from district to district. In District B, Participant B1 reported that, “Administration is always supportive, but it seems like at a distance.” Likewise, in District D, participant D3 shared that, “Administration is supportive, and they let me take the lead.”

Following administrative support is the major theme of adult and peer support. Five participants responded that the more the student uses their AT successfully with adults, more opportunities for reciprocal interactions occurred. Participant A1 explained that, “As the student becomes more proficient, then the staff also is going to be using it more because you know the kid can tell you what they want and what they need.” The reciprocal conversation occurs when the students can get their message across. This increases the communication exchange, as Participant D3 stated: “Seeing people responding when the students are using it; they’re getting

their message across." The use of the AT then provides extended communication opportunities. "Obviously it becomes an opportunity for students to say the most basic things to have their needs met up into being able to answer questions and have some kind of reciprocal conversation," explained Participant B2.

In summary, multiple participants indicated that buy-in, parent involvement, administrator support, student motivation, and support from peers and other adults contributed to using AT. The final research question revealed buy-in, limited or lack thereof, as a theme to address why AT is discontinued.

Educators' Discontinued Use of Assistive Technology

The fourth and final research question set forth to address why educators discontinue the use of AT in the school setting. Multiple interview questions were asked to retrieve this information from the participants. Two categories named limited buy-in and technology were created to address the major and minor themes. The limited buy-in category is comprised of two major themes and one minor theme. The technology category consists of two major themes and two minor themes. Research question 4's categories and themes are presented in Table 6.

Table 6

Research Question 4 Themes

Category	Major Theme	Responses	Minor Theme	Responses
Limited buy-in	No/little buy-in	9	Lack of training	4
	Limited understanding of how AT is used	6		
Technology	Technology	6	AT used in a different way	4

Frustration	6	Other options	3

Limited Buy-in

The first category labeled is limited buy-in. It consists of two major themes, no/little buy-in and a limited understanding of how AT is used. The minor theme, entitled lack of training, further expands on both major themes. Participant B1 explained how limited buy-in led to the discontinued use of AT in the school setting: “Number one is definitely buy-in and support from all adults that engage with the student. I know a lot of teachers and paras are fearful and hesitant.” At the student level, lack of buy-in was reported to discontinue the use of AT. “The student really could not get past being one of the only people using the computer. Even when offered to go to the special ed classroom and use it. There was a little buy-in in that situation,” Participant B2 shared.

The second major theme addressed the educators’ lack of understanding of how AT is used. Participant D4 shared the following occurred because of limited understanding:

> They take it away when they’re at snack or lunch and when you want the communication. They're just busy, you know, doing what they need to do. There are great opportunities for communication like at mealtime and recess and it’s never present there.

The minor theme in this category, lack of training, also highlighted a finding on the discontinued use of AT in the school setting. According to Participant A1, “I would say is if you don’t have adequate training and you’re struggling to understanding how to even use the device then, your limited in the ways in which you can assist the child with learning the device.” Four participants reported how this impacted the use of AT in the school setting along with technology.

Technology is the second category label and also the name of the first major theme that adds insight to the fourth research question. Six participants reported that technology is a barrier.

> Well just like we said here, technology is technology. You know at any given point there have been times where you know you're in the middle of a lesson, you're really wanting to use the device with the student to answer questions, to do stuff and then, the device that dies or freezes or you know something just goes wrong. (Participant D1)

Two minor themes in the technology category revealed that the AT was used in a way it was not originally intended or it was put aside. Four participants stated that they used the AT in a different way. Participant A2 descried how the AT for reading used by one student was incorporated into lessons with all students: “We ended up not using the AT device until the students had an opportunity to practice their ‘missed words.’ Then the AT device was able to read the entire paragraph and students were able to listen for their ‘missed words.’

Additionally, at the student level, the AT produced a different skill set by the student, according to Participant B2:

> I’ve seen the compensatory skills increase significantly. I don’t know if was the identification and trying to apply the use of the technology kind of lit a fire under his butt and he decided there was things he needed to do if he didn’t want to use that. So, did it work the way we thought it to or should? Not necessarily. But did it have an impact? Absolutely.

Three participants indicated that they used other options including no tech or low-tech tools to replace the high-tech devices for communication and/or literacy. Participant A2 continued to say that, “The student used his consumable book to read the story and highlighted

the words manually." Participant D2 indicated that the AAC device was put aside for "Low tech tools, like the Big Macs, were used for commenting. It's not an overload of information."

In summary, participants reported a number of reasons that AT was discontinued. Two categories with major and minor themes revealed that the AT was discontinued due to limited to no buy-in from the IEP team members. The was a limited understanding of how AT is used, and lack of training added to not building buy-in. Finally, technology was a barrier which produced themes including its problems with the technology breaking or being too overwhelming extending its non-use to frustration, using it in a different way or replacing it with other options.

Summary

In summary, this phenomenological qualitative inquiry set out to learn about the phenomenon of AT being used or discontinued in the school setting. The researcher used semi-structured interview questions to answer the four research questions:

1. How do educators learn to use and implement assistive technology?
2. What are educators' perceptions of the value of assistive technology?
3. Why is assistive technology used by educators?
4. Why is assistive technology discontinued by educators?

Ultimately, the researcher wanted to learn why some educators were able to use the AT and why some were not able to use the AT.

A total of 10 participants from four school districts in Allegheny County, Pennsylvania volunteered to participate in the study. Participants included three speech language pathologists and seven special educators whose years of experience in special education ranged from five to 22 years. In phenomenological qualitative inquiry, the researcher's relationship with the participants in the shared phenomenon is key. In this study, the researcher provides technical

assistance and training to the participants, a familiarity which empowered participants to speak openly and honestly in their responses.

All participants shared numerous insights to why AT is used or discontinued in the school setting. Information gained from the nine semi-structured interviews and one questionnaire was winnowed down into seven categories. The categories created from the findings included education, learning preferences, student potential, buy-in, adult and peer supports, limited buy-in, and technology. Interpreting the findings, Step IV of the four-step process the researcher used, will be expanded upon in Chapter 5.

CHAPTER 5

DISCUSSION

Research Purpose

"For most people technology makes things easier. For people with disabilities; however, technology makes things possible" (Radabaugh, 1998, as cited in National Center on Accessible Educational Materials, n.d.). Assistive technology is a tool for students with disabilities that enables them to access curricular materials, to read a book their peers are reading, to write an article for the school newspaper, or to have voice to talk with their friends at lunch. The IDEA defines AT as a tool that supports, increases, improves, or maintains the functional capabilities of a child excluding surgically implanted devices (Individuals with Disabilities Education Act of 2004, 2018). The necessity of AT is linked to providing students with disabilities in public schools a free and appropriate public education with no cost to the parents. These rights are provided under the Individuals with Disabilities Act and the Americans with Disabilities Act. AT makes life possible for some students with disabilities.

The researcher conducted a phenomenological qualitative inquiry to explore the phenomenon of using AT or putting AT "on the shelf" in the school setting. The purpose of this study was to identify factors involved in educators using or discontinuing to use AT in the school setting. The abandonment rate of AT ranges from 19.09% (Federici & Borsci, 2016) to 78% (Petrie et al., 2018) in the medical field. The most frequently abandoned AT tools are those that user interacts with physically, such as hearing aids or mobility devices (Federici & Borsci, 2016). The rate of discontinued use in the school setting is unknown (Edyburn & Smith, 2004; Satterfield, 2016; Watson et al., 2010).

The problem when AT is not tracked and is used inconsistently in the school setting is twofold. One, students are not able to access their curriculum, read text, write, access their environment, and communicate. The consideration of AT is right afforded to them as a part of their individual educational programming. Two, organizations do not have systems in place to track its use, and failing to implement AT that a district has purchased results in a wasteful financial burden the district must shoulder. Estimated AT raw costs range of from $145 to $17,000. This range encompasses AT for communication and literacy software and was generated from the cost of frequently used AT in the school setting. The estimated raw cost does not include the costs incurred for educators to learn to use the tool. These learning costs could be substitute coverage, company training fees, and overtime when educators work beyond their contracted hours.

The researcher was interested in gaining an understanding of educators' use or discontinued use of AT in the school setting after AT has been acquired. The researcher wanted to learn more about educator efficacy with implementing AT. This study set forth to answer the following questions:

1. How do educators learn to use and implement assistive technology?
2. What are educators' perceptions of the value of assistive technology?
3. Why is assistive technology used by educators?
4. Why is assistive technology discontinued by educators?

Research Method

The researcher conducted a phenomenological qualitative inquiry using live interviews or a written questionnaire with multiple participants. The researcher focused on learning about the phenomenon, or experience, of why AT was used or discontinued in the school setting.

Qualitative analysis is dedicated to determining what is meaningful to each person from an experience. The findings are not intended to be generalizable. Rather, they provide an insight into the phenomenon experienced by the participants. However, findings from qualitative inquiry may be used to guide services and practices for others experiencing similar phenomena.

The sample included 10 educators from four school districts in Allegheny County, Pennsylvania who the researcher supports in providing AT services. The sample included three autistic support teachers, two life skills teachers, two learning support teachers, and three speech language pathologists. Their experience in special education ranged from five to 22 years. Two interview options were provided to the educators who volunteered to participate. Following the health and safety protocols established for COVID-19 for each district, the researcher offered one option as a live interview via a live Zoom. The second option was for participants to share their responses on a written questionnaire. Nine participants completed the live Zoom interview. One participant completed the written questionnaire. Data were collected, compiled, and analyzed using a four-step process.

Data Analysis

The researcher reviewed the data per the four-step process identified by Bloomberg & Volpe (2019):

- Step I: Review and Explore for Big Ideas
- Step II: Re-read and Examine the Data
- Step III: Report Findings
- Step IV: Interpret the Findings.

Steps I through III were completed and findings were reported in Chapter 4. Step IV is the focus of this chapter.

In Step I: Review and Explore for Big Ideas, the researcher reviewed the transcripts and captured the participants' responses using in vivo coding. The researcher used the participants' own words in the coding process to reduce bias. This prevented the researcher from adding information or interpreting meanings that were not stated due to the researcher's history with the participant. In Step II: Re-read and Examine the Data, the data from each interview question were examined and reduced to themes and then assigned to a broader category that grouped similar themes. These broad categories comprise the major findings of the research study. In Step III: Report Findings, findings were presented as major and minor themes that corresponded to the research questions. Step IV: Interpret the Findings, is the focus of this chapter. The remainder of the chapter will discuss the implications of the findings, the conclusion of the study, and recommendations for future research.

Implications of Research Findings

Seven findings stemmed from the research conducted in this study. These findings are relevant to the scope of the research study as they correlate to the existing research presented in Chapter 2, the literature review. Most of the findings aligned with the research, although some findings were identified as new because they did not align to the existing literature. No findings conflicted with the literature review's research. The findings from this study are not generalizable in answering why AT is used or discontinued in the school setting on a larger scale, as this study was a qualitative phenomenological inquiry, designed to gain insights from this sample's experience with the common phenomenon of using AT or discontinuing the use of AT in their particular school settings. The findings reflect the participants responses to the interview questions based on their experiences with AT.

The seven findings derived from this research study are identified as (a) continuing education opportunities, (b) learning preferences, (c) student potential, (d) buy-in, (e) adult and peer support, (f) limited buy-in, and (g) technology. Each finding is comprised of major and minor themes that were identified to generate the finding. The researcher viewed the themes as the legs that braced the category. The findings build upon each other by starting with the educator and radiating out to how they value AT, their experiences with its successful implementation, and then experiences with its unsuccessful implementation.

Research Question 1

Research question 1 inquired about how educators learned to use assistive technology. Two findings surfaced to answer this question. The first finding is the educators' continuing education opportunities. The second finding is the educators' learning preferences. A new source for learning was identified which did not appear in the literature. This will be discussed at the end of this first finding. See Table 7 for research question 1 findings.

Table 7

Research Question 1 Findings

Finding	Theme	Literature Alignment	Link to the Literature Review
Continuing Education Opportunities	Learned from the AIU	Aligned	IDEA 2004 definition of AT service
		Aligned	Educator preparation programs
		Aligned	Staff training and support

Finding	Theme	Literature Alignment	Link to the Literature Review
	Learned from colleagues	Aligned	Coaching
	Learned from social media	New	Not addressed in the literature review
Learning Preferences	Small group	Aligned	Coaching
	In-person	New	Not addressed in the literature review

Continuing Education Opportunities

The first finding includes the use of three sources of learning outside of higher educational institutions, which served as the vehicle for continuing education about AT, its use, and implementation for the study's participants. The three sources included learning formally and informally from the Allegheny Intermediate Unit (AIU), learning informally from colleagues, and learning from social media. The first two sources to deliver instruction are supported in the literature with respect to AT services, educator preparation programs, staff training and support, and preparation models. They present with limitations as well. The last source, learning from social media, is new.

The first source of continuing education was predominantly the AIU. Participants identified the AIU as their source for learning about AT. This source aligned with the research presented in the literature review in the areas of AT services, educator preparation programs, and staff training and support. The IDEA of 2004 definition of AT services includes training and technical assistance for a child with disabilities, the child's family as appropriate, and the

professionals or other individuals who provide services to the child (Individuals with Disabilities Education Act of 2004, 2018, § 300.6). Each intermediate unit across the state of Pennsylvania has at least one training and consultation coordinator designated to provide services in AT.

Participants cited two limitations that related to AT service delivery. The first limitation of the delivery of AT services is the inconsistency in which the services are provided. There are 29 intermediate units across the state of Pennsylvania which are regionally controlled in how they provide AT services. Most of the IU AT coordinators use a version of the SETT framework or another person-centered planning framework, but they are not systematic in how other AT services are provided. Participant B1 relayed,

> I came from a district out near Harrisburg, and I didn't have somebody like you to teach us all of this or give us this information. So, it was limited and was a very different experience. So, I don't know if that's something that's like, more local, or if that is a statewide thing.

The second limitation is with the inability to provide continuing education credits in compliance with the Pennsylvania Department of Education's Act 48 requirements of 180 hours of continuing professional education for informal training sessions. The AIU AT coordinators provide formal trainings in the use and implementation of AT. Trainings are provided at the individual team level, school level, and/or district wide. Act 48 continuing education credits are provided for larger formal training sessions, but they are not provided for team training sessions. This makes it difficult for educators to gain continuing education credits outside of a formal training session or from an educational institution.

Learning from a source outside of an educational institution aligned with the research in the literature review on educator preparation programs. The research indicated there continues to

be a lack of inclusion of AT as part of pre-service teaching programs' course of study. Participant B1, a speech language pathologist, explained,

> My experience in grad school was very limited with a very limited topic discussed. I think having that change would be a huge because it's the technology. It isn't something that is going away. It's probably just going to continue to expand. With technological advances, knowing the basics but then also being aware of different options and different techniques then the implementation process that would be good.

However, two participants indicated that their educator preparation programs included a class on AT. One was a speech language pathologist, and one was a special education teacher. These participants have five years and seven years of experience post-graduation, respectively. Participant D1 described, "I did have training like way back when I was in college but that was a couple of years ago. In my master's at Pitt and I did my internship in an autistic support classroom." This may indicate a more recent shift in educator preparation programs to include AT as part to pre-service teacher training. The current model of delivering training for practicing teachers, which falls under staff training and support, continues to be inefficient in providing the number of services needed in the educational setting via staff training (DeCoste & Bowser, 2020).

The literature review described three barriers to effective staff training and support: the amount of time necessary to learn the tool, educator attitudes, and training content. One participant's response aligned with these three barriers. Participant A1, addressed them by saying,

> I think the obstacle in my setting is typically like ability time for training. You just don't have it typically. It depends on who your administrators are and what they think and how

> supportive they will be because of whatever their priority is or their perception of it might be. If it something extremely elaborate, which I don't know I think they've gotten easier to use, like the iPad versus some of those other things, if it's too difficult or confusing, it's likely not going to be used by staff and they're going to stick with what they already know.

The second source of continuing education identified by the participants was learning from colleagues. This category is supported by research on the benefits of coaching, an evidence-based practice/program (EBP), that was addressed in the preparation models section of the literature review. Participant D4 talked about her experience learning from others: "When I worked for an approved private school, we had a speech pathologist. Her sole her realm, her responsibility was dedicated to augmentative communication. She taught me so much. It was invaluable." Participant D2 added information about using other educators in the building, "I have you guys coming in and then speech therapist and then also other special education teachers just right in your school, like the knowledge and experience that other people have." Such comments demonstrated that participants rely on their colleagues providing coaching support in addition to learning from the experts.

Coaches are widely used in education as they are an established EBP. Jim Knight's (2017) impact cycle for instructional coaches requires and understanding of the three coaching models: communication skills, active listening, goal setting, and follow-up. The relevance of coaching in this study is that participants provided suggestions to improve their learning outcomes by having a professional provide feedback, setting goals, and actively participating in opportunities to help guide them and others with using the AT. These are skills essential to the

coaching EBP, ultimately ending with the benefits of AT in supporting students with disabilities. Participant B2 expressed their thoughts on AT:

> I think in my experience two things would be the early-on [introduction to AT in the elementary school] and then checking in. Even if it's after the session. If that's okay like in six weeks so that it's on everybody's mind. Whether at the end you're like, "Let's set a date in six weeks to check back to see how it's being used and what supports are needed." I think that there's accountability with that. Not that you're supposed to hold us accountable but, as a trainer and, obviously someone who is doing this, you want it to be implemented and used in the best interest of kids. That comes back to saying someone is going to be checking in on me to see how I am using it. It taps into their internal, "Oh I am going to be doing this again, someone is checking in on me, and say how are you doing, how are you using it, and how is it going."

Two limitations with coaches exist. One limitation is that coaches are most frequently used in academic supports for literacy, mathematics, and/or behavior. Therefore, they do not often, if at all, support in AT delivery services as a formal position. This leads to the second limitation, the fiscal justification for a position. This would be district dependent. If there is a limited number of educators in need of this support or a limited number of students using AT, financially it may not be a justifiable capital. The participants' responses suggest more supportive measures are needed to aid them with the successful implementation of AT. This will be discussed in the last section of this chapter.

The third source of learning the participants listed was social media. The literature review did not include online social media learning tools, as this is a relatively new source of teacher professional learning. Social media tools shared by the participants included Facebook,

Instagram, blogs, podcasts, and/or online trainings from device and software companies. These have become increasingly available as a tool for adult learning because of online instruction instituted during the COVID-19 pandemic. This newly identified source of adult learning provides opportunities for educators to continue their education in a format that appeals to their preferred learning style. Participant D4 shared, "I like YouTube because I can pause it, replay, and I need to see it sometimes many times over." Participant D3 included other social media formats from which to learn:

> Social media, like, I follow a lot of speech therapists on like Instagram or Facebook, and they do a lot of videos of using different devices. So, I think that's really important. I am a visual learner. I like to watch it in action and just troubleshoot when I get a kid with a device. You know, I keep it with me for the day and just play around with it and I learned that way as well.

In summary, two themes appeared in the literature to support how educators learn to use assistive technology and one theme was not presented in the literature review. The first theme addressed educators' continuing education opportunities. Responses aligned with the research presented in the literature review. The AIU as a primary source for delivering training is aligned with the IDEA 2004's definition of AT services. Educator preparation programs continue to demonstrate limited coursework in AT. However, newer educators indicated a slight shift towards including AT in more depth in their academic programing. The second theme discussed in preparation models was coaching. This is an EBP which was identified as a need in the implementation of AT. Continuing educational opportunities are the vehicle in which AT is taught. Social media was the third source for continuing learning opportunities. This was not represented in the literature review and is deemed as a new theme to support learning. The next

finding builds upon the initial mode of learning and addresses the educator's learning preferences.

Learning Preferences

The second finding of the research study is the educator's learning preference. This finding was split in alignment to the research presented to support this study. In one respect, the theme of adult learning preferences was not included in the research for this study. In another respect, however, it aligned to the research on coaching as an EBP, which was discussed in the literature review. Coaching was discussed in the previous finding and continues it thread in this finding on educators' learning preferences.

Participants' responses leaned towards a coaching model to aid in their ongoing learning and implementation. Two key coaching elements were reported by the participants: the inclusion of an observation of a lesson and the feedback when implementing the tool with the student. These supports provided by the coach aid in strengthening instructional practices. Participant B2 shared,

> Sitting with the student, being able to demonstrate how it's being used or what they're doing to maybe have the process evaluated to see if there another way or better way. Because when you're learning, you're not really sure you're getting ideas and things. But someone who is more of an expert and evaluated what's happening or being able to provide feedback would be helpful to make sure that we're really moving in the right direction for the student.

Coaching as a model to promote success is not currently used in the delivery of AT services in the schools involved in this research study. While the study participants do not have the support of an instructional coach, the concept of coaching as a model to support implementation skills

was braided into the participants' responses throughout the report of findings. However, participants did not explicitly use the term coaching, nor was each critical element of coaching addressed in one question. Rather, the participants alluded to the key elements in pieces throughout the interviews such as observing, supporting with implementation, providing feedback, and follow-up.

One new theme that emerged under the learning preferences finding was the concept of adult learning styles. The participants indicated that they preferred to learn in a multitude of ways. The most frequent learning style preference reported was in-person learning with hands-on learning opportunities with the tool in a small group setting. Participant C1 reported, "I like being able to be hands-on. I'm one of those people who need to hear it, see it, and use it in order for it to sink in." Other participants added benefits from learning with others. Participant B1 stated,

> Definitely, in-person. I think small group has its benefits because somebody else might ask something that I didn't maybe think of. But it's definitely in-person and that way if there's other professionals there you can kind of bounce ideas off of each other or find out this is how I did this, and this is how I presented this.

Adult learning preferences and practices were not included in the research for this study. Therefore, it is deemed as new theme to support the finding for learning preferences.

To summarize the findings for research question 1, coaching as an EBP appeared throughout participants' responses as an approach to learning and support. Participants reported that they would like to have the student and a professional to provide them feedback during the session. This meets the criteria for coaching because it includes an observation of a lesson and feedback on the instruction that was delivered. Additionally, learning from other colleagues,

points towards coaching. Learning preferences was considered a new finding because the research for this study did not include adult learning practices. The findings from research question 1, gaining knowledge, extend to question 2 with regard to forming perspectives on implementing the AT with the students.

Research Question 2

Research question 2 asked participants about their perceptions of the value of AT. Student potential was the one finding that emerged to answer this question. Two themes formed this finding. One theme was that students used the AT to show what they know. This theme aligned with the research in the literature review. The second theme that AT is their voice was not supported in the research and is deemed a new theme to support the finding on student potential. See Table 8 for research question 2 findings.

Table 8

Research Question 2 Findings

Finding	Theme	Literature Alignment	Link to the Literature Review
Student Potential	Student shows you what they know	Aligned	IDEA 2004 definition of AT
	It's their voice/presuming competence	New	Not supported in the literature

Student Potential

The first theme to support the student potential finding is that the participants saw AT as the tool for the students to show what they know. This aligned to the federal definition of AT in the literature review. The IDEA 2004 defines AT as a tool that is used to "Maintain, or improve

the functional capabilities of a child with a disability" (Individuals with Disabilities Education Act of 2004, 2018, § 300.5). Participant B2 shared their perception of AT as, "Any kind of program that can support what they need to express themselves or organize information or any of those things to access materials, that way, versus paper, they have support to answer their thoughts or expand their thoughts." The participants unanimously voiced that their perception of AT was that it is a valuable tool students use to show what they know. Participant A1 shared,

> Well, it is just so well gratifying when they make a connection and ask for something or tell you something. You realize that they know. You know the connection between when they choose that button or whatever, that you know what they want or need. That's extremely fun!

This perspective echoed the federal explanation of AT as a tool to support access to the curriculum and to use to demonstrate what they know. "Assistive technology provides students with a tool to meet a goal that wouldn't be possible or as successful with that tool," explained Participant A2. This incorporated AT for literacy as well as communication. AT for non-speaking students served as their voice in demonstrating what they know.

The second theme to support the finding of was that the participants reported that AT is the student's voice. This did not align to the research in the literature review. The view of student potential is linked to the approach of presuming competence by Cheryl Jorgensen, Michael McSheehan, and Rae Sonnenmeier (2007). This approach describes how presuming competence plays a role in student achievement for students with intellectual disabilities when learning general education curriculum with the appropriate supports and services. This perspective was supported by the participants. Participant D1 shared,

> So, in my eyes assistive technology is a vital key for students or anyone who has a limited ability to communicate because it is honestly their way of speaking and their way of getting through how they're feeling, what their wants are, and needs are.

This theme, presuming competence, in supporting student potential is new to this study because it was not addressed in the literature review.

In summary of the finding for research question 2, student potential, one theme that supported it was aligned with the research presented in the literature review. The participants indicated that the AT is a tool for students to use to show what they know. This aligned with the federal definition of AT as a tool to maintain or increase the student's life functions. The second theme to support the finding, AT is the student's voice, was not aligned with the research presented in this study. Therefore, it is identified as new. These findings illustrate the participants' perspectives of AT as a successful tool for expressive communication, in the areas of speaking and writing.

Research question 1 revealed the participants' continuing education opportunities on AT and learning style preferences. This led into research question 2, participant perspectives on AT. Perspectives have an impact on the continued use of or discontinuing the use of AT. The next two research questions continue to build upon the previous two research questions by taking what was learned in a style that was most preferable. Then identifying the personal perspective on its value. Finally, the last two questions address the application of what was learned to implement it continuously or discontinue its use.

Research Question Three

Research question 3 inquired about why educators use AT. This research question expands on the first two by delving into what the educators do with the AT after they learned

about how to use it. The participants responses yielded two findings, that buy-in and adult and peer support impacted the educator's continued use of AT in the school setting. Each finding had themes that were supported by the research in the literature review. Buy-in was unanimously discussed by all participants for both success and abandonment of AT. See Table 9 for research questions 3 findings.

Table 9

Research Question Three Findings

Finding	Theme	Literature Alignment	Link to the Literature Review
Buy-in	Team buy-in supports implementation	Aligned	Roger's theory of diffusion
	Parent involvement	Aligned	User's input
	Student motivation	Aligned	User's input
Adult and peer support	Administrator support	Aligned	Leadership
	Reciprocal interactions	Aligned	Roger's theory of diffusion

Buy-in

In answering question 3, buy-in was examined as a finding to support the continued use of AT in the school setting. Three themes were used to create this finding. The two major themes related to how team buy-in supports the successful implementation of AT and parent involvement. One minor theme was the student's motivation. These three themes were aligned to the research from the literature review.

The first major theme that was used to create the buy-in finding was listed as team buy-in supports success. Each participant expressed when team members worked to implement the AT, it was used in the school setting. This theme aligns to the theory of diffusion. As educators experienced success with implementing AT in the school setting, it was used more often and branched out to be used with others. Participant B2 described a situation where they began to use the AAC with two students to make their lunch choices and how it evolved.

> This past school year, the students I worked with, we started putting items in their AAC for what they were going to eat for lunch. Then once they got used to doing it, we would go to the cafeteria where the menu board was. I would read it to them, and they would communicate what they would have or not have. The cafeteria was near the gym. There were two teachers at the gym who the students particularly liked to say, "Hi" to. We would go and share what we were having for lunch, and they might ask questions. Some answers were verbalized to their ability and others were answered using their device. Then going to the office every day to say, "Hello", and ask a question, and provide information. I saw one student, that reciprocal conversation became him sharing his interest or sharing information. And so initially it might have been me saying, "OK we were going to go to the office, and we need tissues today." We would type it in and then go into the office he would ask it. But as he got more comfortable, he would start sharing information with them. So, it was really exciting to see the growth with that!

This demonstrated how the use of the tool began with one task to meet one need. Then it continued to branch to different tasks, with different language functions, and with different staff in the natural environment. The more others saw the success, its use was expanded, and more

opportunities were provided. Thus, the students' communication opportunities became meaningful and frequent.

The next theme that formed the finding of buy-in was identified as parent involvement. This theme aligned with the research with respect to user's input. Phillips and Zhao (1993) discussed the value of obtaining the user's input and parents' input when determining AT for the user. When parents' input is valued in the decision-making process, there is a likelihood that the use of the AT will continue. Parents' input can be obtained across multiple points in the AT process. Chapter 4 highlighted parent involvement from the onset of the AT process. Continuing with that strand, Participant D1 explained that as a part of their process, they discuss a student's AT needs. Then, "We talk to the parents about their viewpoints and kind of gave them the reasoning behind why we thought it would be beneficial and they were completely on board." Other participants included parents in the data collection. Participant A1 described,

> Ok, so if especially we're in the classroom trialing it, you can tell the student's responsive to it or not. If they're interested in it or motivated by it. So, you're sort of tracking all those things. Then the parents may as well. I had one particular child I am thinking of, that had ended up using the iPad. Mom was using it at home too. She said, "Yes, he's touching the button and he's saying, 'Go' or he's touching the button and he's saying, 'Drink'". We collect data or anecdotal data with the parent.

Participants included parents in their trainings to show them how to use the AT and how their child used it. This practice extended it from the school setting into the home setting. Participant D1 shared an experience when they invited the parents in for a training on the use of the AAC:

> Student D01 has it and knows how to use it. So, the parents were on board and they were all like, “This is amazing!” And they cried whenever we showed them Student D01 tell them this and they were like, “WOW! That’s crazy!” So, hopefully they will use it at home.

Parent involvement in all aspects of the AT experience was supported by the research. Parental input was a key component in whether the AT is used or not used. Similarly, the student’s motivation also impacted the continued use of the AT in the school setting.

The third theme that supported the buy-in finding was student motivation. This was a minor theme derived from this sample of participants. This aligned to the research in the literature review with respect to user’s input. When the student has input with the decision, the student increases their opportunities to show what they know. Participant D4 explained how her student showed her Google Earth and his interest in it. She used this as an opportunity to increase his speech.

> He didn't always like the programs that we tried with them. He was obstinate. He liked what he liked. It surprised me with his speech to talk about some of the things on Google Earth. I mean we were able to have conversations and never could do that before.

This example aligns with the research on user’s input and continued use of the AT. However, there one limitation with this finding. The information about parental involvement and student motivation was reported by the participants. Information was not directly collected from the student user or the parents because they were not included in the sample for this research study. Rather, anecdotal data was used based on the educator’s perception of the student’s reaction and ability to express wants and needs with the use of the AAC device. Participants did not further

explain if they asked the student for their input. For this reason, the researcher decided to list this as a limitation.

Adult and Peer Support

The second finding that was generated to provide insight on why educators continue to use AT was the support offered by adults and peers. Two themes that made up this finding are identified as administrator support and reciprocal interactions. These themes aligned to the research discussed in the literature review under the EBP for leadership and the diffusion of innovation theory respectively.

The first theme supporting this finding is administrators' support of AT. This was aligned to the research in the literature review under the EBP of leadership. The research indicated that staff is motivated by their leaders in the school setting. While being a part of the process, the administrator supports the team and their vision with the use, decision making, training opportunities, and implementation of AT. The participants indicated that when they had administrator support, school leaders were "Pretty much supportive with letting me do whatever is best for the student," according to Participant D3. As educators feel more supported in their environment, they can begin to tap into others to continue the use of AT. This includes the use of other staff and peers as a part of the natural environment.

The second theme that created the finding for adult and peer support is the use of reciprocal interactions to continue to use the AT. This theme is aligned to the research presented in the literature review with respect to the diffusion of innovation theory. The theory asserted that as success is achieved with a technology or tool, more people will use it. Regarding the use of a communication device, the more the educators support its use across multiple environments, activities, and communication partners, the more the student will have the opportunity to use it.

This theory was also addressed in the finding for buy-in. It was listed as a separate theme in the adult and peer support finding because of added the element of peer support. Peers are a part of the environment and therefore are a part of the learning experience. Participant D3 discussed the use of a classroom communication board that was available for all students as one student used an AAC device.

> I think the board helped. I think knowing that he wasn't, maybe that he wasn't alone in it. I think that the peers felt like they knew what was going on and because it's cool. They want to know, you know, what's going on. We did it as part of their calendar time with the sight words. They still got to practice off that board. The kids got to use that board too. He got to use his device as well. So, I think it just really helped engage the kids and they were like, "He can talk too."

This educator's experience illustrated the diffusion of innovation theory. It highlighted how including the tool in the environment increased its use with staff and students during a daily routine. This capacity-building process is significant and relevant because that the more people used it, the more it became successful and was continued to be used. There are no limitations identified for this finding.

In summary, the findings for research question 3 provided insights on why educators continued to use AT in the school setting. The responses from the participants from this sample indicated that buy-in and adult and peer supports were key in supporting the successful use of AT in the school setting. The research in the literature review on the diffusion of innovation theory, user's input, and leadership aligned with the findings. When the user's input, including the parent's input, is honored, the user and their parent(s) were more likely to use the AT. Dove tailing with parent support is leadership and the theory that when success is attained with using

AT, others will use it. The last research question provided input by this sample on why AT was discontinued in the school setting.

Research Question 4

Research question 4 probed into why AT was discontinued by educators. The participants in this sample unearthed two findings, limited buy-in and technology, that contributed to the discontinued use of AT. The findings are supported by the research in the literature review. One new finding that emerged which was not addressed in the literature was that the AT was used in a different way to support access for all students. Buy-in was identified in research question 3 as a finding to support the use of AT in the school setting. Its counterpart, limited or no buy-in, surfaced as a finding to address why AT was discontinued. See Table 10 for research question 4 findings.

Table 10

Research Question 4 Findings

Finding	Theme	Literature Alignment	Link to the Literature Review
Limited buy-in	Limited to no buy-in	Aligned	Roger's theory of diffusion
	Lack of understanding on how to use AT	Aligned	Staff training and support
	Lack of training	Aligned	Staff training and support
Technology	Technology	Aligned	User's needs User's input
	Frustration with technology	Aligned	User's needs

Finding	Theme	Literature Alignment	Link to the Literature Review
			User's input
	Use of other options	Aligned	Technology
	AT used in a different way	New	Not supported in the literature

Limited Buy-in

The first finding that surfaced from this sample's responses was that limited buy-in contributed to AT being discontinued in the school setting. This finding was comprised of two major themes: limited to no buy-in and the combination of limited understanding on how to use AT with the lack of training. The latter two themes were combined in this section because the same research topics aligned to them.

First, limited to no buy-in by the staff and parents was reported as an issue that contributed to the discontinued use of AT in the school setting. Participant B3 explained,

> The biggest barrier with the paras and the devices is they don't feel comfortable. So, I think instead of new asking question, sometimes it is better not to use it, or they feel, "I know what the kid is saying. I can understand him or her."

The lack of buy-in aligned to the research on the theory of diffusion. Previously this theory was used to explain how the success of AT increased because it yielded success. This success perpetuated more people to use it. Related to this theme and research question, the theory of diffusion is also used to address the converse. When the AT is met with no success, regardless of the reason, it was more likely to be abandoned. The participants explained that they attributed its non-use to the lack of training and lack of understanding on how it can be used.

Second, the combined themes of lack of understanding how it can be used and lack of training aligned with the research presented in the literature review. These themes were supported by the research on staff training and support. Participants expressed that the lack of training was one reason why the AT was not used. The research in the literature review explained that a barrier to implementation was not being afforded the time by all IEP team members necessary to learn how to use the tool. Participant A1 expressed,

> Sometimes one of the barriers in the school setting is typically the teacher and the para cannot go at the same training at the same time which would kinda be nice. So, then the paras are kinda getting trained on the fly because typically they won't take them away from the student and get a sub and all that stuff while I am getting professional development on the devices.

According to the participants, they inferred that the lack of team training time may have contributed to the lack of understanding of how AT can be used to support student success. Participant A1 also said, "I think there's a lack of understanding in the ways in which you should use AT, like I was talking about with the child's voice, and you don't want to them to remove it when you know they're 'bad'." Therefore, this matches the research on not having shared time to learn, often resulting in a lack of understanding about how to use the device. Participant B2 stated,

> Knowing some of the teachers that we have and how hard they work and how creative and inventive they are and committed they are, I see a strong academic focus without understanding all the other pieces. So, I really believe in a high realistic bar for each student again, realistic being part of it, but academics are important. There are so many pieces. You're looking at the whole person. You're looking at some students with the

> more severe profound disabilities. I think that's why maybe the devices and things aren't considered as important because we're thinking about how they need to learn to read and write. Not understanding that that device is an integral part to learning to read and to write. Because we read and write to communicate to understand and that's what communication is in general.

One limitation is noted for this finding. This finding was based on a limited number of participants. This includes the number as well as the profession of the participants. The sample was predominantly special educators and speech language pathologists. Their responses reflect their experiences working in the school setting. Other professionals, paraeducators, occupational therapists, physical therapists, and general educators were invited to participate. The sample that was used was based on those who responded. Therefore, the small sample size limits the breadth of possible reasons for AT abandonment.

Technology

The second finding used to answer research question 4 is identified as technology. Two major themes, technology and the frustration with using it, comprise this finding. Two minor themes also added to the finding. They include AT used in a different way and the use of other options. The major themes and the minor theme, use of other options, are supported by the research in the literature review. The minor theme of AT being used in different ways, was not aligned to the research, and is identified as new.

The set of major themes used to create the finding for technology are listed as technology and frustration. These themes were aligned to the research in the literature review with respect to technology, user's needs, and user's input. The researcher combined the themes because they encompass the same research components of how technology as a barrier can contribute to its

successful use or its discontinued use. The research in the literature review indicated that the performance of the tool, the tool's appropriateness, and its utilization affected the outcome of its use within the school setting. This information, coupled with not including the user's input or adjusting to the user's needs, was reported to cause AT to not be used in the school setting. Participant D1 voiced,

> I think a hard thing about AT is that there are a lot of different programs out there. I think that that is difficult to navigate among the different programs so maybe like if there were a way in like a magical land where they can make one communication program that will work for everyone. That will be ideal because you don't have to go through a million different trainings to figure it.

This participant, as well as others, expressed frustration with the number of tools and with not recognizing the user's input or changing needs. AT is specific to the user and their needs. Additionally, the tool and its maintenance caused frustration, per Participant B1:

> I feel like I've had a lot of technical issues with either, you know, we get locked out of the iPad for some random reason or it's not charged. My knowledge about the app and about how to implement, you know, the use of these different technologies. So that's a limitation as well and I know that I can reach out to you with all of my questions.

The minor theme, use of other options, encompassed the act of using a completely different tool. Three participants indicated that they would use a lower tech device. Participant A1 shared, "I mean we would probably go back to like the age of PECS and stuff. So, you went back to your non-technical communication devices so using pictures and like, Boardmaker, you know, like way back when." This aligned to the research in the literature review regarding the

performance of the tools. When technology tools do not perform as expected, it frequently leads to abandonment of the tool.

One new theme that uncovered to support the finding of technology was that AT was used in other ways. This did not align to the research in the literature review. This theme emerged from three participants in the sample, who explained that they used the AT with other students, not just those to whom the AT was assigned. Participant C1 explained that they would use the tool with all the students, “Most of the time, especially if their friends are into it, I will keep that in mind if I'm trying something new, to try with the group.” This theme revealed that the AT specific for one student was used for all students, thus promoting it being used under the universal design for learning (UDL) framework. UDL was addressed in the study’s significance in Chapter 1. Three participants reported how they used the AT tool for one student with all students to promote and enhance the entire class’s academic experience.

One limitation is connected to this finding. Most of the participants’ experiences with AT predominantly focused on AAC, the tool used to promote and support expressive communication. A few participants addressed AT for literacy, reading, and writing. This will be discussed in the recommendations for further research section.

To summarize the findings for research question 4, the participants of this study indicated that they discontinued the use of AT because of limited to no buy-in from the IEP team. This finding included the themes that were grounded in the social science theory of diffusion. When AT is not successfully implemented, others do not continue to use it, thus leading to its abandonment. One theme used to create this finding was the lack of training for all IEP team members. Consequently, the IEP team did not gain a full understanding of how the AT is used. This theme aligns with the research on the staff support and training barrier, not providing

sufficient time for all staff to be trained. Not being provided enough time for training paralleled the research on staff attitudes with using the AT. If they do not know how to use it, they run the risk of not understanding why it is used, resulting in not using it.

The final finding to support why educators discontinued the use of AT revealed the frustration associated with the navigating the number of AT devices, the complexity of the device, and the lack of considering the user's input and needs. Additionally, AT was discontinued according to this sample because it was complex and swapped out with a lower tech tool. Alternately, in a few cases, it was used with all students. The latter theme was not addressed in the literature review. Rather, it was addressed as a possible outcome based on the significance of the study.

In conclusion, the implications of the seven research findings that were generated from the participants' responses aligned with the research discussed in the literature review. Three new themes emerged that created the findings. These new themes were not identified in the review of literature. They included presuming competence with student potential, preferred adult learning styles, and using AT in a different way. The findings created from this phenomenological qualitative inquiry were gathered to gain insight on why the participants used or discontinued the use of AT in the school setting. The findings cannot be generalized to all situations involving AT because they are tied to the experiences of this sample. The researcher sought to find the meaning, the essence, of why educators use or discontinue the use of AT.

Conclusions

The findings from this study may be used to guide practices by AT service providers and other professionals implementing AT in the school setting. They are not generalizable because findings from a qualitative phenomenological inquiry are grounded in understanding the shared

experience. In analyzing interview responses from this study's participants, the researcher identified three concluding implications based on the findings to explain the phenomenon of using or discontinuing to use AT in the school setting. The researcher sought to answer three research questions that build off each other to understand educators' efficacy with the implementation of AT. The questions began with inquiring how educators learn about AT. Gaining knowledge sets the foundation about the tool's purpose, how to use it, and how to implement it. Then expanding that foundation, the researcher was interested in learning how the educators' perceptions about the value of AT impacted their efficacy with implementation. This was gained by exploring the educators' learning preferences. Finally, the researcher wanted to learn why educators used or discontinued to use AT. The three conclusions below address the source for educators' continuing education, buy-in from the IEP team members, and coaching to support implementation. The study completed by Tucker, Jones, and Cappa (2008) indicated three major themes which were used to gain those insights from this study. The findings from this study aligned with the three themes addressed by Tucker et al. in 2008.

Continuing Education Conclusion

The first research question set forth to answer where the participants learned to about AT, how to use AT, and how to implement AT. The participants relayed that that the AIU was the predominant source of continuing education for AT knowledge and implementation. It is relevant to this study because it is the foundation of the conceptual framework of this research. The researcher sought to use the interviews to gain insights on the use or discontinued use of AT by educators with implementing AT in the school setting.

The participants from this study supported the finding of continuing education being provided by an outside source and that there is a lack of coursework in higher education

institutions on AT. The research in the literature review supported the participants' responses. The implication for this finding is that the AIU is in alignment with the federal definition of AT services and continues to maintain this support. This implication aligned to the first theme presented by Tucker et al. (2008), who asserted that there was a reliance on the IU AT consultant to address the needs of students with low incidence disabilities.

The focus of research question 1 was building educator awareness and knowledge of AT use and implementation in the school setting. Two new themes not addressed in the literature review appeared to support the finding that continuing education on AT is most frequently provided from a source outside of higher educational institutions. These two new themes included the idea of using social media as a vehicle for delivering continued instruction and offering preferred learning styles preferences when delivering instruction to educators. Participants from this study indicated that they prefer to learn in-person through a hands-on approach with the student. These two themes suggest that when the approach to learning matched the participant's preferred learning style, they continued to use AT.

Buy-In Conclusion

This finding was reported under multiple other findings in this study such as continuing education, learning preference, buy-in, and limited to no buy-in. The second research question inquired about the perception of the value of AT, and the finding that answered this research question was identified as student potential. Participants' recognition that students have potential and the educators' presumptions of their student's competence to show what they know and use AT as their voice stems from their buy-in about the tool's effectiveness. Consequently, buy-in answered both research questions 3 and 4. Buy-in or lack thereof, was reported to support the use of AT or discontinued use of AT in the school setting. Therefore, buy-in was found to be

significant. As the participants relayed how they learned about AT and their perspectives of AT, the next logical step the researcher identified was how they applied what they learned.

Application of AT was delivered in general, formal professional development and as a part of individualized, team trainings. On a broader scope, buy-in and lack of buy-in appeared to connect with the theory of diffusion and the EBPs of having a common vision and support of leadership. If the tool was successful, it was used. If the tool was not successful, it was not used. Participants reported that their use or discontinued use was connected to buy-in. The participants' responses provided the insight that when they gained knowledge about the tool in a preferred learning style, they were more likely buy into the technology and thus implement it. Conversely, they reported that when other team members did not gain adequate training on the tool, it was discontinued. Without the opportunity for a common training with all IEP team members, and without a shared vision, combined with not having leadership support with the implementation of AT, the impact was negative. It was discontinued. These findings supported the second theme presented by Tucker et al. (2008). Their theme stated that the educators who work with the students lacked the knowledge and skill to implement the tool. Participants relayed that follow-up was needed to support them with the implementation.

Coaching Conclusion

The third conclusion identified from the findings in this study denoted that the EBP of coaching was suggested to support ongoing implementation. The term coaching was not explicitly stated; rather, certain elements were suggested to support the participants' implementation of AT. Coaching and leadership support are EBPs that may address the lack of adequate training of all IEP team members. These two EBPs may also aid in addressing the use of AT so that if AT does get in a different way, support may be available to aid in that process.

Subsequently, this aligned to the third theme by Tucker et al. (2008), that the least trained person is relied upon and works most often with the student.

The EBP of coaching fulfills the participants' requests for service to support all IEP team members. They intimated that follow-up, being provided with input when working with students, and extending learning opportunities would ensure that all IEP team members were on board and bought in. Coaching is an EBP associated with academic supports and is typically provided by a professional within the district. Relying on an outside professional to provide this service or support this approach is a limitation. Because coaches typically do not work to support AT implementation, coaching is a missing element in the AT process, a factor that contributes to the conceptual framework of understanding why educators use or discontinue to us AT in the school setting.

The three conclusions discussed from the findings of this research study are cyclical on two levels. One level is the cycle of learning, applying, and assessing the effectiveness, which leads back to learning again. The second level is the cycle of the three EBPs, leadership, vision, and coaching, which are threaded in each element of the first cycle. Leadership is necessary to support learning, application, and assessment. Vision is necessary to have a shared common goal and a plan to apply and analyze the outcomes. Coaching is a vehicle to promote and provide education, application, and support continuity of the success of AT in the school setting. The findings identified from this research study resulted in the need for further research in the future.

Recommendations for Further Research

The findings of this research study spurred further research to expand and refine the implementation of AT in the school setting. Three future research topics were generated from the findings and limitations of this study to address (a) the use of AT, (b) universal AT

implementation for communication, and (c) coaching to support the implementation of AT in the school setting. Future topics for further exploration to expand this research study are identified.

Further research on AT tracking systems is a recommendation to extend this study's findings. The creation and implementation of an AT tracking system enables IEP teams to analyze the practices, systems, and data. This was suggested in 1993 by Gannon and Parrino for federal programs funding for AT for individuals with disabilities. A database can meet multiple needs of the stakeholders. For example, it can provide critical information on how much is the AT being used or it can provide information on which AT is abandoned in the school setting. A data tracking system may be used to support the implementation of the AT tool as a tier one support for all students within a school's multi-tiered system of support, thus supporting UDL. A tracking system can also provide data for a cost-benefit analysis to justify the financial investment in an instructional coach to support educators with the use and implementation of AT. Scheduled systematic review of the AT data with the IEP team can aid in progress monitoring to ensure teams address the challenges with the AT implementation and adjust accordingly.

Further research is warranted on the universal implementation of AAC in elementary schools for students with expressive communication needs. Most of the participants in this study indicated that they used AAC as their AT. Therefore, further research is warranted to address the concerns posed by the participants regarding providing AAC to students earlier in their academic career. This may include a deeper dive into the approach of presuming competence or potential of the student when the student has access to a communication tool. Such research would provide more evidence on the practice of engineering the environment to promote communication.

Findings from this research study indicated that coaching is an EBP requested to support the successful implementation of AT in the school setting. Having an accessible expert onsite in a school provides follow-up, questions, and feedback to teachers while working with the student, all of which were needs voiced by the participants. Coaching support can enhance educators' skills, aid in building buy-in from all IEP team members, and expand their learning. Coaching may be an approach that can be used to diversify learning opportunities and deliver them in the educator's preferred style of learning. This can include using multiple tools, including social media. Additionally, a coaching approach can aid in expanding the use of AT universally with all students in the MTSS framework. Therefore, research on the effectiveness of coaching as a practice to support ongoing AT support is warranted.

Finally, further research on this study can be expanded in multiple directions to increase the breadth and depth of this study. To increase the breadth, this study can be replicated with a diverse sample including general educators, related service providers, and paraeducators. This research study can also be widened to include parents and students. The lack of a diverse sample was a limitation of this study addressed earlier in the chapter. Additionally, the research can be replicated with a larger number of districts. To increase depth, this study can be replicated in a single district as a phenomenological case study.

The purpose of this study was to provide insight into the problem of inconsistent use of AT in the school setting. The researcher conducted a phenomenological qualitive inquiry using live interviews or a written questionnaire to gain information on why educators use AT or discontinue to use AT. Ten participants representing four school districts in Allegheny County, Pennsylvania volunteered to participate and provided their experiences with AT. Their responses were used to answer four research questions:

1. How do educators learn to use and implement assistive technology?
2. What are educators' perceptions of the value of assistive technology?
3. Why is assistive technology used by educators?
4. Why is assistive technology discontinued by educators?

The findings from the participants in this study revealed that when they implemented AT successfully, it was due to team buy-in including parental support, administrator support, and peer support. Their perspectives of the student's potential and presumed competence with the use of the AT supported the successful implementation of AT. Conversely, the findings from this study's participants indicated that when AT was discontinued it was due to limited or no buy-in from IEP team members, a limited understanding of the AT, and challenges with the technology. While findings from a phenomenological qualitative inquiry are not generalizable across all situations, the findings can be used to guide districts on their systems for tracking AT and their practices on supporting educators with the ongoing AT process. Ultimately, the outcome of the implementation of AT in the school setting was articulated by Participant C1: "With some kids AT is just one of things that's an absolute necessity as opposed to somebody that would use it to enhance what they're doing."

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Appendix A: Special Education Laws, Acts, and Court Cases

- 1954 *Brown v Board of Education,* 347 U.S. 483 – The U.S. Supreme Court held that a separate education for African American children was not an equal education. This precedent set the foundation for students with disabilities (Donovan et al., 2021).
- 1965 Elementary Education and Secondary Education Act (ESEA) – The law that was signed by President Lyndon B. Johnson. It provided funding and resources for programs receiving federal funds to educate vulnerable students, including students with disabilities (Brenchley, 2015).
- 1972 *Pennsylvania Association for Retarded Children v Commonwealth of PA* – Fourteen school-aged students with developmental disabilities were denied an education under the Pennsylvania law that allowed schools to deny educating students who did not have a mental age of five years. This was a violation of the Fourteenth Amendment's Equal Protection and Due Process clause. This case provided the foundation for educating students with disabilities with their regular education peers. The U.S. Court for the Eastern District of PA issued a consent decree that stated students with mental retardation (a term used in 1972) are to be provided a free and appropriate public education where the placement in regular education was preferred to another type of education training program. This case provided the procedural protections that formed the basis of the Education for All Handicapped Children (PL 94-142) (Donovan et al., 2021).
- 1972 *Mills v D.C. Board of Education* – The District of Columbia claimed that it could not educate seven students with disabilities because it lacked the funds and claimed the students were incapable of benefiting from instruction. The Court ruled that education should not be denied due to student deficiencies and that the lack of funding was not an

excuse. This case provided the protection of a free and appropriate public education and did not accept lack of funding as an allowable reason to deny providing the supports and services needed to educate a student with disabilities (Donovan et al., 2021).

- 1973 Section 504 of The Rehabilitation Act of 1973 – This act protected people in all federal programs from being discriminated against on the basis of having a disability (Individuals with Disabilities Education Act of 2004, 2018).
- 1975 The Education for All Handicapped Children Act (EAHCA) – This is most commonly referred to as P.L. 94-142 - Individuals with Disabilities Education Act. This legislation was signed by President Gerald Ford and mandated that all students with disabilities be educated in schools, including students with severe disabilities. Public schools that received federal funds were required to provide equal access to education to students with both physical and mental disabilities. It mandated that students with disabilities be provided an individualized education program, be educated in that student's least restrictive environment, and that the education be at no cost to the parents. Data show the impact this law had over the past 44 years. In 1975, 1.8 million children with disabilities were excluded from receiving a public education. In 2018-2019, 7.5 million students with disabilities received special education in the public school (Individuals with Disabilities Education Act of 2004, 2018).
- 1977-1978 Education of All Handicapped Children Act was released and enacted.
- 1982 *Board of Education v Rowley* – Supreme Court defined FAPE and ruled that an IEP must be reasonably calculated in order for a student with disabilities to receive educational benefits (Soronen, 2017).

- 1988 The Assistive Technology Act increased "access to, availability of, and funding for assistive technology for all individuals with disabilities, including young children" (Early Childhood Technical Assistance Center, n.d., para. 4).
- 1990 Americans with Disabilities Act of 1990 (ADA), P. L. 101-336, was enacted; this law "prohibits discrimination on the basis of disability" (Center on Technology and Disability, 2021, p. 1). This protection was extended to state and federal services, programs, and activities, including public schools. Under this act, there are four titles that address meeting the diverse needs of persons with disabilities: employment, equal access to public education, public accommodations that must be provided by private companies including private schools, and assistive technology for phone companies to allow persons who are deaf or hard of hearing using telecommunication devices (Center on Technology and Disability, 2021). The implication of this act extended to the accommodations that need to be provided to all persons with disabilities. This act provides blanket protections for all persons with disabilities when in school and becomes the law that protects persons with disabilities upon graduation.
- 1990 Education of All Handicapped Children Act was renamed as the Individuals with Disabilities Act (IDEA). Amendments included adding transition supports for students transitioning from high school to post-secondary life, adding accountability for including students with disabilities in the general education class, and creating supports for students receiving services in the general education.
- 1997 IDEA was reauthorized to include students with disabilities in state and district assessments and that a general education teacher is required as a part of the IEP team. This provides continuity of special education services across all educational settings.

Additionally, this supports the need for providing students with AT to access the curriculum, communicate, and complete daily life functions.

- 1998 Section 508 of the Rehabilitation Act of 1973 was amended to require Federal agencies to make electronic information accessible to persons with disabilities (U.S. General Services Administration, 2020)
- 1998 P. L. 100-407, Technology-Related Assistance for Individuals with Disabilities Act was amended to P. L. 105-394 and called the "Tech Act"
- 2001 No Child Left Behind was enacted and required that students with disabilities be proficient in mathematics and reading by 2014.
- 2004 IDEA was reauthorized.
- 2017 *Endrew F. v Douglass County School District* added clarification of FAPE to the Rowley case. Its decision was two pronged. One prong identified that some educational benefit needs to be above de minimis. The second prong was that the educational program must be ambitious in light of the student's circumstances (Soronen, 2017). This has an impact on providing students with access to the general education curriculum with the necessary supports and services, including the implementation of AT.

Appendix B: Types of Assistive Technology

Assistive Technology Tools for Reading

AT for reading includes providing books in alternate formats and text-to-speech (TTS) for electronic texts. AT tools for reading do not replace instruction. AT for reading provides access to the printed materials and can be used as a compensatory tool for reading texts (Young et al., 2019). The following provides more information on AT tools for reading.

Books in alternate formats include large printed text in large font sizes, books or texts that are modified to reduce text complexity, and audio books. Libraries provide electronic books and audio books. Audio books include human recordings or computerized voice recordings. The largest set of available human-read books is via Learning Ally, previously known as The Recordings for the Blind and Dyslexic. This is a paid service in which a plethora of books including textbooks, novels, and magazines are available and read by a human reader. They also provide a program that uses a computer to read the electronic text. Bookshare is an online repository of books funded through a grant from the Office of Special Education. Bookshare provides computer files for books in an electronic file for large print, HTML, audio, Braille coded, and navigable electronic text. This is a free program for students who qualify. A paid subscription is also available. Bookshare provides a free text-to-speech screen reader to read their books. Apps and other comprehensive text-to-speech computer programs can read Bookshare books.

Text-to-speech (TTS) is a program in which the computer reads the printed text on the page (Cunningham & McNaughtan, 2018). It is available in several hardware options. It is a specialized scanning pen that, when dragged across a page, the processor reads the typed text. It is available now in most operating systems of tablets, such as iPads, and computers.

Additionally, TTS is available in comprehensive software that reads scanned files and allows annotation (type, draw, highlight, and record) on the scanned document. A screen reader is sometimes confused with text-to-speech. Screen readers read what is on the computer screen and are typically used for those who have vision needs or for those with severe reading challenges. TTS programs vary in what they are able to do. Some only read text in a word processing program, while others may read webpages, and yet others read multiple document formats. Embedded features in the TTS program, such as highlighting, dictionary support, and reading rate, support engagement and motivation when reading (Young et al., 2019).

Finally, a TTS program is valuable for students who have needs to access print. TTS promotes independence in completing reading tasks and increases motivation (Young et al., 2019). Research on TTS results in reading gains, reading fluency, time spent on reading, and reading comprehension (Svensson et al., 2019; Young et al., 2019).

Assistive Technology Tools for Writing

Tools for writing include supports at both the motor level of writing and the cognitive level of writing (Erickson & Koppenhaver, 2020; Nankee et al., 2009). Writing is a multifaceted process that requires motor skills, language, and cognition. Writing "involves the ability of the student to express ideas in a way that is meaningful to others" (Swenson et al. 2009, p. 1). Writing is described as having two skill levels, the microstructure (foundational skills) and the macrostructure (processing skills) (Edwards-Santoro, 2020). Microstructure elements include handwriting, keyboarding, spelling, sentences, and mechanics. Macrolevel structures include combining sentences to increase complexity, the writing process, and synthesis (Edward-Santoro, 2020). AT tools are available to support writing at the microstructure level and macrostructure level for composition and for demonstrating knowledge and skills.

AT tools to support the microstructures for handwriting and keyboarding at the no-tech level include pencil holders, writing windows, and alternate papers. Mid-tech AT tools to support the motor skill of writing include keyboards, alternate keyboards with different sized buttons, slant boards, and alternate keyboards of a different size or key layout. High-tech AT tools for the motor skill of writing include on-screen keyboards and voice typing. These tools support alternate options to writing with a piece of paper and pencil.

AT tools to support the microstructures for spelling and grammar include word processors with built-in spell check and grammar check. Mid-tech options include word prediction. Word prediction is a program that provides a list of high frequency words based on the letters typed. It was designed to reduce the number of keystrokes for students with physical disabilities when typing (Erickson & Koppenahver, 2020). While this tool is currently available in most smart phones and iOS products, such as iPhones and iPads, AT word prediction programs are more robust in their features. These features include text-to-speech, predict ahead capability, dictionary support, ability to use and create a topic dictionary, and the ability to use a flexible spelling pattern. A high-tech AT tool example is speech dictation. It is also known as voice recognition, voice typing, and talk typing. The computer types what the person says into the microphone. This is another tool that is available on most smart phones, tablets, and word processing programs. It requires clear speech, a consistent cadence, a quiet environment, and a quality microphone. While these tools are becoming more available and common within the general population, it is considered AT when the student is not able to demonstrate what they can do without it. AT tools to support the microstructure of writing enables the student to produce written work. They work well when they are coupled an outline or visual organizer.

Visual organizers are used to support the macrostructures of writing as they aid with organizing, sequencing, and synthesizing information (Edwards-Santoro, 2017). On the no-tech end of the spectrum, paper graphic organizers and outlines can be used to aid with organizing information. Mid-tech graphic organizing tools are available on tablets and computers. The programs vary in their ability to construct the graphic organizer manually and accessibility of pre-made templates. One program varies graphic organizers at the elementary and secondary levels. This particular program further supports by transferring the visual to a word processing program. This program's ability enables the student to have the visual organizer and automatically generated outline in one writing space.

AT tools used to demonstrate knowledge through writing include the ability to complete electronically the same assignments a student would do using paper and pencil. The barrier to completing this task is that not all electronic documents are accessible. If the document is made in a word processing program, then a student may be able to complete it electronically. If the document is a scanned copy into a PDF (portable document file) format, it may or may not be accessible. This type of file format allows you to view the file and not make any changes. This means that the student may or may not be able to type on it or to use a TTS program to read it without additional software. Its accessibility is dependent upon its creator because it may contain copyrightable information. PDF annotating extensions, apps, and/or software allow the student to read it and to write, type, and draw on it. As the technology has advanced to enable access to inaccessible text, instructional materials are required to be provided to students in a timely manner. This requirement was identified under the National Instructional Materials Accessibility Standard known as NIMAS.

NIMAS became effective in 2006 as a part of IDEA Part B sections 612(a)(23)(A) and 674(e)(4) (U.S. Department of Education, 2010). The NIMAS requires instructional materials be provided in an accessible format in a timely manner. The NIMAS states publishers of instructional materials need to have text, images, and metadata in an electronic file accessible to students with a print disability or those who are blind (U.S. Department of Education, 2010). Reading and writing are forms of communication. The NIMAS enables students with print disabilities the opportunity to have instructional materials available in a digital format. When electronic formats are coupled with AT tools, the student has access to the content to support learning. Students who have more extensive needs in expressive communication utilize a different AT tool to enable them to be understood by others.

Assistive Technology Tools for Communication

AT tools used to support expressive communication are called augmentative and alternative communication (AAC) tools. AAC tools are "augmentative when used to supplement existing speech, and alternative when used in place of speech that is absent or not functional" (American Speech-Language-Hearing Association [ASHA], 2020, para. 3). Use of AAC may be temporary or permanent for a student. AAC tools are used to relay the student's expressions of thoughts, ideas, wants, needs, preferences, and various other things we communicate on a daily basis. Communication is classified as unaided and aided. Unaided communication uses speech and sign language, and aided communication systems are non-electronic or electronic (Light & Drager, 2007). Electronic devices can be "software solutions that provide a means for expressive and receptive communication for students with limited speech and language" (Georgia Department of Education, para. 11). The majority of aided AAC systems use symbols to represent words. Depending on the student, communication needs vary and are identified in the

IEP. Students who use AAC tools vary in needs, from severe speech and language challenges, to needing to use a tool for speaking longer phrases, to needing it to talk with unfamiliar people (ASHA, 2020). The IEP team determines the appropriate AAC tool(s) and how it is used across all settings. AAC tools have two levels, basic and high-tech tools (ASHA, 2020).

Examples of non-electronic, basic AAC tools use objects, photos, symbols of objects, and words on paper that represent language symbolically. Systems that use the symbols to communicate vary, from using one symbol on a card to a grid of symbols used to create a communication board or a communication book. These systems rely on communication partners to speak the words the student selects. The communication partner is any person who interacts with the student. Students learn to use a communication system effectively when the communication partner models the language using the tool (Light & Drager, 2007). Three basic non-electronic symbolic systems that are used in the educational setting include a picture exchange, a communication board, and a communication book.

One systematic protocol implemented in the classrooms uses a single symbol to initiate a communicative exchange in a systematic way. The Picture Exchange Communication System (PECS®) is based on behavior analysis principles (Bondy & Frost, 2020). It uses cards with symbols that represent a student's desired item. The student takes the card and gives it to an adult to initiate a communicative exchange. There are six progressive levels in which students advances systematically. Schools use the PECS® or a modified version of it. This approach aids students in the teaching of functional communication (Bondy & Frost, 2020) which may then lead students to the use of an electronic communication device.

A second system used organizes the symbols on a grid, called a communication board. The communication board can be created from scratch or it can be a reproduction of an

electronic communication program. The student points to the word and a communication partner responds to it by repeating what the student said, responding to it, and/or adding to it. The words on the communication board vary depending on the activity, task, or lesson. A variety of words can be used to enable the student to communicate for a number of language functions, such as, but not limited to, requesting, commenting, relaying information, and asking questions.

The third system that uses a systematic approach to promote expressive communication is a communication book. These books house the individual symbols the student uses to exchange at the emergent level of communication. Other books used are printed copies of the AAC device system. A communication book and system used consistently in New Zealand and Australia called the Pragmatically Organised Dynamic Display (PODD) system is used sparingly in the United States. It warrants mention because it requires a communication partner to read the words in a consistent order on each page. The student indicates the choice with a gesture, expression or verbalization. This system relies on the communication partner to navigate the system and engage with the student. It was created by Gayle Porter as a no-tech communication book with vocabulary organized systematically for social language with changing pages (Zangari, 2014). The PODD was produced to provide students with a communication system that mimicked the electronic devices and cost significantly less.

Electronic devices range from low-tech to high-tech options. These options are based on the ease of use as well as the complexity of the technology. A low-tech AAC option includes a push button that plays a recording of one or multiple messages. A mid-tech AAC option device has a grid with raised boarders and a space for paper to slide under the boarders. The spaces in the grid, keys or buttons, are recordable. These devices are durable and vary on key sensitivity to activate the message. The words are changed out manually by removing the paper. These devices

have a number of different levels on which messages can be recorded. These are characterized as static devices because they stay until changed manually as opposed to advancing automatically. Those that do advance with the touch on the screen are characterized as dynamic display. They are the high-tech AAC devices.

High-tech AAC tools encompass a variety of hardware such as an electronic tablet, surface computer, and laptop. Each has a language program that speaks words when selected. The purpose of the device is for the student to use it to speak when their speech is absent, unintelligible, emerging, and/or inconsistent. Language programs are comprised of pre-determined words that are arranged in a grid. The organization of the words is mostly in English word order, beginning with the pronouns for subjects followed by verbs, adjectives, and adverbs for the predicate phrase. The companies that manufacture and sell the communication devices differ in their symbol sets (a pictorial image that represents the word), the choice of words, and the navigation to other words not present on the main page. Students can select words using their hand, foot, arm, leg, head, and eyes. High-tech communication devices are designed to be sensitive to touch and may allow for alternate access options. Alternate access options include the use of switches or eye gaze cameras to make selections. The IEP team, along with the AT coordinator, collaborate to determine the language needs and access needs of the student. Students need to be able to have a voice to communicate with peers and adults. AAC is one tool that supports communication and access to the environment. Additional tools may be needed for further environmental access.

AT Tools for Accessing the Environment

There are three categories of AT that facilitate access to the environment. One is called aids for daily living. These are tools that aid in self-help skills such as eating, bathing, toileting,

and daily household maintenance (Georgia Department of Education, n.d.b). The second category is seating and positioning. The physical therapist supports students with adaptive seating such as specialized chairs like a T-stool. This is a chair in the shape of the letter T where the horizontal seat is where the student sits with the vertical leg. This supports building a student's core muscles, and for some students, it provides necessary sensory feedback. In addition to the type of adaptive seating, positional supports are used to increase participation by allowing students to sit in certain positions with seating options such as additional cushions for posture and footstools. The third category is environmental control aids. These tools are electronic and non-electronic switches that are attached to an environment control unit, which allows a device to be plugged into it. When the appliance needs to turn on and off, the external switch is plugged into the environmental control unit, the switch is depressed/activated, and it turns it the appliance on and off. This type of AT is used for students who do not have full capability of their hands to operate appliances such as a fan to cool them off. It is also used with household appliances such as a blender. These devices allow students to control their environment and participate in daily living activities with simple appliances. In the educational setting, these are tools that are typically supported by the occupational therapist and/or physical therapist for students to perform self-care tasks, sit, and have some control over their environment.

A student may use one or multiple AT solutions to meet one or more needs that are identified in their IEP. It is important to note that the disability does not dictate what AT tool or tools a student uses. AT is individualized and provided to students to access the curriculum and/or their environment. AT is a tool or many tools. Deciding on the tool, acquiring the tool, and training on the tool are all parts of the AT service.

Appendix C: Allegheny Intermediate Unit AT Request, SETT Part I

Allegheny Intermediate Unit

Educational Opportunities • Innovative Solutions • Leadership Excellence

AIU Assistive Technology (AT) Consultation Request

TEAM USE
Student Name:
School District:
School Building:

AIU USE
Date **completed** documents received:
Training and Consultation (TaC) Coordinator-AT:

Consultation will be scheduled *ONLY* after **AT REQUEST FORM, ER/RR, and IEP** are received **via email** from the Special Education Administrator.
Incomplete or NON-Microsoft Word format requests will be returned to the administrator.
Submit Request to: kristen.tachoir@aiu3.net

Revised June 2018

The following changes are in effect as of July 1, 2018

AIU Assistive Technology Request Process

The student's team should determine the need for an AT consultation. The **AT Consultation Request** should be completed through *a collaborative effort by the team, including the parents*. Documents containing the AIU Assistive Technology Considerations Checklists and AIU Assistive Technology FAQs are provided as resources in completing the request.

1. The student's team should **forward the completed AT Consultation Request to the Special Education Administrator** for review and approval.

2. A **Microsoft (MS) Word version** of the AT Consultation Request document **must be submitted by the Special Education Administrator via email** along with digital copies of the student's current Evaluation/Reevaluation (ER/RR) and current Individualized Education Plan (IEP) or 504 Plan (PDF).
   - Team completes information on cover page and the AT Consultation Request.
   - Any additional documentation that the team and/or administrator feels pertinent for the AT consultation may also be included *as email attachments.*

3. All AT request documentation and questions regarding an AT request should be emailed to:
   Kristen Tachoir, Training and Consultation Coordinator, Assistive Technology (TaC–AT) kristen.tachoir@aiu3.net

4. **PLEASE NOTE**: If the student's primary diagnosis is Blind/Visual Impairment, contact Michael Horvat, AIU Vision Assistive Technology Specialist michael.horvat@aiu3.net

Revised June 2018 2

AIU Assistive Technology Support Options

Option A: Consultation

Team, including parents, requests AT consultation to identify tools and/or strategies for individual students with IEPs or 504 agreements

↓

Team completes AT Consultation Request

↓

Onsite consultation conducted: Observation and/or direct work with the student

↓

TaC-AT facilitates the development of the SETT Framework-Part II (AT Action Plan) with the student's team (minimum of two as determined by the team)

↓

The primary contact disseminates AT Action Plan to team members, including parents

Option B: Training

Team **does not request** an AT consultation for an individual student

↓

The team identifies the specific tool for training

↓

The team **may** complete the SETT Framework-Part II to document use of the tool for specific tasks across environments

To request building or district-wide training of a particular AT tool Contact: kristen.tachoir@aiu3.net

Option C: Use of AIU AT Forms

Team does not require an AT consultation or services

No consultation or training is provided by the TaC-AT

↓

The team **may** use AIU AT forms to document information in preparation for IEP planning or program development

↓

*The team **may** opt to use forms for record-keeping and data collection purposes*

*The team **does not** need to send forms to the AIU*

It is recommended that a copy be retained in the student file

Revised June 2018 3

AT Consultation Request 1 of 4

ALL four (4) pages MUST be completed and should be completed through a collaborative effort by the student's team, including the parents

Student Information

Name:
Date of Birth/Age:
District/School:
District of Residence:
Grade/Educational Placement:
Current IEP Date:
Current ER/RR Date:

Student/Team Availability

Consider times during classes, activities, & therapy sessions in which assistive technology may be needed as well as days and times that the student and team members especially related service providers are available.

Monday	☐ AM	☐ PM	Thursday	☐ AM	☐ PM
Tuesday	☐ AM	☐ PM	Friday	☐ AM	☐ PM
Wednesday	☐ AM	☐ PM			

Arrival Time:	Dismissal Time:	Student Lunch:	Recess:
Therapy Sessions (day/time):	OT: Vision:	PT: Hearing:	Speech-Language:

AT Consultation Request 2 of 4

Team Members

Role	Name	Email	Phone
Primary Contact			
Student			
Parent/Guardian			
Special Ed/Agency Admin			
Building Principal			
General Education Teacher			
Special Education Teacher			
Speech-Language			
IT Building Contact			
OT			
COTA			
PT			
Teacher of VI/Blind			
Teacher of Deaf/HH			
Program Supervisor			

Team members to attend AT Action Plan meeting *following AT Consultation*: [Minimum of 2]

Name:	Name:	Name:
Name:	Name:	Name:

REQUIRED Special Education Administrator APPROVAL

Name: Date Approved:

AT Consultation Request 3 of 4

The SETT Framework – Part I: Team Consideration of Student Need for Assistive Technology

SETT	WHAT WE *KNOW* ABOUT OUR STUDENT	WHAT WE *NEED TO KNOW* ABOUT OUR STUDENT
STUDENT **What does the student need to do but independent completion is difficult?** e.g. special needs& current abilities (related to areas to be addressed), expectations & concerns, student interests & preferences		
ENVIRONMENTS **What is the impact on student performance across different environments?** e.g. instructional & physical arrangements, supports of staff & student, materials & equipment, access issues, attitudes & expectations of staff and family		

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AT Consultation Request 4 of 4

The SETT Framework – Part I: Team Consideration of Student Need for Assistive Technology

SETT	WHAT WE *KNOW* ABOUT OUR STUDENT	WHAT WE *NEED TO KNOW* ABOUT OUR STUDENT
TASKS **What SPECIFIC tasks occur in the student's natural environment to enable progress toward mastery of goals? What SPECIFIC tasks are *required* for active involvement?** e.g. communication, instruction, productivity, and participation		
TOOLS **By SPECIFIC name list all "NO-LOW-HIGH" tech options that have been trialed.** **Explain how they have or have not yielded positive outcomes.** *NOTE: Refer to the AT Considerations Checklists to complete this section*		

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Appendix D: School District Correspondences

Invitation to Superintendents

February 17, 2021

Dr. Superintendent
Superintendent of School District
Street address
Pennsylvania, PA

RE: Permission to Conduct a Research Study

Dear Dr. Superintendent,

My name is Kendra Bittner. I currently work for the Allegheny Intermediate Unit as a Training and Consultation for Assistive Technology. I support your district with their assistive technology needs. I am writing to request your permission to conduct a research study with your school district. I am currently enrolled in the Doctor of Special Education program at Slippery Rock University in Slippery Rock, PA. I am in the process of writing my dissertation. The study is entitled, "A Phenomenological Qualitative Inquiry: Use or Discontinued Use of Assistive Technology in the School Setting."

I am seeking to interview educators with whom I have worked in supporting their assistive technology needs. The educators I am asking to interview include two special education teachers, one general education teacher, paraeducators, two speech language pathologists, and/or the occupational therapist, and/or the physical therapist. Taking part in this research is completely voluntary.

If approval is granted, educators will be contacted to volunteer. Those who volunteer to participate will be given a consent form to be signed and returned to me at the beginning of the interview. Participants will complete the interview on a date, time, and format (Zoom or phone) of their choosing. The interview should take no longer than 60 minutes. The interview results will be collected and analyzed for the dissertation. Individual input will be kept confidential. No personal information will be used to identify the district and the participants. Should this study be published, only results will be documented. NO costs will be incurred by either your district or the individual participants.

Your approval to conduct this study will be greatly appreciated. I will follow up with a telephone call next week and would be happy to answer any questions or concerns that you may have at that time. You may contact me at my email address: kxb1096@sru.edu

If you agree, kindly read the Consent to Participate form, sign, and return one signed form in the enclosed self-addressed envelope. You may keep the second for your files.

Kind regards,

Kendra V. Bittner
Doctoral Student at Slippery Rock University
kxb1096@sru.edu
(412) 639-9566

SlipperyRock University of Pennsylvania

CONSENT TO PARTICPATE IN RESEARCH

A Phenomenological Qualitative Inquiry: Use or Discontinued Use of Assistive Technology in the School Setting

Dr. Ashlea Rineer-Hershey, Principal Investigator
a.rineer-hershey@sru.edu
724-738-2460

Kendra V. Bittner
kxb1096@sru.edu
(412)639-9566

Invitation to be Part of a Research Study

You are invited to participate in a research study for a dissertation on the implementation of assistive technology in the education setting. In order to participate, participants must be over 18 years of age, work in a school district as an educator who supports students with special needs, and work with student(s) who use assistive technology.

Important Information about the Research Study

Things you should know:

- The purpose of the study is to interview educators to gain an understanding of their experiences, values, and implementation of assistive technology in the educational setting.
- If you choose to participate, your consent will allow me to contact key educators to be interviewed. The educators I will contact are those with whom I have worked. They include two special education teacher(s), general education teacher(s), paraprofessional(s), two speech language pathologist(s), occupational therapist, and/or physical therapist. I will contact them via email, invite them to participate in an interview, and ask for a date, time, and platform in which to be interviewed (Zoom or phone call). The interview should take about 45-60 minutes.
- Risks or discomforts from this research include sharing their experiences with assistive technology in the educational setting. Personal information will be protected and will not be used to specifically identify participants in any way.
- The study will not benefit the participants.
- Taking part in this research project is voluntary. You do not have to participate, and you can stop at any time.

Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

What is the Study About and Why are We Doing it?

The purpose of the study is to gain an understanding of educators' experiences with assistive technology and how they implement it or not. The goals are to learn how educators learn to

use assistive technology, to learn how they implement assistive technology, and to gain an understanding about their value of assistive technology. This information will aid in discovering why some educators are able to apply assistive technolog or discontinue its use.

What Will Happen if You Take Part in This Study?

If you agree to take part in this study, you will be asked to share information about your experience working with students with special needs and their assistive technology in an audio recorded interview. This includes how long you have worked in special education, how you entered into special education, your experience with working with students who use assistive technology, your background in learning how to use and implement assistive technology, your experiences with implementing it, and your comments about assistive technology. I expect the interview to take approximately 45-60 minutes. The interview will be audio recorded and transcribed. To protect your identity, you will be assigned a random identifier. The audio recording will be deleted after it is transcribed.

How Could You Benefit From This Study?

Although you will not directly benefit from being in this study, you might benefit from being in this study because information gathered on learning to use assistive technology may be used to refine the training process.

What Risks Might Result From Being in This Study?

You might experience a minimal risk from being in this study. That minimal risk might be a breach of confidentiality. The researcher ensures that your information will be kept private and unidentifiable. The interview will be collected and housed on a personal computer which is only used by the researcher. You will be assigned a random identifier and the audio file will be permanently deleted after it is transcribed.

How Will We Protect Your Information?

I plan to publish the results of this study to my university for educational purposes only. To protect your privacy, I will not include information that could directly identify you or your district. I will ask for separate written permission from each participant to allow me to audio record the interview.

I will protect the confidentiality of your research records by assigning a random identifier to each participant. Your name and any other information that can directly identify you will be stored separately from the data collected as part of the project. The audio recording will be deleted after it is transcribed.

What Will Happen to the Information We Collect About You After the Study is Over?

I will not keep your research data to use for future research or other purposes. Your name and your district's name, as well as other information that can directly identify you, will be deleted from the research data as part of the project.

How Will We Compensate You for Being Part of the Study?

You will receive a gift card to a restaurant for your participation in this study. If you decide to withdraw from the research study during the interview, you will still receive the gift card for your time spent with me.

What Other Choices do I Have if I Don't Take Part in this Study?

If you choose not to participate in the live interview, you may complete the interview questions electronically. Then you can return them to me.

Your Participation in this Research is Voluntary

It is completely up to you to decide to be in this research study. Participating in this study is voluntary. Even if you decide to be part of the study now, you may change your mind and stop at any time. You do not have to answer any questions you do not want to answer. If you decide to withdraw before this study is completed, information gathered up until that time will be used in the research study. I will follow the same identity protection as if the study was completed.

Contact Information for the Study Team and Questions about the Research

If you have questions about this research, you may contact me, Kendra Bittner at (412)639-9566 or email me at kxb1096@sru.edu

Contact Information for Questions about Your Rights as a Research Participant

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the following:
Institutional Review Board
Slippery Rock University
104 Maltby, Suite 008
Slippery Rock, PA 16057
Phone: (724)738-4846
Email: irb@sru.edu

Your Consent

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. I will give you a copy of this document for your records. I will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact me using the information provided above.
I understand what the study is about and my questions so far have been answered. I agree to take part in this study. I understand that I can withdraw at any time. A copy of this signed Consent Form has been given to me.

_____	_____	_____
Printed Participant Name	Signature of Participant	Date

By signing below, I indicate that the participant has read and to the best of my knowledge understands the details contained in this document and have been given a copy.

_____	_____	_____
Printed Name of Investigator	Signature of Investigator	Date

Photo/Audiotape/Videotape Release Form:

I request the use of audio recorded material of you as part of our study. I specifically ask your consent to use this material, as I deem proper, specifically, for news releases, professional publications, websites and pictorial exhibits related to our study. I also emphasize that the appearance of these materials on certain media (websites, professional publication, news releases) may require transfer of copyright of the images. This means that other individuals may use your image. Regarding the use of your likeness in audiotape, please check one of the following boxes below:

☐ I do give unconditional permission for the investigators to utilize audiotapes of me
☐ I do not give unconditional permission for the investigators to utilize audiotapes of me

_____	_____	_____
Printed Participant Name	Signature of Participant	Date

PLEASE NOTE: Should you choose not to allow your voice to be used, I can still benefit from your inclusion as a research study participant. I will take notes as we talk, or you may have the option to complete an electronic copy of the interview questions.

Acceptance to the Study

June 22, 2021

Dr. Superintendent
Superintendent of School District
Street address
Pennsylvania, PA

RE: Thank You

Dear Educator,

Thank you for granting me permission to conduct interviews with your staff for my dissertation. I greatly appreciate it. Slippery Rock University's IRB committee approved my participant recruitment. I would like to contact the following people:

- , Special Education Teacher
- , General Education Teacher
- , Speech Language Pathologist
- , Occupational Therapist
- , Physical Therapist
- , Paraeducator

As a professional courtesy, I will contact the school principal and special education director to inform them of your approval and of the study.

Again, much gratitude for your support. I look forward to continuing to work with your staff and their assistive technology needs.

Kind regards,

Kendra V. Bittner
Doctoral Student at Slippery Rock University
kxb1096@sru.edu
(412) 639-9566

Inform District Personnel

June 22, 2021

Principal / Special Educator Director
School District
Street address
Pennsylvania, PA

RE: Approval to Conduct a Research Study

Dear Principal / Special Education Director,

Hello! I am currently enrolled in the Doctor of Special Education program at Slippery Rock University in Slippery Rock, Pa. I am in the process of doing research for my dissertation. I received approval from your superintendent to conduct interviews as a part of my research study. The study is entitled, "A Phenomenological Qualitative Inquiry: Use or Discontinued Use of Assistive Technology in the School Setting."

I am seeking to interview educators with whom I have worked in supporting their assistive technology needs. Slippery Rock University's IRB committee approved my participant recruitment. I would like to contact the following people:

- , Special Education Teacher
- , General Education Teacher
- , Speech Language Pathologist
- , Occupational Therapist
- , Physical Therapist
- , Paraeducator

The interview will take no longer than 60 minutes. Participation is entirely voluntary. Those who volunteer to participate will be given a consent form to be signed and returned to me.

Participants will complete the interview on a date, time, and format (Zoom written questionnaire) of their choosing. The interview should take no longer than 60 minutes. The interview results will be collected and analyzed for the dissertation. Individual input will be kept confidential. No personal information will be used to identify the district and the participants. Should this study be published, only results will be documented. No costs will be incurred by either your district or the individual participants.

Thank you kindly for your support. I look forward to continuing to work with your staff and their assistive technology needs.

Kind regards,

Kendra V. Bittner
Doctoral Student at Slippery Rock University
kxb1096@sru.edu
(412) 639-9566

Invitation to Participants

June 22, 2021

Educator
School District
Street address
Pennsylvania, PA

RE: Invitation to Participate in a Research Study

Dear Educator,

Hello! I am reaching out to you for your assistance. I am currently enrolled in the Doctor of Special Education program at Slippery Rock University in Slippery Rock, Pa. I am in the process of doing research for my dissertation. I received approval from your superintendent to conduct interviews as a part of my research study. The study is entitled, "A Phenomenological Qualitative Inquiry: Use or Discontinued Use of Assistive Technology in the School Setting."

I have worked with you and your team in providing assistive technology supports for one or more students. As a part of my research, I would like to know more about your experience as an educator on how you learned about assistive technology, how you learned to use it, to gain your perspective on assistive technology, and to talk about your experience with the assistive technology. I am asking to talk with key IEP team members because my goal is to learn about each team member's experience.

If you agree, I would like gather information from you one of two ways. (1) Zoom on a date and time that is convenient to you or (2) you can complete questionnaire. The discussion should take no more than 60 minutes. I will provide a small token to compensate you for your time. The information you provide will be recorded and used for academic purposes only. The recording will be permanently deleted. If you want to participate and prefer to not be recorded, I will be happy to provide you with a link to a Google Form with the same questions for you to write your responses. No identifying information about you, your school, and your student will be used. Information gained will not be used in any way to affect your job or how we work together.

If you agree, kindly sign and email me the Consent to Participate and Photo/Audiotape/Videotape Release Form.

1. Read, sign, and return the Consent to Participate and Photo/Audiotape/Videotape Release Form via a scan. Please keep a copy for your files.
2. Share with me your preferred format:
    a. Live discussion via Zoom - Send me dates and times between now and July 13, 2021 that are convenient for you.

OR

b. Write your responses via a Google Form – I will send you the link upon receipt of your consent form.

3. Send me the address where I can mail your token of appreciation.

I will be happy to answer any questions or concerns that you may have at that time. You may contact me at my email address: kxb1096@sru.edu or call me at (412) 639-9566.
Thank you for your consideration and response.

Kind regards,
Kendra

Kendra V. Bittner
Doctoral Student at Slippery Rock University
Kendra V. Bittner
Doctoral Student at Slippery Rock University
kxb1096@sru.edu ,(412) 639-9566

Dr. Ashlea Rineer-Hershey
Principal Investigator
Slippery Rock University
a.rineer-hershey@sru.edu

Slippery Rock University of Pennsylvania

CONSENT TO PARTICPATE IN RESEARCH

A Phenomenological Qualitative Inquiry: Use or Discontinued Use of Assistive Technology in the School Setting

Dr. Ashlea Rineer-Hershey, Principal Investigator
a.rineer-hershey@sru.edu
724-738-2460

Kendra V. Bittner
kxb1096@sru.edu
(412)639-9566

Invitation to be Part of a Research Study

You are invited to participate in a research study for a dissertation on the implementation of assistive technology in the education setting. In order to participate, participants must be over 18 years of age, work in a school district as an educator who supports students with special needs, and work with student(s) who use assistive technology.

Important Information about the Research Study

Things you should know:

- The purpose of the study is to interview educators to gain an understanding of their experiences, values, and implementation of assistive technology in the educational setting.
- If you choose to participate, your consent will allow me to contact key educators to be interviewed. The educators I will contact are those with whom I have worked. They include two special education teacher(s), general education teacher(s), paraprofessional(s), two speech language pathologist(s), occupational therapist, and/or physical therapist. I will contact them via email, invite them to participate in an interview, and ask for a date, time, and platform in which to be interviewed (Zoom or phone call). The interview should take about 45-60 minutes.
- Risks or discomforts from this research include sharing their experiences with assistive technology in the educational setting. Personal information will be protected and will not be used to specifically identify participants in any way.
- The study will not benefit the participants.
- Taking part in this research project is voluntary. You do not have to participate, and you can stop at any time.

Please take time to read this entire form and ask questions before deciding whether to take part in this research project.

What is the Study About and Why are We Doing it?

The purpose of the study is to gain an understanding of educators' experiences with assistive technology and how they implement it or not. The goals are to learn how educators learn to

use assistive technology, to learn how they implement assistive technology, and to gain an understanding about their value of assistive technology. This information will aid in discovering why some educators are able to apply assistive technolog or discontinue its use.

What Will Happen if You Take Part in This Study?

If you agree to take part in this study, you will be asked to share information about your experience working with students with special needs and their assistive technology in an audio recorded interview. This includes how long you have worked in special education, how you entered into special education, your experience with working with students who use assistive technology, your background in learning how to use and implement assistive technology, your experiences with implementing it, and your comments about assistive technology. I expect the interview to take approximately 45-60 minutes. The interview will be audio recorded and transcribed. To protect your identity, you will be assigned a random identifier. The audio recording will be deleted after it is transcribed.

How Could You Benefit From This Study?

Although you will not directly benefit from being in this study, you might benefit from being in this study because information gathered on learning to use assistive technology may be used to refine the training process.

What Risks Might Result From Being in This Study?

You might experience a minimal risk from being in this study. That minimal risk might be a breach of confidentiality. The researcher ensures that your information will be kept private and unidentifiable. The interview will be collected and housed on a personal computer which is only used by the researcher. You will be assigned a random identifier and the audio file will be permanently deleted after it is transcribed.

How Will We Protect Your Information?

I plan to publish the results of this study to my university for educational purposes only. To protect your privacy, I will not include information that could directly identify you or your district. I will ask for separate written permission from each participant to allow me to audio record the interview.

I will protect the confidentiality of your research records by assigning a random identifier to each participant. Your name and any other information that can directly identify you will be stored separately from the data collected as part of the project. The audio recording will be deleted after it is transcribed.

What Will Happen to the Information We Collect About You After the Study is Over?

I will not keep your research data to use for future research or other purposes. Your name and your district's name, as well as other information that can directly identify you, will be deleted from the research data as part of the project.

How Will We Compensate You for Being Part of the Study?

You will receive a gift card to a restaurant for your participation in this study. If you decide to withdraw from the research study during the interview, you will still receive the gift card for your time spent with me.

What Other Choices do I Have if I Don't Take Part in this Study?

If you choose not to participate in the live interview, you may complete the interview questions electronically. Then you can return them to me.

Your Participation in this Research is Voluntary

It is completely up to you to decide to be in this research study. Participating in this study is voluntary. Even if you decide to be part of the study now, you may change your mind and stop at any time. You do not have to answer any questions you do not want to answer. If you decide to withdraw before this study is completed, information gathered up until that time will be used in the research study. I will follow the same identity protection as if the study was completed.

Contact Information for the Study Team and Questions about the Research

If you have questions about this research, you may contact me, Kendra Bittner at (412)639-9566 or email me at kxb1096@sru.edu

Contact Information for Questions about Your Rights as a Research Participant

If you have questions about your rights as a research participant, or wish to obtain information, ask questions, or discuss any concerns about this study with someone other than the researcher(s), please contact the following:
Institutional Review Board
Slippery Rock University
104 Maltby, Suite 008
Slippery Rock, PA 16057
Phone: (724)738-4846
Email: irb@sru.edu

Your Consent

By signing this document, you are agreeing to be in this study. Make sure you understand what the study is about before you sign. I will give you a copy of this document for your records. I will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact me using the information provided above.
I understand what the study is about and my questions so far have been answered. I agree to take part in this study. I understand that I can withdraw at any time. A copy of this signed Consent Form has been given to me.

_____	_____	_____
Printed Participant Name	Signature of Participant	Date

By signing below, I indicate that the participant has read and to the best of my knowledge understands the details contained in this document and have been given a copy.

_____	_____	_____
Printed Name of Investigator	Signature of Investigator	Date

Photo/Audiotape/Videotape Release Form:

I request the use of audio recorded material of you as part of our study. I specifically ask your consent to use this material, as I deem proper, specifically, for news releases, professional publications, websites and pictorial exhibits related to our study. I also emphasize that the appearance of these materials on certain media (websites, professional publication, news releases) may require transfer of copyright of the images. This means that other individuals may use your image. Regarding the use of your likeness in audiotape, please check one of the following boxes below:

☐ I do give unconditional permission for the investigators to utilize audiotapes of me
☐ I do not give unconditional permission for the investigators to utilize audiotapes of me

_____	_____	_____
Printed Participant Name	Signature of Participant	Date

PLEASE NOTE: Should you choose not to allow your voice to be used, I can still benefit from your inclusion as a research study participant. I will take notes as we talk, or you may have the option to complete an electronic copy of the interview questions.

Thank You Correspondence to the Participant

July, 2021

Educator
School District
Street address
Pennsylvania, PA

RE: Thank You

Dear Educator,

Thank you for taking time out of your day to discuss with me your experience with learning how to use and implement assistive technology for your student(s). Your time and information are much appreciated and will be used for academic purposes in my dissertation. Your dedication to the student and *his/her* assistive technology is invaluable.

As a token of my appreciation, please accept this gift card as a thank you. Should you have any questions, want to rescind your input, and/or want to access results of all participants' interviews, please contact me.

I look forward to continuing to work with you as your assistive technology coordinator in supporting your students.

Kind regards,

Kendra V. Bittner
Doctoral Student at Slippery Rock University
kxb1096@sru.edu
(412) 639-9566

Appendix E: Semi-Structured Interview Questions

Name:

Date:

Researcher/Interviewer:

Setting:

Demographic Information

1. Please tell me a bit about yourself. What grade(s), subject area(s) do you teach or support? Why did you choose to work in special education?
2. How long have you been working with students with IEPs or 504 service agreements?
3. How many students have you worked with from September 2017 to now who have:
    a. assistive technology listed as an accommodation in their IEP or 504 service agreement?
    b. utilized assistive technology that is provided outside the formal constructs of an IEP or 504 service plan (i.e. used in the classroom with all students, provided by the family or another related service provider)?

AT Process

4. How was assistive technology determined for your student(s)?
    a. Probing question: Tell me who was involved in the process to trial, collect data, and make the decision.
    b. Probing question: Tell me how you were involved in the process.
    c. Probing question: Tell me how you, the student, and/or the family were included in the decision-making process.

5. Tell me about the type of support you received to effectively implement assistive technology (e.g. administrative, training, follow up).

Experience with AT

6. How did you learn to use the specific assistive technology tool(s) selected for your student (e.g. college course, professional development, training, video from the company, attended a company training, explored on my own, etc.)?
    a. Probing question: What type of training works best for you to learn how to use the assistive technology tool (e.g. in person, one to one, small group with the team, watching a video, exploring on your own)?
7. How did you learn to implement the specific assistive technology tool(s) selected for your student (e.g. college course, professional development, training, video from the company, attendance at a company training, explored on my own, etc.)?
    a. Probing question: What type of training works best for you to learn how to implement the assistive technology tool(s) selected for your student (e.g. in person, one to one, small group with the team, watching a video, exploring on your own etc.)?
8. If you were asked to define assistive technology to another teacher or parent, how would you describe assistive technology and its purpose?

Educator's Perspectives

9. Tell me some disadvantages you encountered with using assistive technology with your student(s).
10. Tell me about a time when assistive technology was implemented unsuccessfully with your student and it was no longer used.
    a. Probing question: What resources were available to you to address the problem?

   b. Probing question: What effect did using these resources have on the AT implementation?

11. Tell me some advantages of using assistive technology with your student(s).
12. Tell me about a time when assistive technology was implemented successfully with your student and it was continued to be used.
    a. Probing question: In your opinion, what contributed to its success?
13. What concerns, comments or thoughts do you have about using AT with your students?
14. What would you like to add that has not been discussed?

Appendix F: Research and Interview Questions Matrix

Research Questions/ Interview Questions	How do educators learn to use and implement assistive technology?	What are educators' perceptions of assistive technology?	Why is assistive technology able to be used by educators?	Why is assistive technology discontinued to be used by educators?
1. Please tell me a bit about yourself. What grade(s), subject area(s) do you teach or support? Why did you choose to work in special education?				
2. How long have you been working with students with IEPs or 504 service agreements?				
3. How many students have you worked with from September 2017 to now who have: a. assistive technology listed as an accommodation in their IEP or 504 service agreement?				
b. utilized assistive technology that is provided outside the formal constructs of an IEP or 504 service plan (i.e. used in the classroom with all students, provided by the family or another related				

Research Questions/ Interview Questions	How do educators learn to use and implement assistive technology?	What are educators' perceptions of assistive technology?	Why is assistive technology able to be used by educators?	Why is assistive technology discontinued to be used by educators?
service provider)?				
4. How was assistive technology determined for your student(s)?	X			
a. Probing question: Tell me who was involved in the process to trial, collect data, and make the decision.	X			
b. Probing question: Tell me how you were involved in the process.	X			
c. Probing question: Tell me how you, the student, and/or the family were included in the decision-making process.	X			
5. Tell me about the type of support you received to effectively implement assistive technology (e.g. administrative, training, follow up).	X			
6. How did you learn to use the specific assistive technology tool(s) selected for your student (e.g. college course, professional development, training,	X			

Research Questions/ Interview Questions	How do educators learn to use and implement assistive technology?	What are educators' perceptions of assistive technology?	Why is assistive technology able to be used by educators?	Why is assistive technology discontinued to be used by educators?
video from the company, attended a company training, explored on my own, etc.)?				
a. Probing question: What type of training works best for you to learn how to <u>use</u> the assistive technology tool (e.g. in person, one to one, small group with the team, watching a video, exploring on your own)?	X			
7. How did you learn to <u>implement</u> the specific assistive technology tool(s) selected for your student (e.g. college course, professional development, training, video from the company, attendance at a company training, explored on my own, etc.)?	X			
a. Probing question: What type of training works best for you to learn how to <u>implement</u> the assistive	X			

Research Questions/ Interview Questions	How do educators learn to use and implement assistive technology?	What are educators' perceptions of assistive technology?	Why is assistive technology able to be used by educators?	Why is assistive technology discontinued to be used by educators?
technology tool(s) selected for your student (e.g. in person, one to one, small group with the team, watching a video, exploring on your own etc.)?				
8. If you were asked to define assistive technology to another teacher or parent, how would you describe assistive technology and its purpose?		X		
9. Tell me some disadvantages you encountered with using assistive technology with your student(s).		X	X	
10. Tell me about a time when assistive technology was implemented unsuccessfully with your student and it was no longer used.		X		X
a. Probing question: What resources were available to you to address the problem?		X		X

Research Questions/ Interview Questions	How do educators learn to use and implement assistive technology?	What are educators' perceptions of assistive technology?	Why is assistive technology able to be used by educators?	Why is assistive technology discontinued to be used by educators?
b. Probing question: What effect did using these resources have on the AT implementation?		X		X
11. Tell me some advantages of using assistive technology with your student(s).		X	X	
12. Tell me about a time when assistive technology was implemented successfully with your student and it was continued to be used.		X	X	
13. What concerns, comments or thoughts do you have about using AT with your students?		X	X	X
14. What would you like to add that has not been discussed?		X		

Appendix G: IRB Certificates

CITI PROGRAM

Completion Date 06-Jul-2020
Expiration Date 06-Jul-2022
Record ID 37333320

This is to certify that:

Kendra Bittner

Has completed the following CITI Program course:

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Human Subjects Research (Curriculum Group)
Students Conducting No More than Minimal Risk Research (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Slippery Rock University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?wfcceb5cd-3227-49de-b0ac-3727fe41b197-37333320

CITI PROGRAM

Completion Date 09-Jul-2020
Expiration Date 09-Jul-2023
Record ID 37378387

This is to certify that:

Kendra Bittner

Has completed the following CITI Program course:

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Revised Common Rule (Curriculum Group)
Revised Common Rule (Course Learner Group)
1 - Basic Course (Stage)

Under requirements set by:

Slippery Rock University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w94d033cb-6ed0-4568-ae44-e6efdd7dd88f-37378387