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Doctoral Capstone Project

**BREAKING DOWN BARRIERS TO THE INTEGRATION OF ASSISTIVE
TECHNOLOGY**

by

**KRISTEN MANCHIN, MS, OTR/L**

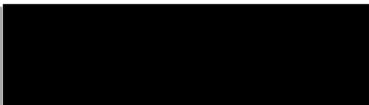B.S., Towson University, 2008
M.S., Philadelphia University, 2013

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Approved by

Academic Advisor_____

Cynthia Abbott-Gaffney, OTD, MA, OTR/L, FAOTA
Associate Professor of Occupational Therapy

Program Director_____

Kimberly Gargin-Pachik, OTD, OTR/L
Clinical Professor of Occupational Therapy

**"When technology integration is at its best, a child or a teacher doesn't stop to think**

**that he or she is using a technology tool – it is second nature. And students are often**

**more actively engaged in projects when technology tools are a seamless part of the**

**learning process."**

~ Nana Gilbertson

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**BREAKING DOWN THE BARRIERS TO ASSISTIVE TECHNOLOGY**

**KRISTEN MANCHIN, MS, OTR/L**

Temple University College of Public Health Author, 2024

Major Professor:  Dr. Cynthia Abbott-Gaffney, OTD, MA, OTR/L, FAOTA; Associate
Professor

## ABSTRACT

Although assistive technology (AT) can be life-changing for needing individuals, numerous barriers exist when attempting to introduce and integrate AT into the daily lives and routines of elementary school students with special needs and learning differences. Limited awareness and training are two of the major contributing factors. Recent reports show that approximately 240 million children have disabilities, and without access to the products and services they need, it can significantly impact them as individuals, their families, and their communities (United Nations, 2022). It is expected that the need for individuals requiring the use of AT will rise to approximately 3.5 billion by the year 2050, and therefore, it is essential to offer the needed supports and services in a timely and data-driven manner (United Nations, 2022). Introducing and teaching individuals with special needs and learning differences to use these tools at an early age and with the support of trained multi-disciplinary professionals can help meet these growing needs and challenges.

In partial fulfillment of a post-professional doctorate degree in occupational therapy, I have developed this doctoral capstone to include a research study using a mixed-methods approach, including a literature review, an original survey, and semi-structured interviews to gather additional knowledge and data regarding perceptions, learning, and awareness of available AT, its use, and its direct impact on the individual users. The results of this study contributed to

the development of targeted interventions and programming to address and limit barriers

impeding access to AT for elementary school students.

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# LIST OF ABBREVIATIONS

ADLs…………………………………………………………Activities of Daily Living

AT…………………………………………………………...……Assistive Technology

ATDs……………………………………………………Assistive Technology Devices

AOTA……………………………….…American Occupational Therapy Association

ATIA…………………………………….…..Assistive Technology Industry Association

COPM……………………………………….. Canadian Occupational Performance Measure

EHP…………………………………………………Ecology of Human Performance

ELT……………………………………………………. Experiential Learning Theory

EPER………………………………………………...Extra Pay for Extra Responsibility

ESEA…………………………………….…Elementary and Secondary Education Act

FAPE……………………………………………...…Free Appropriate Public Education

HBCU………………………………………….Historically Black Colleges and Universities

IADLs………………………………………..…Instrumental Activities of Daily Living

IDEA…………………………………………….Individuals with Disabilities Education Act

IEP……………………………………………………. Individualized Education Plan

LEA…………………………………………………………Local Education Agency

LoTTIE…………………………………………..Low-Tech Tools for Inclusive Education

MSI……………………………………………..…Minority Serving Institutions

NEA……………………………………………………National Education Association

OSERS…………………………….Office of Special Education and Rehabilitative Services

OT……………………………………………………….…Occupational Therapist

OTPF……………………………………….…Occupational Therapy Practice Framework

PIADS…………………………………Psychosocial Impact of Assistive Devices Scale

SEA……………………………………………………..State Education Agency

SELF-A…………………………………….Self-Efficacy for Learning Form - Abridged

SDP………………………………………………………Service Delivery Process

SKATE…Skills and Knowledge on Assistive Technology in Early Childhood Inclusive

Education

SPEACS……Systematic Process for Enhancing and Assessing Communication Supports

TAM……………………………………....………….Technology Acceptance Model

TCCU…………………………………….Tribally Controlled Colleges and Universities

UNICEF……………………….United Nations International Children's Emergency Fund

WEMWBS……………………………...Warwick-Edinburgh Mental Well-Being Scale

WHO…………………………………………….....…World Health Organization

**CHAPTER ONE – Introduction**

**Introduction**

Assistive technology (AT) can play a significant role in promoting function, participation, and independence in the lives of those living with disabilities and learning differences. According to the World Health Organization (WHO), for those requiring AT devices and services, learning to use and incorporate these tools throughout their early academic years can lead to improved long-term health and well-being for direct and indirect users (WHO, 2024). Additionally, there are associated socioeconomic benefits, including the reduction of direct health and welfare costs, the creation of a more productive workforce, and the stimulation of economic growth (WHO, 2024). The ability for an individual to effectively take part in roles and occupations, allowing them to be productive members of society, gives way to positive feelings of self-worth and mental health. Despite knowing the positive impacts AT can have on an individual and the community, the integration and use of AT are often not employed to their full potential within the school setting. Ahmed (2020) states that poor opportunities for training, the availability of devices, and the level of students' needs impact teachers' knowledge, beliefs, and skills for using and implementing AT. These barriers contribute to AT non-adherence and abandonment, or non-use due to psychosocial reasons and an active and conscious choice to stop using a device, respectively (Jahan et al., 2024).

**Background**

The Assistive Technology Industry Association (ATIA) defines AT as "any item, piece of equipment, software program, or product system that is used to increase, maintain, or improve the functional capabilities of persons with disabilities" (ATIA, n.d.). Another key aspect of providing AT is the service delivery process (SDP). The U.S. Department of Education (2024) defines the

AT SDP as "any service that directly assists the child with a disability in the selection, acquisition, or use of an ATD." These services should include an evaluation of needs, buying or getting the ATD, feature matching, planning for integration, and training for stakeholders (U.S. Department of Education, 2024). Section 504 of the *Rehabilitation Act of* 1973 protects the rights of students with disabilities by ensuring these students are not excluded from their ability to take part, cannot be denied benefits, or be subjected to discriminatory action by any program or activity receiving federal funding (U.S. Department of Education, 2024). By providing the technology and skills needed to participate in educational experiences, students can access Free Appropriate Public Education, also known as FAPE (U.S. Department of Education, 2024). Education in regular classes, education in regular classes with the use of related aids and services, or special education and related services in separate classrooms for all or portions of the school day," are considered appropriate education (U.S. Department of Education, 2024).

With the potential to have life-long impacts on direct and indirect users, AT can promote function, participation, and independence in the lives of those with different abilities and learning challenges. More specifically, AT encourages involvement and engagement in academic and vocational tasks, social encounters, and accessibility to physical environments, encouraging more meaningful and purposeful life opportunities and experiences" (Bartfai & Boman, 2014; Brandt et al., 2011; Dahlberg, Blomquist, Richter, & Lampal, 2014; Larsson Ranada & Lidstrom, 2019; Steel & de Witte, 2011). Similar to Early Identification and Early Intervention, identifying the need for assistive technology in younger learners should begin as early as possible to reap the most influential benefits (Hunt, 2021). Despite knowing the positive impacts, the implementation of AT can have on direct and indirect users, commonly reported barriers continue to inhibit access. The

WHO and United Nations International Children's Emergency Fund (UNICEF) report that more than 2.5 billion people require assistive devices or products; however, one billion of them are denied access (WHO & UNICEF, 2022). Access is especially concerning for those living in low- and middle-income countries. Access to needed technologies can be available to as few as 3% of those in need (WHO & UNICEF, 2022). Of the 240 million children with disabilities, those without access and instruction to AT are more likely to miss academic opportunities, live with increased risks of discrimination, and experience negative impacts on confidence and well-being (UNICEF, 2021).

**Statement of the Problem**

As a basic human right, Simon et al. (2023) report that inclusive education and equity are the foundational pillars supporting improvement within schools. Over recent years, there has been a strong push to include students with disabilities in general education settings. As these students with disabilities are integrated into general education curriculums, adaptations and modifications to instruction, such as the incorporation of AT, may play a critical role when accommodating these students' learning needs (Zilz & Pang, 2021). Improving early access to AT can lead to increased awareness and exposure of this population's contributions to their schools and communities, influence positive psychosocial experiences, facilitate adaptability, and improve self-esteem (McNicholl et al., 2020). With early introduction and implementation of an educated and trained transdisciplinary school staff, AT will not only support inclusion and equitable access for participation of children within their educational environments, but also support their ability to engage with the world, build social relationships, and develop independence and overall mental health, and wellbeing (Hunt, 2021). By providing these students with added or full inclusion

opportunities, all involved stakeholders may experience benefits: the direct users, their families, the teachers, school professionals, classmates, classmates' families, and the greater community (Simon et al., 2023). When denied the right to access AT, not only can the effects impact the direct user but also the family and community members and the individual's contributions to society (WHO, 2024).

**Role of Occupational Therapy**

The Occupational Therapy Practice Framework (OTPF) states that occupational therapists are responsible for supporting and maintaining a client's health and wellness by engagement in home, school, workplace, and community settings (AOTA, 2014). According to the American Occupational Therapy Association (AOTA), occupations performed in the areas of activities of daily living (ADLs), instrumental activities of daily living (IADLs), education, play, leisure, and social participation fall within the scope of practice for occupational therapy practitioners, (AOTA, 2024). These areas include toileting, hygiene, dressing, eating and feeding, functional mobility, communication management, formal and informal educational participation, exploration and participation in play and leisure, and friend and peer group participation (AOTA, 2020). Contextual factors, including products and technology, contribute to a student's performance, and play a crucial role in student participation (AOTA, 2020). Contextual environments within the school setting may include accessing the cafeteria for school lunch, textbooks, instruments for music class, bathrooms, and playgrounds (AOTA, 2020). Occupational therapists are ideal professionals to support the needs of individuals and additional stakeholders potentially benefiting from the early integration of AT, as AT can influence many or all of these domains. The seven core values of occupational therapy include *altruism, equality,*

*freedom, justice, dignity, truth,* and *prudence,* which can be applied when considering the lives

and experiences of the intended AT beneficiaries (NeuroLaunch, 2024). Offering and supporting

the use of AT early in an individual's early academic years gives access to these core values. An

occupational therapist's role is to assist and support individuals and clients with overcoming

challenges limiting their participation in their daily roles and routines. Through skilled

observation and assessment, occupational therapists can apply these values when identifying and

recommending specific AT conducive to meeting the holistic needs of the client throughout the

lifespan.

      Below, in Figure 1, is a mind map depicting topics and areas of focus when researching

the barriers contributing to early access and integration of AT within the school setting.

**Figure 1**

*Mind map*

**Proposed Solution: Central Commitment to Bridging the Gap**

My proposed solution includes original research with outcomes used to inform original program development. My goal is to decrease the barriers impacting the early adoption of AT within the educational setting, and improve participation, function, and independence for students with different learning needs. This intervention aims to enhance school professionals' ability to define AT and the AT SDP, understand governing laws, increase awareness of commonly used AT within the elementary school settings, utilize strategies for effective recommendation and implementation, facilitate access and trial of AT through local state agencies, and incorporate testimonials regarding how early integration of AT can potentially impact the future success of the intended users. To gain added insight from Individualized Education Plan (IEP) team members on AT in the educational environment, I developed a self-reported survey distributed using social media platforms to collect information on barriers, perceptions, knowledge, and confidence when working with students who are, or could potentially benefit from the integration of AT. I also conducted semi-structured interviews to support a deeper understanding of the information collected from survey participants. Through the implementation of education and training programs, improvements in school staff's overall knowledge of AT post-education and training can be found along with the potential for and effectiveness of increasing AT use in academic environments. Because training and education are consistently and strongly reoccurring themes among reported barriers to AT integration, the proposed intervention will include training based on methodologies identified as most effective by educators and related personnel. In doing so, defining AT, showing levels of AT, and

providing background information will be necessary. I will also share highlights of relevant laws,

requirements, types of assistive devices, and ideal training planning.

**CHAPTER TWO – Project Evidence and Theoretical Base Supporting Central Commitment**

**Introduction**

This chapter will present a theoretical basis for understanding factors contributing to the problem related to decreased assessment for, delivery of, and consistent incorporation of assistive devices to increase curriculum access in the school setting. I also present a visual model of the problem. Finally, using guiding questions, I synthesize the evidence on contributors to the problem, as well as prior efforts to address the problem.

**Model of the Problem**

Incorporating assistive technology into classroom routines for students with disabilities can help bridge the academic gap when accessing the general education curriculum. Oftentimes, these technologies are being underutilized within the classroom setting due to a variety of factors. The research identifies barriers, including inadequate funding, limited information, poor training and support for staff, deficiencies in outcome assessments, and negative staff attitudes (Hemmingsson & Nygard, 2009). Because indirect technology users such as educators, assistants, related service providers, and caregivers are not provided with adequate training and support, AT is often viewed negatively. To ensure the effectiveness and carryover of the AT, all stakeholders should be involved in the SDP. By including stakeholders in the process, there is a greater opportunity to understand and improve educational, social, and physical experiences and outcomes for learners with disabilities (Ayon & Dillion, 2021). Alghamdi (2022) that suggests increased confidence in using AT results in increased familiarity and greater frequency of use. Incorporating assistive technology into classroom routines for differently abled students can help support long-term positive mental health and well-being (Mahoney & Hall, 2017). Using AT to

access the general education curriculum can support students experiencing challenges with keeping the educational pace of their peers and increase opportunities for inclusion (Freeman-Green et al., 2023). As students requiring additional learning support have more meaningful inclusion opportunities, they can also experience added social benefits and opportunities (Schladant, et al., 202). Encouraging the use of AT among elementary-age direct users, their peers, and other school professionals can begin to normalize the need and integration of AT into daily routines and tasks throughout the lifespan (Dratsiou et al., 2021; Owuor et al.,2018). By opening more attractive and profitable career prospects, these individuals will have the potential to live more fulfilling and gratifying adult lives contributing to increased positive mental health and well-being (Moulton, 2021). Those unable to access necessary AT may be subject to feelings of exclusion and isolation and be more likely to live in poverty, becoming a burden on family members and society (Khalil, 2022).

**Figure 2**

*Model of the problem*

**Theory Supporting Problem and Solution**

To promote life-long positive mental health and well-being in elementary-age students, it is important to address barriers limiting access to AT in the school environment. Consistent and methodical implementation of AT must be offered by related services professionals and educators to increase acceptance and utilization among stakeholders within the classroom setting. Using theories such as the Technology Acceptance Model (TAM) and the Ecology of Human Performance (EHP), the researchers can enhance and target the need for and importance of incorporating AT throughout needing individuals' daily lives.

The Technology Acceptance Model (TAM), developed by Fred Davis in 1985, states that the more likely one believes technology is easy to use, the more likely one is to adopt and use the technology (Scherer et al., 2019). The core principles include perceived usefulness, perceived ease of use, and attitude toward using the technology (Scherer et al., 2019). Perceived usefulness corresponds to what one believes technology can do to enhance performance or achieve goals (Scherer et al., 2019). Perceived ease of use is the degree to which one believes using technology will be effortless and straightforward (Scherer et al., 2019). Perceived usefulness and perceived ease of use; together, create the attitude towards using the technology (Scherer et al., 2019). Outcome variables of the core principles include behavioral intent; or the intent to use the technology, and technology use. The subjective norm, or an important person's view of the technology, computer self-efficacy or the degree to which one feels as though they can perform the computer task and facilitating conditions or the belief that the organization supports the use of technology make up the external barriers (Scherer et al., 2019). When applying this theory to the model of the problem, the school staff's perceived use and perceived ease of use of the AT

impact their attitude toward using and incorporating it into the classroom. Their attitude impacts

the intent and actual use of the technology. Usefulness and ease of use are impacted by external

barriers such as a district's AT training team, the educators perceived confidence in using the

technology, and the availability and support provided by contributing external factors to integrate

the technology.

**Figure 3**

*The Technology Acceptance Model (TAM)*



Technology acceptance model (TAM) (Davis, Bagozzi, & Warshaw, 1989, p. 985)

Using the Ecology of Human Performance (EHP) model, one can begin to formulate the

idea that changing and adapting the students' context to complete a task, will then in turn, impact

the students' performance and enhance their skills and abilities. EHP, developed by occupational

therapy faculty members at the University of Kansas, believes that contextual factors should not

only consider the physical environment, but also the cultural backgrounds, and relationships of

those within their environments (Dunn et al., 1994). Context, according to the EHP model,

encompasses one's temporal, physical, cultural, and social environments (Dunn et al., 1994).

When considering differently abled students and their performance within their environment, it is

pertinent for educators and other school staff, to determine not only how their role and their

relationship with the student impact performance, but also, how relationships with the student's peers, and the academic, social and physical demands of the classroom contribute to their self-conceptualization and performance within the class. By altering and adapting the concept to normalize the use of AT making it a part of everyday routines, it is then that the context begins to form more inclusivity, while also increasing the student's role and feelings of belonging, contributing to positive mental health and well-being (Dunn et al., 1994).

**Figure 4**

*The Ecology of Human Performance Model: Limited Context Without AT*



(Figure 2.3 adapted from Dunn et al., 1994, p. 600)

**Figure 5**

*The Ecology of Human Performance Model: Improved context with AT*



(Figure 2.4 adapted from Dunn et al., 1994, p. 600)

Stakeholders' perceptions regarding the use of technology play a significant role in the use and implementation of assistive technology in the classroom. Without the confidence and knowledge of knowing what is available and how to use it, stakeholders are less likely to seek out and experiment with the use of AT. Incorporating the principles of both TAM and EHP can support stakeholders while enhancing their knowledge, skills, and confidence when selecting and integrating assistive technology in the classroom setting, while also positively impacting the context, task, and performance of the student.

**Guiding Questions to Solidify Understanding of the Problem**

When considering the impact that early integration of AT within the elementary school setting can have on the immediate and long-term mental health and well-being of involved stakeholders, it is crucial to understand contributors to this problem. With the availability of these technologies, it is important to discover the impact on the stakeholders, as well as the barriers contributing to the underutilization of these devices and products.  To better understand the problem, the following guiding questions were applied for evidence review in this topic area:

**Question 1:** Is there evidence that suggests integration of AT within the school setting impacts students' opportunities for inclusion?

Current evidence supports that the integration of AT can directly impact the ability to successfully participate in inclusive classroom environments for students with special learning needs. The integration of AT into inclusive classrooms has proven to show positive outcomes in mathematics, early literacy, communication, language development, behaviors, and overall development (Black et al., 2015; Fernandez-Batanero et al., 2022; Schladant et al., 2022; Simon et al., 2023). In addition to these general education curriculum skills, students' academic performance increases; along with increased motivation and attention (Fernandez-Batanero et al., 2022). The ability to access the educational curriculum improves with the integration of AT for students relying on technology to lessen the disparity between them and their peers while allowing them to perform tasks and functions they would typically be unable to do (Fernandez-Batanero et al., 2022). Al-Dababneh & Al-Zboon (2022) state that "although computer technology has the potential to act as an equalizing factor by liberating many children from their disabilities, barriers such as inadequate training and prohibitive cost must be overcome before

widespread use becomes a reality" (p.30). Although barriers still exist, technologies such as computers, laptops, and mobile devices can offer potentially life-changing opportunities for students with special learning needs (Fernandez-Batanero et al., 2022). While the evidence shows that using AT positively affects students with learning differences' ability to take part in the general education classroom, continued research is recommended (Burne et al., 2011; Lohmann et al., 2019; Schladant et al., 2022).

**Question 2:** Is there evidence that suggests opportunities for inclusion impact access to the general education curriculum?

The reviewed literature on opportunities for inclusion and accessing the general education curriculum revealed positive, negative, and neutral findings. The inclusion of those with special needs can be viewed by their classmates as having either a positive or neutral effect on access to education (Hehir et al. 2016). Faura-Martinez and Cifuentes-Faura (2022) state that inclusive education improves the overall quality of education while also offering a better and more encompassing perception of disability. The inclusion of these peers promotes feelings of acceptance and diversity which are unintended advantages for accessing the overall curriculum for both those with and without learning differences (Simon et al., 2023). Families of individuals without disabilities would also agree that the inclusion of peers requiring special education opens opportunities for socio-emotional development and amplifies the value of diversity (Simon et al., 2023).

Contrary to these beliefs, others report negative or neutral impacts of inclusion in general education settings. Faura-Martinez and Cifuentes-Faura (2022) reference studies regarding the negative attitudes of teachers, parents, and classmates of those participating in inclusive

education environments. Negative feelings of inclusion can often accompany challenges faced by teachers with an emphasis on a dearth of adequate training, knowledge, and the use of evidence-based intervention methods (Faura-Martinez and Cifuentes-Faura, 2022). Some families report that students with disabilities receive greater benefits from inclusion than those without disabilities (Simon et al., 2023). Apprehension exists about an imbalance of teachers' attention when divided between typically developing students and those with disabilities within the general education classroom (Simon et al., 2023). Simon et al. (2023) mention that improvements in teaching practices are necessary to benefit both students with and without disabilities in the classroom.

**Question 3:** Is there evidence that suggests using AT to access the general education curriculum impacts higher education and career opportunities?

The research suggests that advances in available AT have significantly impacted how those with special needs can experience life-changing social and economic benefits, increased graduation rates (Simon et al., 2023), and improved opportunities for continued higher education (Lyner-Cleophas, 2019). Along with improved access to higher education and career opportunities comes increased participation towards a more successful economy (Lyner-Cleophas, 2019). However, although some opportunities expand with the use and integration of AT, some environments can be negatively impacted due to limited access to resources (Lyner-Cleophas, 2019). Even with advances in AT accessibility, people with disabilities continue to remain underrepresented in higher education and experience lower retention rates for remaining in school (Clouder et al., 2018).

**Question 4:** Is there evidence that suggests using AT to access higher education and career opportunities increases mental health and well-being?

According to the WHO, mental health is defined as "a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community" (WHO, 2024). Mental health and well-being can be a direct result of the integration of AT for direct and non-direct users (WHO, 2024). AT allows people to increase self-confidence, enhance skills, and participate in leisure activities (Dratsiou et al., 2021) while living happier, healthier, more productive, independent, and dignified lives (Dratsiou et al., 2021; Khalil & Hantira, 2022). Owuor et al. (2018) state that "AT can improve functioning and independence of people with disabilities, thereby promoting their well-being" (p. 3). By giving individuals the tools for success, there is an improved perception of self. Owuor et al. (2018) believe that individuals give meaning to their life through "symbolic interactionism; presenting an image of themselves which they believe their audience would approve of and accept" (p. 2). This theory values the idea that individuals see themselves as a reflection of the views of those within the community, rather than what they think or know of themselves (Owuor et al., 2018).

By incorporating AT throughout their lifespan, people with disabilities may be better able to minimize the impact of environmental barriers, improve participation in their life roles (Murchland & Parkyn, 2011), and lessen the likeliness of isolation (Khalil & Hantira, 2022). AT offers opportunities to bolster community living versus community care as the need for formal support services and long-term care decreases (Owuor et al., 2018). People with special needs

risk decreasing independence through institutionalization unless community living is enhanced by any means possible, including the integration of AT (Owuor et al., 2018).

Incorporating AT towards daily occupations and the acquisition of a career path, individuals are better able to contribute to the workforce, stimulate economic growth, and decrease health and welfare costs (Khalil & Hantira, 2022). With increased opportunities for employment, the risk of living in poverty and the likelihood that one becomes a burden on family and society decreases (Khalil & Hantira, 2022).

**Guiding Questions to Understand Efforts to Address Problem**

To better understand initiatives and efforts to address the problem, the following guiding questions were developed:

**Question 1:** Is there evidence of efforts to increase awareness of AT among educators and school staff?

Federal laws and acts, including the Individuals with Disabilities Education Act (IDEA) and The Assistive Technology Act of 2004, acknowledge the need to consider AT; however, these laws lack specific and readily applicable information for teachers to put into immediate practice. The IDEA, a federal law within the United States, "ensures students with disabilities receive a Free Appropriate Public Education (FAPE)" tailored to the individual needs of the student (IDEA, 2017). Within this law, Section 300.105 Assistive Technology states that AT devices and services should be considered and provided to the student if determined as needed within the student's IEP (IDEA, 2017). The Assistive Technology Act of 2004 is a federal law aimed at serving people with disabilities for selecting, obtaining, and using AT (RTC/PICL The Assistive Technology Act, 2021). Through the implementation of this act, AT users are offered

support to engage in occupations such as work and play, allowing them to live more independent and fulfilling lives (RTC/PICL The Assistive Technology Act, 2021).

Hands-on and readily available options for educator and school staff exploration include items found within a kit containing Low-Tech Tools for Inclusive Education or LoTTIE Kit (LoTTIE Kits!, n.d.). No longer in business, the company's intended purpose of this kit was to offer items to support students with reading, writing, math, and organizational skills while giving teachers the ability to trial the technology and informally assess potential benefits before seeking out more complex and more expensive items (LoTTIE Kits!, n.d.). Research regarding the efficacy and effectiveness of this kit was not discovered.

In higher education courses, experiential learning opportunities have been offered to address the use and integration of AT within the classroom. Although disability simulation can be controversial, many students reported positive learning outcomes based on presented experiential learning assignments (Coleman et al., 2015). In this study, the learners reported that their learning experience was not focused on the attempt to understand the simulated disability but more so, to understand the physical and logistical barriers that the use and need for AT can present (Coleman et al., 2015). Additional and future research indicates further examination of effective means for professional development delivery to enhance educator expertise (Schladant et al., 2022).

**Question 2:** Is there evidence of efforts for education and training for educators and school staff regarding the use and integration of assistive technology?

A review of the efforts to address education and training among educators of AT included *Skills and Knowledge on Assistive Technology in Early Childhood Inclusive Education* (SKATE)

program and *Systematic Process for Enhancing and Assessing Communication Supports* (SPEACS) program. SKATE is a European program designed specifically for educators working in Early Childhood Education and Care, whose main goals include fostering skills and knowledge surrounding the use of technology and digital solutions (Schladant, et al., 2022). The 24-week intervention yielded results of significantly increased AT knowledge among teachers, positive beliefs, and use (Schladant et al., 2022). Implementation of this program also revealed that early literacy skills significantly improved following intervention (Schladant et al., 2022). SPEACS is a program through the University of Delaware that works with educators to provide research-based literacy strategies for students with severe and complex disabilities (Delaware Access Project, n.d.) Participation in the SPEACS program offers professional learning and coaching opportunities for AT stakeholders through observations, modeling, online learning, experiences, book studies, lesson studies, and technical assistance (Delaware Access Project, n.d.). At this time, there is no evidence of the efficacy and effectiveness of this program available.

**Question 3:** Is there evidence of efforts to support collaboration among IEP team members when integrating AT into the general education curriculum?

Schladant et al. (2022) discuss results claiming that teachers acknowledged benefits from innovative professional development that focused on building the capacity of practitioners' ability to integrate AT as a responsive instructional strategy supporting early literacy skills. When presenting education and training to a particular group of educators, learning platforms included a combination of self-guided online learning modules, access to a classroom toolkit of AT devices, and coaching through in-person or remote delivery options (Schladant et al., 202).

**Question 4:** Is there evidence of assessments that evaluate outcomes impacting mental health following the integration of AT?

Three outcome measures were used to determine the psychosocial impact of implementing AT among higher education students and their educational engagement, academic self-efficacy, and well-being (McNicholl et al., 2023). Outcome measures included the Psychosocial Impact of Assistive Devices Scale (PIADS), the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS), and the Self-Efficacy for Learning Form – Abridged (SELF-A).

The PIADS is a self-report questionnaire containing 26 questions related to the perceptions that an AT can have on the direct user's functional independence, well-being, and quality of life (Jahan et al., 2024). The PIADS is comprised of 3 subscales: competence, adaptability, and self-esteem (McNicholl et al., 2023). More specific to this research, the Children's PIADS contains 15 questions applying a five-point Likert-type scale using smiley faces and short phrases to assess constructs of Competence, Adaptability, and Self-Esteem (Cunningham, 2018). The PIADS assessment tool is reported to have good internal consistency, test-retest reliability, and construct and concurrent validity (McNicholl et al., 2023).

The WEMWBS was created to measure mental well-being when evaluating projects, programs, and policies aimed at improving mental well-being (WEMWBS, n.d.). This scale is often used in schools, colleges, and clinical settings focusing on key attributes of psychological components (WEMWBS, n.d.). Using a mix of bottom-up and top-down approaches, this measure has been instrumental in strengthening program decision-making and securing funding in various countries and is available in multiple languages (WEMWBS, n.d.). This scale uses a 5-point Likert scale with higher scores indicating stronger mental well-being (McNicholl et al.,

2023). The WENWBS is reported to have good face and content validity, and internal consistency with a Cronbach's alpha of 0.89 (McNicholl et al., 2023).

The SELF-A measures academic self-efficacy when engaging in everyday educational tasks such as studying, note-taking, and test preparation (McNicholl et al., 2023). It consists of 19 items to be scored with a numerical value between 0-100, with 0 indicating that the student cannot do a task, and 100 indicating that the student can perform the task (McNicholl et al., 2023). The SELF-A is reported to have good reliability and validity ratings (McNicholl et al., 2023).

**Conclusion**

The need for AT is becoming more prevalent with anticipated growth among children with special learning needs within the school system (WHO, 2024). Because of laws such as those stated within the IDEA, students with disabilities need to be provided with FAPE and attend and participate in mainstream classrooms with peers (U.S. Department of Education, 2024). To offer and provide such mandates, AT may be required to meet the learner's needs while accessing the presented general curriculum. Matching and selecting the needed AT is a process that should include all involved stakeholders (Borger et al, 2017). Stakeholder perceptions of AT can significantly impact the use and integration of chosen AT and therefore, a critical need exists for using a transdisciplinary approach (Boger et al., 2017). Learning and developing the skills necessary to access and apply the AT to curriculum, life skills, and social participation is crucial at an early age (Schladant et al., 2022). With earlier access, understanding, and integration of AT supports, both direct and non-direct users of AT can live more meaningful, independent, and productive lives (Schladant et al., 2022). The evidence

suggests that integrating AT within the school setting increases access to the curriculum, increased likeliness of higher education and career opportunities, and positive psychosocial influences (Al-Dababneh & Al-Zboon, 2022; Black et al., 2015; Burne et al., 2011; Clouder et al., 2018; Dratsiou et al., 2021; Fernandez-Batanero et al., 2022; Hehir et al. 2016; Lyner-Cleophas, 2019; Khalil & Hantira, 2022; Owuor et al. 2018; Faura-Martinez and Cifuentes-Faura . 2022; Murchland & Parkyn, 2011; Lohmann et al., 2019; Schladant et al., 2022; Simon et al., 2023; WHO, 2022).

## CHAPTER THREE – Description of Central Commitment

**Background of the Problem**

Imagine a world where technology not only enhances our lives, but also empowers individuals to maintain or improve their functioning in areas such as cognition, communication, hearing, mobility, self-care, and vision. This is the purpose of assistive technology, as defined by the World Health Organization (2024). Various technologies to address these concerns are available; however, due to barriers including awareness, training and education, availability, and negative perceptions, many people who could potentially benefit from their use are not accessing these technologies. Only when all involved assistive technology stakeholders are invested in integrating and using the available assistive technology, will the direct user fully benefit from their functions (Borger et al, 2017).

The purpose of elementary school is to prepare students for opportunities and experiences for life-long learning, and the ability to become productive and contributory members of society. In elementary school, students are not only participating in academic subject areas, but also experiencing personal, emotional, and social growth. Collectively, these skills will prepare and shape individuals for their future endeavors. These learning experiences may look different for those who are differently abled or face learning challenges; therefore, educators and related school staff must be informed and educated regarding opportunities to maximize inclusion for these individuals. It is increasingly important for young students benefiting from assistive technology, to begin accessing and learning to use the technology to support future health, well-being, and increased independence (Schladant et al., 2022).

**Introduction to Proposed Solution**

The important impact of and key components needed to integrate AT in the school setting were researched to develop an evidenced-based solution for increasing the participation of students with learning differences and their access to the general education curriculum. *Breaking Barriers AT School: An Education and Training Program for School Professionals*, is a program to support the successful implementation of AT in educational environments.  The program consists of online informational sessions, collaboration opportunities for IEP team members, and hands-on learning experiences to increase confidence in the selection, implementation, and assessment of AT.

**Description of Artifacts Contributing to the Proposed Solution**

Multiple artifacts were integrated to contribute to the proposed solution, and a detailed description of each is provided. Artifacts include an in-depth review of the available and related literature, the creation and distribution of a survey focusing on the perceptions and barriers to integrating assistive technology in school settings, semi-structured interviews of educators, related service professionals, and caregivers, the development of an original program to address the problem, and a plan for implementation of a future pilot of the program.

*Literature Review*

A review of the literature identified extensive evidence of barriers impacting the use and integration of AT. The literature underscores a need to increase awareness and understanding of AT as it is "the first step towards equitable provision of such technology" (Borg & Östergren, 2015, p.305). Secondly, the research points to a strong need for education and training (Schladant et al., 2022). Stakeholders often face time constraints and limited access to

knowledgeable AT professionals who can provide adequate training and support. Opportunities for collaboration among professionals allow for innovative and transformational results (Boger et al., 2017). A transdisciplinary approach encourages a more detailed and comprehensive view of successful challenges and integration (Boger et al., 2017). Lastly, the research suggests several outcome measures that can be used to assess the psychosocial impacts AT use can have on an individual (McNicholl et al., 2023).

*Original Survey*

We developed a survey to collect data on factors affecting the use and integration of AT into the lives of direct users. Survey participants included caregivers of children with special needs ranging in age from three to twenty-one, educators, educator assistants, and related service providers, including occupational, physical, and speech therapists and assistive technology specialists. Data collection included perceptions of integrating assistive technology into school and community life, and its impact on health and well-being. The survey aimed to collect data to understand better the main barriers contributing to using AT, including availability, training, and education, limited understanding of integration, time for selection and acquisition, funding, and any other challenges that present barriers. I used the outcomes of the survey to further inform the design and content for *Breaking Barriers AT School: An Education and Training Program for School Professionals*, which I created to bridge the gap in awareness, understanding, delivery of, and integration of AT into the school setting, ultimately yielding increased occupational engagement for the AT users.

*Synchronous Virtual Interviews*

Survey participants answered a survey question inquiring about their willingness to participate in synchronous virtual interviews to further their understanding of commonly used AT within the educational setting and details regarding AT training. In addition to demographic information, I used the semi-structured interviews to gather additional information from the respondents regarding prior   AT training, professional backgrounds of those who are providing the AT training, available options and resources for trialing AT, and information about commonly used AT based on specific disability classifications.

*Development of an Original Program*

To address the key points derived from the literature review and data collection from the original survey and individual interviews, I developed *Breaking Barriers AT School: An Education and Training Program for School Professionals.*   The *Breaking Barriers AT School* program includes a transdisciplinary collaboration of AT stakeholders and potential AT stakeholders, typically working in an elementary school setting. I designed the program so that the Occupational Therapist (OT) practitioner on the IEP team will serve as the "Program Coordinator". Using key principles of the Technology Acceptance Model (TAM) and the Ecology of Human Performance (EHP) model, it is expected that increased awareness, education and training, collaboration, and hands-on experience with tools to measure outcomes will offer confidence and improved perceptions of AT used to change students' context for improved access in their educational environment.

Program participants will include grade-level IEP team members, with an emphasis on collaboration among general and special educators and educator assistants. Following an

educational overview of AT, participants will collaborate to identify the student or students to participate in the trial, then complete the assessment tool, the Student Environment Task and Tools, or *SETT Scaffold for Gathering Data-Annotated* (SETT-SGD-A), (Appendix C) (Zabala, 2024). Once the IEP team members complete the SETT-SGD-A, the team will select an AT device, software, or product they would like to further explore with the identified student or students. After the team selects the technology, team members will collaborate by sharing perspectives from each of their roles. The coordinator will provide team members with hands-on and experiential learning opportunities using the chosen AT. Following the hands-on exploration, team members will create a pilot plan to trial the technology with the direct users in their everyday schedules and routines. Team members will collect and use data using photovoice strategies during this process. Photovoice uses photographic documentation as a means of recording and reflecting needs, encouraging dialogue, taking action, and informing policy (Appendix D) (Strack, n.d.). It can capture the positive and negative features of a community while aiming to address issues needing attention (Strack, n.d.). The team will collaborate and share data and experiences about the aspects of the AT that are working well and aspects in need of problem-solving and constructive feedback. Once the team works through barriers and challenges, the team will create an implementation plan for longer-term use. Pre- and post-implementation measures administered by the Program Coordinator will inform outcomes.

The team coordinator will administer a modified version of the Canadian Occupational Performance Measure COPM). The COPM will be used to measure student perceptions before the initiation of the AT trial phase and within the final week of the implementation phase. The COPM is an evidenced-based outcome measure that gathers information from the client's

perspective regarding their performance on specific tasks (Canadian Occupational Performance Measure, 2024). The student will also complete the Children's PIADS. The Children's PIADS consists of 15 questions for the student to answer using an adapted five-point Likert scale and short phrases (Cunningham, 2018).

*Future Pilot Implementation of Original Program*

Pilot phases two and three of the *Breaking Barriers AT School* program will occur within an urban school in Wilmington, Delaware. Educational teams will complete surveys to name students with AT needs and willing team members to take part. Participants will include general and special educators, educator assistants, caregivers, students, related service specialists, and other IEP team members with an active role in AT implementation. The program coordinator will facilitate surveys to better understand which grade-level teams have a need and are willing to participate. Interested participants will engage in the launch of *Breaking Barriers AT School: An Education and Training Program for School Professionals* by identifying the current barriers to students' educational access.  Outcomes from measurement tools will be analyzed for each pilot implementation and across phases for comparison, aggregating results, and to guide continuous program quality improvement.

**Conclusion**

The central commitment of this doctoral capstone project seeks a deeper understanding of the barriers to accessing and using AT. Integrating this information into an educational program will yield improved training for both direct and non-direct AT users for more effective technology integration within daily routines. The evidence throughout the literature underscores the importance of structured educational and collaborative opportunities, with hands-on

approaches to accessing and integrating AT (Borger et al., 2017; Coleman et al., 2015; Schladant et al., 2022). However, related service professionals need specific information on educators' experiences with AT to develop these training opportunities most accurately. These approaches can help to combat many of the commonly reported barriers. Thus, the information gained from the original survey provides increased knowledge and prioritization of participant-reported barriers, as well as their preferred methods for effective training. The originally collected data presents insights into participants' perceptions of the usefulness of AT and stakeholders' willingness to use the AT. Results from participant interviews offer a deeper understanding of the depth, quality, timing, availability, and frequency of the AT training they received, and the professional backgrounds of those who most often provided AT training and education. *Breaking Barriers AT School* combats identified barriers, considers perceptions of stakeholders, provides education, and structured methods for collaboration and hands-on exploration to successfully integrate AT within educational settings. A future pilot of the program will yield further information about the program's effectiveness.

**CHAPTER FOUR – Outcome Measurements for Artifacts**

**Background of Program and Integration of Artifacts**

The evidence suggests that more than 2.5 billion people need at least one or more assistive devices, yet approximately 1 billion people in need of AT are denied access (WHO, 2024). Currently, there is a need to promote access, availability, awareness, and implementation of these devices and products (WHO, 2024). The WHO estimates that 240 million children have disabilities. An absence of the needed AT can have negative impacts on the individual, the family, and the community (WHO, 2024). According to the Individuals with Disabilities and Education Act (IDEA), when a student's IEP team decides the need for AT, the school must purchase or provide the necessary technology for use so the student can receive Free and Appropriate Public Education (FAPE) (U.S. Department of Education, 2024). A literary review of barriers for successful adoption and implementation of AT has shown several key factors. The identified barriers include awareness, education and training, collaboration among stakeholders, and limited assessments for outcome measures (WHO & UNICEF, 2022).

Many assistive technology options currently exist; however, these technologies are not consistently accessible or used to their full potential in the classroom as educators oftentimes lack awareness and understanding for successful integration into classroom routines (Huls, 2022). For teachers to be successful when using AT, it is crucial for them to understand the potential advantages and disadvantages (Huls, 2022). Without knowledge and awareness of available assistive technology options, these resources will continue to be underutilized, depriving students of their full academic potential, opportunities for inclusion, and future success.

To address identified needs and barriers surrounding assistive technology, I developed a program based on a literature review, data collected through an original survey, and semi-structured interviews. Objectives, methods, and results are described in detail below.

**Original Data Collection to Inform Program Development**

This study was conducted with the support of my doctoral advisor in partial fulfillment of a post-professional doctorate in occupational therapy. My doctoral advisor is an associate professor with a post-professional doctorate, 28 years of clinical experience, and 10 years of experience in academia and research. Approval was obtained from the Temple University Institutional Review Board (*31465*).

*Research Question*

The purpose of this study was to answer the following research question:

What barriers do educators and related services professionals identify as prohibitory to consistent integration of AT for students in the elementary school setting?

The research aimed to review the identified barriers to the successful integration of AT and develop strategies to address these needs.

*Participants*

We recruited participants using social media specialty groups focused on education, special education, caregiving, occupational, physical, and speech therapy, and assistive technology specialists. Inclusion criteria included:

- Professionals must work in school-based settings with students or children with special needs ages three to twenty-one.

- Working or residing in the United States.

- Have the ability to understand and speak English.

Participants were asked to confirm eligibility for inclusion by self-selecting one of the following from a forced choice question in the survey:

1. A caregiver of a child with special needs attending school between the ages of 3 years – 21 years

2. An educator or educator assistant working in an academic setting with students with special needs ages 3 years – 21 years

3. A related service professional (occupational, physical, or speech therapist, or assistive technology specialist) working in a school-based setting with students with special needs ranging from 3 years to 21 years

4. Another similar role working with students with special needs ranging from 3 years to 21 years in a school-based setting for which they will be asked to identify the role

Participants were excluded from the study if the participant:

1. Was working with a child or student younger than the age of 3 years and greater than the age of 21 years and 11 months

2. If the participant was non-English speaking

3. Not a resident living and working in the United States

4. Did not speak and understand English

*Outcome Measures*

**Web Survey**

We collected quantitative and qualitative data through a web-based survey (see Appendix A) powered by Qualtrics. The survey included questions and was scaled to assess program participants' familiarity and frequency of usage of AT using a 5-point Likert-type scale. We distributed the survey by posting in social media groups focusing on specialty populations and through the use of snowball sampling. The survey gathered information on participant perspectives on using AT. The survey included forced-choice questions to assess familiarity and frequency of AT use. The survey required 5-15 minutes to complete. It consisted of 15 content questions, and one question to gauge interest and collect contact information if willing to take part in a follow-up interview. Questions included: a) 2 multiple choice questions on participant characteristics; b) 11 multiple choice options using a five-point Likert-type scale on participants' perceptions, knowledge, training, and use of AT; and c) 1 question for ranking perceived barriers and d) one question for ranking training preferences. Appendix A includes a list of all survey questions.

**Interviews**

We arranged interviews with survey participants who expressed a willingness to participate. Interviews were conducted between the researcher and the participant using a HIPAA-compliant Zoom platform and required 30-45 minutes. The interviews consisted of 12 questions. Appendix B includes a list of interview questions. Open-ended questions allowed participants to share perspectives not reflected in the forced-choice survey questions. The Zoom platform auto-generated interview transcripts. We removed all identifying information. Data

collected through open-ended, semi-structured interviews was analyzed and organized using Dedoose.

*Procedures and Data Collection Timeline*

Following receipt of the Institutional Review Board approval (31465), the researcher used the following timeline:

- Weeks 1- 12:  Recruitment of participants through social media platforms and snowball sampling to collect web-based survey data

- Week 8 – Semi-structured interviews of voluntary participants meeting inclusion criteria

- Weeks 13 - 19- Analysis of collected data and documentation of study findings.

*Data Analysis*

**Web Survey**

We analyzed quantitative web survey results and produced descriptive outcomes using Qualtrics tools.  These included measures of central tendency for responses related to AT perceptions, knowledge, training, use, and barriers. Measures of distribution were used to assess the frequency of usage of AT within the school, home, and community.

**Interviews**

We analyzed qualitative data using Dedoose software. Using interview transcripts and DEDOOSE, we developed a coding framework of four "root codes" or focus areas to categorize the interview responses. The four focus areas were education in AT, AT types in use, AT

resources, and training preferences. We reviewed responses to identify parent themes and sub-categories. We further reviewed responses and discussed how to align themes with corresponding parent and sub-category themes. We used descriptive statistics to summarize the findings.

*Analyzing Integrated Data*

Due to multiple data sources, ensuring convergence becomes a critical component to increasing validity. Using the Farmer et al. protocol (2006), we applied a methodological triangulation approach to analyze data from literature reviews, web surveys, and semi-structured interviews. Data source triangulation was addressed through the involvement of various sources, including educators, related service professionals (occupational, physical, and speech therapists), and parents and caregivers.

*Results*

**Web Survey**

The survey included 124 respondents, including educators, related service professionals, assistive technology specialists, and caregivers. Occupational therapists made up 65% of the total respondents. Figures 6-10 illustrate the results of the web survey.

**Figure 6**

*AT impacts on students' participation and mental health*



**Figure 7**

*Reported Training Adequacy and Likeliness of Implementation*

**Figure 8**

*Ranking of preferred methods when engaging in training opportunities*



**Figure 9**

*Knowledge of available AT options with school district and state*
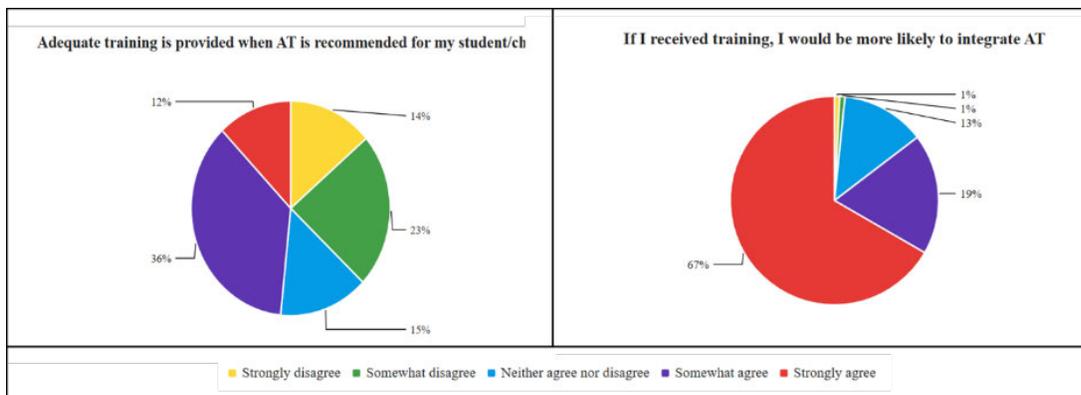
**Figure 10**

*Ranking of top barriers impeding AT use*



**Interviews**

Seven participants completed interviews, consisting of educators, related service professionals, assistive technology specialists, and caregivers. Occupational therapists made up 43% of the total respondents. Figures 11-12 illustrate the results of the semi-structured interviews.

**Table 1**

*Reported inclusion of AT education in professional degree curriculum and on-the-job training*

|  | College curriculum | # of Participants | On-job training | # of Participants |
|---|---|---|---|---|
| **OT** | Yes | 3 | No | 3 |
| **Educator** | No | 1 | Yes | 1 |
| **PT** | No | 1 | No | 1 |
| **SLP** | No | 1 | No | 1 |

*Discussion*

The integration and utilization of AT are pivotal in supporting students with disabilities, and enhancing their independence, participation, and quality of life. However, despite its potential, several barriers persist in its adoption, including limited availability, inadequate training and education, limited understanding, and time constraints for effective collaboration. This discussion synthesizes key points from existing literature, survey data, and semi-structured interviews to better understand these barriers.

Acquiring a foundational understanding of AT and how it can be acquired and integrated into school settings is crucial for ensuring availability and access to learning and promoting independence. IEP team members should be well-informed about available AT and how this can support an individual's unique needs. By disseminating foundational information regarding the laws, policies, procedures, and funding sources regarding AT, stakeholders may better understand how to access and acquire these devices and programs allowing them to live a more fulfilling life (RTC/PICL The Assistive Technology Act, 2021). As reported by survey and interview participants, currently, there is significant variation in overall understanding and awareness of available AT options across members of the IEP team. Additionally, participants report inconsistencies in AT training pre-service levels.  As IEP team members become better informed about AT and the AT SDP, these stakeholders may feel a sense of increased empowerment, resulting in changes in education delivery, increased opportunities for inclusion, and overall increased mental health and well-being of the direct user.

Collaboration among IEP team members is essential when integrating AT throughout direct and indirect users' lives and daily routines. Effective partnership contributes to a collective

understanding of the unique strengths and needs of the user and promotes more desirable

outcomes for all involved stakeholders (Borger et al., 2017). As IEP team members are offered

more opportunities for collaboration, these shared efforts offer valuable insights and expertise,

ensuring the selected AT is appropriate for the user's needs, and may decrease AT non-adherence

and abandonment. Through effective and meaningful collaboration, IEP team members can

create a coordinated approach that maximizes the potential of integrating the AT while

promoting greater independence, academic success, and overall health and well-being for

involved stakeholders. Currently, time and opportunities for collaboration among team members

are reported as one of the top barriers among survey and interview participants.

Hands-on and experiential learning opportunities among IEP team members are a critical

component in the AT selection process. This allows all members to better understand the

practical applications and functions of the devices and programs under consideration prior to

selecting and contributes to decreasing the potential for AT non-adherence and abandonment.

Evidence within the literature reports that positive learning outcomes result from experiential

learning opportunities (Coleman et al., 2015). As reported by survey and interview participants,

hands-on learning opportunities for matching and selecting AT based on the user's needs are

highly preferred. By encouraging hands-on opportunities for learning, IEP team members can

make better-informed decisions about the various available technologies and preemptively

consider their previously acquired knowledge and experiences when selecting and matching AT

based on the needs of the individual and non-direct users.

In conclusion, the integration of AT is a critical component when fostering independence,

participation, inclusion, and improved quality of life for students with disabilities. As identified

throughout the literature and survey and interview participants, barriers to effective AT integration include limited foundational knowledge and understanding of available AT, inadequate education and training opportunities, insufficient collaboration opportunities, and scarce hands-on and experiential engagement opportunities. By addressing these barriers, stakeholders can decrease gaps in the AT selection and service delivery process.

*Limitations*

Participants in the study featured a disproportionate representation of professionals and stakeholders. Sixty-five percent of responding participants included occupational therapists, with the remaining participants consisting of physical therapists at ten percent, speech-language pathologists at eight percent, caregivers and teachers each at six percent, AT professionals at three percent, and other or non-identified at two percent. This skews the results when considering the high percentage of OT professionals who reported receiving training in AT as a part of their professional degree program. A balanced representation of professionals would yield higher numbers of limited training in AT. Additionally, direct AT users did not complete the survey or interview. Direct user experiences will provide added, meaningful information to enrich training further. Lastly, the web survey and interview participants represented varied geographical areas in the US. Given variations in state and district AT practices, analysis of participant responses from concentrated areas may yield significant variations in needs. Different options and processes for AT resources and acquisition will influence response variations.

*Implications for Future Practice*

It is important for related services professionals and educators to collaborate on the successful integration of AT in the school environment, and to do so with fidelity. Doing so will

lead to improved long-term mental health and well-being for the direct users of AT. Empowering educators through training and collaboration to include AT as a strategy to support students with different learning needs can result in improved student outcomes. Providing education and training for the integration of these ATs will offer educators and related personnel the confidence to support students more naturally when in inclusive classrooms. Promoting increased inclusion opportunities encourages diversity, leading to enhanced learning experiences for all involved stakeholders. Using a transdisciplinary approach will foster collaboration and investment in the selected AT (Boger et al., 2016). Incorporation of assessment measures which include the perspective of the AT user will decrease AT non-adherence and abandonment and improve outcomes. It is therefore imperative to both provide such training to educators and related services professionals and include this content in professional program curriculum design so that educators and related services professionals can place greater value on evaluation, provision of, training in, and consistent implementation of AT resulting in improved classroom experiences and student engagement.

**Development of an Original Program to Address the Problem**

I integrated findings from a literature review, web survey responses, and semi-structured interviews to design a targeted program to address the need for improved and continuous use of AT in students' everyday lives. Indirect user themes that appeared across these artifacts informed the development of program sections. These themes include perceptions of a student's well-being and participation based on AT integration, the knowledge and confidence of the non-direct users, associated education, and the need for collaboration opportunities.

The *Breaking Barriers AT School* program was developed to increase AT stakeholders' integration capabilities and confidence. The program intends to increase awareness, provide education, improve collaboration, and identify valuable outcome measures to increase accessibility for students requiring AT. Findings from these efforts show that there is a significant need for training and education for caregivers, teachers, teachers' assistants, and related service providers (Lamond & Cunningham, 2020, Rodrigues et al., 2021). Leveraging AT to access the curriculum allows for greater independence when completing tasks that might not otherwise be possible (Rodrigues et al., 2021). Further, family members are key stakeholders in developing strong habits for routines and decreasing negative stigma and should be included throughout the instructional, decision-making, and evaluation process. The integration of AT should not be limited to one setting, such as school or home; rather, integration into a variety of environments and with the collaboration of all stakeholders will create the most opportunities for success and decrease AT non-adherence and abandonment (Rodrigues et al., 2021).

The *Breaking Barriers AT School* program aims to target all stakeholders of the AT to ensure ownership and engagement of AT integration throughout daily routines.  Caregivers may include but are not limited to, parents, guardians, siblings, grandparents, aunts, uncles, and childcare providers. When with the caregivers, the child may have the opportunity to engage with and participate in opportunities with other members of the home or community. Educational staff members include but are not limited to teachers, teachers' assistants, related service providers, AT specialists, and school administration. When in the educational setting, the student may also have additional opportunities for integration involving friends and classmates.

A logic model was developed to depict key concepts of the *Breaking Barriers AT School* program including input resources, problem theories, and strategies leading to desired outcomes.

**Figure 11**

*Full logic model*

The *Breaking Barriers AT School* **Program**



**Program Goals**

Providing and disseminating information throughout each session will provide a basic awareness and understanding of AT. This information, such as laws, policies, terminology, and contributors toward AT non-adherence and abandonment, gives participants the overall basic knowledge required to understand the importance of using and integrating AT. From this, short-term and intermediate goals can be accomplished. The informational portion of each session will result in the following: (1) participants' ability to define AT, and (2) participants' ability to

describe 2 factors contributing to AT non-adherence and abandonment. By the end of the program, participants will be able to describe a minimum of 2 ways to circumvent barriers to AT.

Providing opportunities for collaboration will allow participants to discuss and share experiences and observations from transdisciplinary viewpoints. Opportunities for collaboration will result in the following: (1) Participants' ability to identify three learner attributes indicating potential benefit from using AT, and (2) participants' ability to collaborate with a multi-disciplinary team to list a minimum of two ways to incorporate AT within the natural environment. By the end of the program, participants will demonstrate their ability to feature match and assess AT for the intended user to decrease non-adherence and abandonment.

By encouraging experiential and hands-on learning opportunities, the participants will gain confidence when using the AT and knowledge of its features. Allowing participants to trial and explore AT in a hands-on environment will result in the following: (1) an opportunity to select a minimum of one AT program or device for trial and (2) the opportunity to use photovoice strategies illustrating the selected AT within its natural environment. By the end of the program, participants will generate an ongoing plan for using AT in the natural environment.

**Program Strategies**

1. **Information dissemination** – General information surrounding assistive technology will be shared with participants. This will include the definition of assistive technology, laws, stakeholders, and reasons for assistive technology non-use and abandonment.

2. **Collaboration** - Participants will collaborate with an interdisciplinary team to trial and discuss the use and integration of selected devices for users within the classroom.

3. **Experiential/Hands-on learning**—Participants will be able to interact with, trial, and explore selected assistive technology.
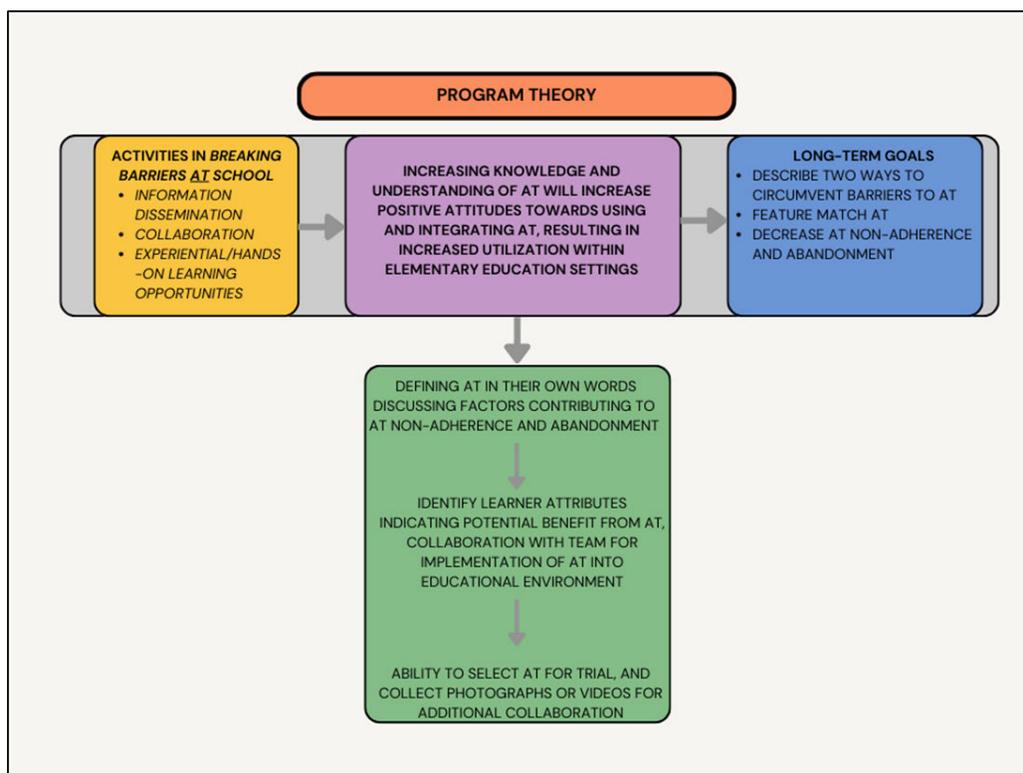
**Program Theory**

*The Breaking Barriers AT School* program stems from two theories: the Technology Acceptance Model (TAM) and the Experiential Learning Theory (ELT). The TAM emphasizes that the more manageable the technology is to use, the more likely one will adopt and use the technology (Scherer et al., 2019). The TAM's core principles are perceived usefulness, perceived ease of use, and attitudes toward using technology (Scherer et al., 2019). Perceived usefulness is directly related to what one believes technology can do to help achieve goals (Scherer et al., 2019). Perceived ease of use is what one considers using the technology as straightforward and effortless (Scherer et al., 2019). The user's attitude toward using the technology is based on the perceived usefulness and ease of use (Scherer et al., 2019). Experiential Learning Theory, or ELT, is a process for learning consisting of 4 phases in a cyclical pattern including a concrete experience, a reflective observation, an abstract conceptualization, and active experimentation (Kolb & Kolb, 2009).

The program references these theories to influence positive perceptions, benefits, and attitudes toward using and integrating AT. By increasing positive perceptions and attitudes, stakeholders may be more likely to see the benefits of the technology and, therefore, be more likely to integrate it throughout daily routines and within the user's natural environments. The

incorporation of ELT will allow stakeholders to recognize the need for AT, reflect on how AT might be helpful, adjust and make changes to ideas, and actively experiment with the integration of the selected AT.

**Figure 12**

*Program theory visual*



**Evaluation Approaches**

The program evaluation will include two groups, a program, and a comparison group. The empowerment evaluation approach will be utilized to build capacity among AT stakeholders. The empowerment evaluation approach focuses on "self-determination as a way to empower stakeholders to use evaluation findings and conduct their own evaluations" (Giancola,

2021, p. 94). This approach encourages stakeholders to play an active role in the evaluation process while making decisions, influencing change, and becoming self-sufficient in conducting their own evaluations (Giancola, 2021). This benefits this program as some stakeholders will remain the same while others change. Those who remain will gain the tools to become self-sufficient and continuously re-evaluate their changing needs throughout their lifespan and with the ever-changing technology.

*Evaluation Design*

The *Breaking Barriers AT School* program will be evaluated using a quasi-experimental design method. The program will include several modules both virtually and in-person based on participants' responses to the survey. Virtual web-based models will be asynchronous to allow for flexibility and challenges with time constraints. In-person sessions will be scheduled to accommodate preferences reported in the survey and will be used to foster improved collaboration among team members and provide opportunities for hands-on and experiential learning. Although the researchers hope to expand upon the education and training program for distinct types of AT, one area of focus may include low-mid technology options within the school settings to support literacy skills.

The participants in the Breaking Barriers AT School program module will include IEP team members and interested school administrators. The participants will include those from the same school and grade with at least one written expression goal on the IEP. This will ensure that similarities among demographics and school resources are present. This group will be considered the program group.

To ensure the program utilizes a quasi-experimental design, a second group, or the comparison group, will be considered at a different but nearby urban school within the same district. The comparison group will have access to the same AT options as the program group; however, it will not receive the intervention until the program group has completed it.

The program group will receive the program intervention over approximately 12 weeks, with follow-ups from the program coordinator at 16, 20, and 24 weeks to ensure consistency and follow-through. After week 12, for the program group, the comparison group will then become the program group.

Strengths and design rigor of the *Breaking Barriers AT* School program include embedded evaluation throughout the program, aiding in monitoring continuous improvement and information acquisition regarding participant benefits or lack thereof (Giancola, 2021). Because this quasi-experimental design includes comparing two groups, the ability to use these findings improves and can assist in filtering competing explanations to justify program results (Giancola, 2021). The participants will be selected from a single grade level and among similar schools; therefore, contextual factors within the school environment can be closely matched to those within the two groups.

The Canadian Occupational Performance Measure (COPM) will determine and set the student's goals and support the effectiveness or perceived change in occupational performance over time. Using a semi-structured interview format, this assessment will help determine if the program intervention is producing positive and desired results. The COPM is reliable, and test-retest reliability has consistently been reported within the well-above-the-acceptable range (COPM, 2024.). Content, criterion, convergent, divergent, and construct validity have been

evaluated for the COPM (COPM, 2024.). Sixteen articles discussing the validity of the COPM consistently report supported validity as a measure of occupational performance (COPM, 2024.). This measure is responsive as it detects statistically significant and clinically meaningful changes in perceived occupational performance over some time (COPM, 2024.). Significant benefits are reported in the utility of the COPM, including use in various clinical settings, with various populations, and within different languages and cultures (COPM, 2024.).

The Children's Psychosocial Impact of Assistive Technology Scale (PIADS) can be used to measure the student's perspective of how the selected AT impacts and supports them with their needs (Cunningham, 2018). This assessment contains 15 items based on self-reported responses to questions using a five-point Smiley Face Likert-type scale (Cunningham, 2018). The assessment questions focus on three themes: Competence, Adaptability, and Self-esteem (Cunningham, 2018). Psychometric properties of the Children's PIADS include strong internal consistency across all three constructs: Competence, Adaptability, and Self-Esteem (Cunningham, 2018). Each construct produced reliable scores for Cronbach's alpha at or above 0.7. (Cunningham, 2018). These scores indicate that each construct is closely related and accurately measured (Cunningham, 2018). The assessment tool proves that it can produce consistent results regardless of the administrator (Cunningham, 2018). Test-retest reliability is determined to be significant based on the Pearson correlation coefficient at 0.88 (Cunningham, 2018).

The program's weaknesses may include variations among participants and scheduling. Although the researchers attempt to achieve similar characteristics among participants, students' abilities, motivation, and personal circumstances may impact results. External factors of involved

participants, such as motivation, understanding, knowledge, and age, may also contribute to program results. Additionally, due to school scheduling and extended breaks throughout the school year, the timeline for which the program is implemented may impact results. For example, students participating over the first half of the school year may experience more extended breaks due to holidays versus those participating in the program throughout the second half of the school year.

*Evaluation Enrichments*

Evaluation enrichments can be added to enhance the evaluation design. Logic modeling will strengthen the credibility of findings while examining how program strategies and activities correspond to early, intermediate, and long-term indicators (Giancola, 2021). Repeated measures or collecting the same data over multiple time points throughout the program may aid in determining if noticeable improvements are being made throughout the intervention (Giancola, 2021). For example, when determining if AT to improve literacy is being evaluated, one might implement repeated measures to collect keyboarding speed and accuracy, spelling, and grammatical errors while typing a written expression assignment at various intervals throughout the program. Longitudinal data may be collected when considering the frequency of use, integration, and self-reported comfort levels that educators and other school staff may share over time. Collecting this longitudinal data will allow evaluators to assess outcome measures towards building capacity. Using Photovoice for additional data collection will contribute to the evaluation enrichment. Photovoice will enable participants to share their personal experiences with the larger group, allowing for further learning and collaboration opportunities (Liebenberg, 2018).

**Implementation**

*Methods*

      *The Breaking Barriers AT School* program can be divided into several modules depending upon the selected AT of focus. The selected AT and the participants' needs will drive the program's delivery method. Modules may include various areas addressing student needs by way of AT. These may include modules for activities for daily living, instrumental activities for daily living, health management, rest and sleep, education, work, play, leisure, and social participation (AOTA, 2024). One example of a program module may include AT to access a literacy-based curriculum. For this particular module, ideally, students will range from grades third through fifth; however, this can expand as needed or as deemed fit by participants.

*Participants*

      Participants in *the Breaking Barriers AT School* program will include educators, educator assistants, students in an elementary school, caregivers, related service professionals, and any other IEP team members. Participants in the program will be based on the AT of focus. Using the literacy-based curriculum example above, program students should include those with IEPs or 504 Plans containing or addressing a need surrounding literacy.

*Outcomes Measures*

      To determine the effectiveness of the *Breaking Barriers AT School* program literacy module, several measures should be considered. Before selecting the AT, the team's occupational therapist should administer the COPM. Using the COPM will provide the collaboration team with a client-centered approach to identifying the preferences and motivators of the student. Comparing pre- and post-assessment results of the COPM will allow the team to

determine if the AT is suitable for the needs of the student, and likely decrease the possibility of AT non-adherence and abandonment.

In an effort to gain the perspective of the direct user, an assessment such as the Children's Psychosocial Impact of Assistive Devices Scale (PIADS) can be utilized. The Children's PIADS is a self-reported questionnaire containing 15 items using a smiley face Likert-type scale (Cunningham, 2018). This scale assesses the child's competence, adaptability, and self-esteem before and while using the AT (Cunningham, 2018). This too should also indicate the likeliness of the student to continue using the AT, resulting in decreased potential for non-adherence and abandonment.

*Procedures and Data Collection Timeline*

Data will be collected using the COPM, the PIADS, and pre-and post-test surveys throughout the program. The COPM should be administered to the student before selecting a specific AT device, product, or software. This can be used to determine client and team-centered goals and contribute to the feature-matching process. When initiating the AT trial, the PIADS should be administered. This will give the collaboration team a more robust understanding of the student's performance before learning to use the AT, and after the student has had sufficient time for trialing. Nearing the end of the trial, approximately 3 months, the team can then repeat the assessments to compare pre- and post-results.

*Data Analysis*

Data analysis will be performed by way of analyzing pre- and post-measures for all involved stakeholders. Data analysis will include scores from the COPM, PIADS, and pre-and post-test survey questions. The effectiveness of the implemented AT will be measured by

determining the teams' preferences, goals, and psychosocial impact of AT using the COPM and PIADS. The program participants considered non-direct AT users will also complete pre-and post-test surveys to ensure an understanding of AT content.

*Results*

The researcher anticipates that the results will provide useful information for addressing barriers to integrating AT throughout the daily lives and routines of the AT stakeholders. It is also expected that through education and training on the selection and integration of AT, the direct and non-direct users will gain confidence and knowledge regarding future use, advocacy, and adoption of AT. With improved integration AT, it is anticipated that opportunities for inclusion and the mental health and well-being of the student will improve.

*Implications for Future Practice and Research*

Considering the implementation of *the Breaking Barriers AT School* program, the research acknowledges and understands that not all ATs are always easily and readily available. It is important to be aware of the availability of AT and, more specifically, what payor sources are willing to offer and contribute towards. Having resources that understand available options and are able to offer the needed services designated in this program could also be a potential implication for future practice.

**CHAPTER FIVE – Artifact Funding Plan & Dissemination Plan**

**Brief Solution and Funding Plan**

The *Breaking Barriers AT School: An Education and Training Program for School Professionals* was created in response to findings determined from an in-depth literature review and a mixed methods study. The *Breaking Barriers AT School* program addresses the needs of students requiring AT and the impact AT implementation can have on the mental health and well-being of the student. In addition to this, the program also addresses general and special educators, educator assistants, related service professionals, and other involved school staff regarding their awareness of and ability to confidently recommend and implement AT in daily classroom and school routines for benefiting students with potential or realized AT needs. The program aims to educate participants regarding what AT is, what is available and valuable, and how to better understand considerations specific to the potential users. In addition to education about AT, the participants will have the opportunity to experience AT in a hands-on environment, trial AT when appropriate with a particular student or students and collaborate with peers for realistic and practical implementation.

Funding for this program is being sought to enhance the academic, social, and personal experiences of students participating in inclusive school environments and the school professionals seeking guidance and support for incorporating the needed AT. This program is believed to benefit both students and school staff as frequently reported barriers to using and incorporating AT within the classroom include lack of awareness of available AT, limited knowledge and confidence when using and implementing AT, time constraints for trialing and exploring AT, and access to funding sources.

**Table 2**

*Costs and resources for program replication*

| PROGRAM MATERIALS/RESOURCES | | | |
|---|---|---|---|
| **Materials/Resources** | **Cost or Time** | **Total for 1 year period** | |
| Research and Planning for Program Content, Literature Reviews, Surveys | | | |
| | | In-Kind | Annual |
| Investigator/Program Facilitator Hours | Accounted for within salary if provided time within workday (professional development hours)  In the absence of in-kind time, investigator/facilitator may receive Academic EPER pay for approximately 40 hours at $24/hr | $0 | $960 |
| Development of Pre- and Post-surveys for each model | Google Forms | $0 | $0 |
| Computer | No cost when using employer computers | $0 | $900 |
| Slideshow Design Software | | | |
| Microsoft Office: Word, Excel, PowerPoint | Software available through employment yielding no additional cost to the district | $0 | $150 |
| Program Evaluation Tools | | | |
| Qualtrics Survey Software | Free if currently being used by district or using free account | $0 | $5,040 |
| Pre- and Post-Surveys | Google Forms for pre-post-tests | $0 | $0 |
| Survey development | Free if developing on work time or professional development time | $0 | $96 |
| Program Implementation Cost and Materials | | | |
| Internet: Comcast Business Plan | Free if currently being used by the district | $0 | $719.88 |
| Zoom Account | Free if currently being used by the district or using free account | $0 | $219.84 |

| Low-Tech Kit Items: pencil grips, adapted writing tools, adapted scissors, adapted paper, line readers, page magnifiers, colored overlays, slant boards, highlighters, rolling stamps for handwriting lines, spacer tools, bin/case/tote to store supplies | • Pencil grip variety pack - $15 <br> • Twist-n-Write Pencils and Refill pack - $15 <br> • Adapted Loop Scissors (mini) 3 pack - $6 <br> • Adapted Tabletop Scissors - $36 <br> • Adapted Suction Scissors - $20 <br> • Adapted Spring loaded scissors 6 pack - $7 <br> • Pack of adapted writing paper - $20 <br> • Rolling handwriting line stamp 3 pack - $15 <br> • Page magnifier 4 pack - $8 <br> • Colored overlays 32 pack - $8 <br> • Highlighted line readers 6 pack - $7 <br> • Space tool/line reader 24 pack - $10 <br> • Slant board/large 3-ring binder - $20 <br> • Carrying tote with dividers - $40 <br> • Total: $227 | $0 | $227 |
|---|---|---|---|
| Digital Reading Pen | • $50 - $200 – Free if borrowing from AT lending library or available through the school district | $0 | $200 |
| Digital Writing Pad | • $20 - $200 - Free if borrowing from AT lending library or available through school district | $0 | $200 |
| iPad Pro | • $350 - $1,000 – Free if already available through district | $0 | $1,000 |

| | | | |
|---|---|---|---|
| Chromebook | • $170 - $300 – Free if already available through district | $0 | $300 |
| Don Johnston Tools (Snap & Read & Co-Writer | • No additional cost if already available through district <br> • Pricing set for individual license ($85 for Snap & Read + $85 for Co-Writer) | $0 | $170 |
| CrickSoftware: Clicker | • $2,000 for 3 years or approximately $667 per year for 3 years (up to 10 devices) <br><br> • $700 for 3 years or approximately $234 per year for 3 years (1 device) <br><br> • No additional cost id already available through district | $0 | $234 |
| **Total** | | In-Kind: $0 | If Purchasing all Resources: $10,416.72 |

**Table 3**

*Potential funding sources*

| Potential Funding Sources | | |
|---|---|---|
| **Funding Source & Grantees** | **Contact Information** | **Funding & Application** |
| National Education Association (NEA) Professional Excellence Grants:<br>- Programs supporting children and youth particularly of color or economically deprived communities | For NEA Affiliates \| NEA<br><br>CGPS-PF@nea.org | Requests typically range from $3,000 - $25,000 over a 1-year period<br><br>- Proposal to include both narrative and budgetary information with data directly corresponding to proposed activities<br>- IRS W-9 and EIN<br>- All information from the State & Local Project Grant application |
| Office of Elementary & Secondary Education – Consolidated State Plan<br><br>- State Education Agencies (SEAs) | Supporting Effective Instruction State Grants—Title II, Part A - Office of Elementary and Secondary Education | Varies based on Consolidated State Plan requests<br><br>- Consolidated state plan<br>- Waivers requested by States of ESEA requirements<br>- Department peer review of State assessment systems<br>- Performance reports regarding State implementation of ESEA programs |
| Reimagining Professional Learning Grants<br><br>- All educators including administrators, coaches, and teachers | Reimagining PL Grant SY22-23 – Legacy Pages (delaware.gov) | No cap for monetary requests<br><br>- Letter signed by district superintendent stating intent to apply for the grant and details regarding the |

| | | needs analysis conducted to identify the goals of the professional learning plan |
| | | - Professional learning plan workbook |
| Wilmington Learning Collaborative<br><br>- Employees and programs within the Wilmington Learning Collaborative Schools group | Home - Wilmington Learning Collaborative (wlc-de.org) | There are no set monetary amounts determined at this time<br><br>- No specific requirements noted at this time |
| Office of Special Education and Rehabilitative Services (OSERS) – Stepping-up Technology Implementation (84.327S)<br><br>- HBCUs, Non-profit Organizations, Indian Tribes and Tribal Organizations, LEAs, SEAs, Freely associated states and outlying areas, individual, other public agencies | OSERS: Grants and Funding \| U.S. Department of Education | Total of $1,625,000.00 for an estimated 4 awards<br><br>- Visit the Grants Learning Center, ensure eligibility, determine federal grants that align with specific project, register using Grants.gov and apply using Workspace, apply using Workspace, track status using submission number |
| Personnel Development to Improve Services and Results for Children with Disabilities at Minority Serving Institutions (84.325M)<br><br>- Must have a bachelor's degree, certification, master's degree, educational specialist degree, or | Personnel Development to Improve Services and Results for Children with Disabilities at Minority Serving Institutions (84.325M) \| U.S. Department of Education | Estimated Total Grant Funding: $3,000,000<br><br>Expected Number of Awards: 12<br><br>Award Ceiling: $ 350,000<br><br>- Complete Grants.gov forms, complete narrative attachment |

| | | |
|---|---|---|
| clinical doctorate from an HBCU, TCCU, or MSI or be a non-profit organization that has the legal authority to enter into grants and cooperative agreements with the Federal government | | forms, and upload file attachments<br>- Follow guidance found on Grants.gov and Submission Tips document<br>- Upload documents as PDFs or Microsoft Word – read only, flattened PDF format |

## Dissemination Plan

The *Breaking Barriers AT School* program targets students, educators, educator assistants, related service professionals, and additional IEP team members seeking to learn more about recommending, using, and integrating AT within the classroom. Additionally, the program aims to promote improved mental health and well-being while encouraging the inclusion of students benefitting from AT. The initial dissemination plan will include poster presentations at the American Occupational Therapy Association (AOTA) and Assistive Technology Industry Association (ATIA) conferences. A pilot program will target a grade-level IEP team in an urban school in the city of Wilmington, Delaware. Occupational therapists and assistive technology specialists will participate as subject matter experts to facilitate and build capacity for future implementation among program participants.

Dissemination Goal 1

Conduct a poster presentation explaining the need for, and reasoning for implementing, the *Breaking Barriers AT School: An Educational and Training Program for School Professionals* at the AOTA 2025 conference in Philadelphia, PA.

Dissemination Goal 2

Conduct a poster presentation at the ATIA 2026 conference in Orlando, FL, explaining

the need for and reasoning behind implementing *Breaking Barriers AT School: An Educational*

*and Training Program for School Professionals.*

Dissemination Goal 3

Complete a pilot study with a grade-level IEP team at an urban school in the city of

Wilmington, DE. The program will be facilitated by the researcher and occupational therapist

within the school building. Participants will use district-designated professional development

time to complete the program.

**Table 4**

*Dissemination plan and funding*

| DISSEMINATION PLAN AND FUNDING | | | | | |
|---|---|---|---|---|---|
| **Type** | **Travel Costs** | **Resource Costs** | **Time & Salary Costs** | **Fees** | **Total** |
| **POSTER PRESENTATION** | | | | | |
| AOTA Conference | • Hotel: $1,028 ($257/night, 4 nights) <br><br> • Transportation Car Rental: $0 <br><br> • Gas: $50 | • $120 poster | • 3 days + 1 weekend day <br><br> • 4 days: Food & drink costs approximately $50/day <br><br> • Total: $200 | • Speaker Registration $480 | $1,878 |
| ATIA Conference | • Hotel: $956 ($239/ night, 4 nights) <br><br> • Flight: $247 <br><br> • Transportation Car Rental: $187 ($45/day) <br><br> • Gas: $50 | • $0 – will re-use poster from prior conference | • 3 days + 1 weekend day <br><br> • 4 days: Food & drink costs approximately $50/day <br><br> • Total: $200 | • Speaker Registration $415 (Early bird/ Regular) | $2,055 |

**Conclusion**

Artifacts developed in response to this study are targeted at enhancing members of IEP teams' knowledge and understanding of using AT to support inclusion for students with special learning needs. Artifacts including future literature reviews and interviews, survey development, and future implementation of the *Breaking Barriers AT School* program will be funded through competitive private and government grants. Allocation of funding will be dependent on the needs of, and current and available resources among participating districts. Variations in funding may be a result of district planning and resources such as staffing allocations, available AT within the district, or available AT within the state's AT lending library. A monetary range of $0 - $10,416.72 for the program, and up to an additional $3,933 for travel expenses. It is anticipated that dissemination of the program will occur at the AOTA 2025 conference, as well as the ATIA 2026 conference. The pilot program is expected to occur within an urban school in the state of Delaware. The pilot program will be facilitated by the OT assigned to the IEP and will take place in accordance with a typical educator schedule.

**CHAPTER SIX – Conclusion**

**Introduction to Central Commitment and Supporting Artifacts**

Integrating AT into students' daily lives with learning differences can significantly impact student outcomes, mental health, and overall well-being in school and post-academic experiences (Hunt, 2021; Khalil, 2022; Mahoney & Hall, 2017; Moulton, 2021; WHO, 2024). Often, IEP team members face various barriers and are found without the navigational tools to recommend and integrate AT successfully (Al-Dababneh & Al-Zboon, 2022; Borg & Östergren, 2015; Hemmingsson & Nygard, 2009; Murchland & Parkyn, 2011; Schladant et al., 2022). In some cases, accessing and utilizing available AT can significantly affect the user's ability to participate in the general education curriculum, resulting in improved mental health and well-being (Hunt, 2021; WHO, 2024). OTs can play a crucial role in ensuring that involved stakeholders and potential stakeholders are informed about AT options and the associated services by addressing some of the significant and most commonly contributing barriers: awareness, education and training, opportunities for stakeholder collaboration, and meaningful assessments to measure outcomes (Borger et al., 2017; Simon et al., 2023). OTs utilizing the *Breaking Barriers AT School* program will have the tools to more easily support AT users and IEP team members to become better informed of the available AT, AT service options, how to integrate the AT into the daily routines of the user, and the psychosocial impacts early learning and integration of AT can have on the direct user.

**Synthesis - Integration of Artifacts**

The literature review served as a preliminary artifact to collect and gather evidence associated with the limited integration of AT within the elementary school setting. Through this literature review, significant barriers to using AT were identified. Commonly reported barriers included awareness of available AT, limited opportunities for education and training, challenges for effective stakeholder collaboration, and poor options to assess outcome measures (Al-Dababneh & Al-Zboon, 2022; Borger et al., 2017; Mahoney & Hall, 2017; Schladant et al., 2022).

The original survey is an artifact developed in response to the literature review and used to collect data on contributors to identified barriers. The survey can be used to collect information regarding the knowledge and perceptions of IEP team members, and specific areas of need for targeting during programming. The questions within the survey are meant to gather information regarding respondents' opinions on the usefulness AT can have throughout the users' lifespan and if the respondents' perceived benefit, or lack of benefit, from using AT impacts their likeliness of incorporating it within the instructional daily routines of the users. Additionally, the survey asks respondents to prioritize significant barriers impacting integration and preferences for addressing and meeting their corresponding training needs.

Voluntary participant interviews were conducted to better understand previous AT exposure and training, professional roles currently offering AT support, knowledge of accessing AT, and preferences for future training opportunities. Through these semi-structured surveys, the researcher can better understand commonly used AT within school settings and what AT typically aligns with specific populations.

This program will lay the groundwork for defining AT, understanding students'

entitlement to access, funding sources, commonly used types of AT within the school setting,

opportunities for peer collaboration, resources and opportunities for hands-on exploration of AT,

and tools to determine the impact on a student's mental health and well-being. Incorporating

theories, including the TAM and EHP, will guide and support program participants in decreasing

the number of identified barriers. As TAM suggests, users are more likely to accept and use

technology as perceptions of technology become more favorable. To increase confidence when

using AT, allowing for experiential and hands-on opportunities will, in turn, increase acceptance.

**Significance of Artifacts**

According to the WHO and UNICEF, there is an excess of 2.5 billion people who need at

least one or more types of AT; however, approximately only 1.5 billion have been able to gain

access to it (WHO & UNICEF, 2022). Some of the frequently named and reoccurring reported

top barriers to accessing these technologies include an initial awareness of AT, and a sufficiently

trained workforce for instructional and implementation purposes (WHO & UNICEF, 2022). By

offering support in accordance with the aforementioned artifacts, program implementation can be

directed towards the unique needs of educational staff while increasing opportunities for student

inclusion through the use of AT. The program's benefits may include increased awareness and

confidence among IEP team members when recommending and using AT. It will also provide an

opportunity for peer learning and engagement regarding strategies that work well for students

using AT and offer support for strategies left to be developed. Increased exposure and

knowledge surrounding AT will support enhanced student engagement, a more personalized

learning approach, increased confidence, empowerment among educators and students, and

amplified awareness among community members. With early instruction and acceptance of AT, students will have the potential to engage in more meaningful occupations throughout their academic careers, post-graduation, or when entering the community and workforce.

**Impact on OT Practice**

By implementing an informational survey and education program for educators and other school professionals, occupational therapists can be better prepared to be agents of change within their school communities. By following and using this AT training and education framework, OTs can facilitate the program while sharing the significant impact AT can have on students at an early age and how this can foster improved independence, mental health, and well-being throughout their lifespan (Schladant et al., 2022). This program can promote awareness, acceptance, and use of AT early in a student's education while also building capacity and instilling a sense of empowerment among educators and school professionals to enable additional opportunities for student inclusion (Schladant et al., 2023). These tools provide an evidence-based approach to support school communities, resulting in improved student outcomes and significant benefits to curriculum collaboration among general and special educator teams. By providing and facilitating educational and training opportunities among transdisciplinary school teams, occupational therapists can continue to expand upon the necessary values, skills, and impact this profession can bring to the school setting (Hunt, 2021; McNicholl et al., 2020).

**Contribution to Occupational Engagement, Health, and Wellness**

Offering a training and education program to increase opportunities for students to use AT at earlier ages can have significant psychosocial impacts on students, their peers, education professionals, and associated caregivers (McNicholl et al., 2020). Student outcomes may include

increased academic success, improved self-worth and confidence, peer acceptance, and inclusion (Khalil, 2022; Mahoney & Hall, 2017). In addition to providing the AT itself, it is also necessary to accompany this with the appropriate services, skills to use it, the ability to advocate for future use, and accommodations to decrease non-adherence and abandonment (Jahan et al., 2024; Rodrigues et al., 2021). Offering useful AT will contribute to meaningful participation in occupations throughout the lifespan, improving health and well-being (Khalil, 2022; Mahoney & Hall, 2017; Moulton, 2021).

As all-involved AT stakeholders become more familiar with the AT, this can also directly impact the mental health and well-being of non-direct users (Owuor et al., 2018; WHO, 2024). When AT is more naturally incorporated into daily classroom routines, this can potentially reduce educator stress, increase classroom engagement, facilitate collaboration, and improve student learning outcomes (Mahoney & Hall, 2017). Classmates benefit from exposure to diversity, socialization opportunities, and normalization of using AT to perform everyday tasks and routines (Schladant et al., 2022). Caregivers are expected to experience fewer negative feelings of burnout while leaving more opportunities to engage in recreation and leisure activities (WHO, 2024).

**Contributions to the OT Profession**

Occupational therapists are charged with helping people perform daily occupations and contributing to positive health and well-being while engaging in such tasks independently (AOTA, 2024). Using AT can enhance participation and independence in daily routines and occupations for some (WHO, 2024). This study highlights the importance of introducing and integrating AT at an early age, involving all stakeholders throughout the continuous AT service

delivery process, and addressing some of the main barriers unique to implementation through the school environment. Methods utilized in this research identify gaps in awareness and knowledge of available AT that could meaningfully contribute to improved student, school professionals, peer, and caregiver outcomes (Mahoney & Hall, 2017; Schladant et al., 2022). Although many stakeholders agree that AT can significantly impact school, home, and community participation, available AT resources are not used to their fullest potential (WHO, 2024). By providing an easily accessible and organized AT training and education program, occupational therapists can better contribute to marked improvement in student outcomes while in school and into their adult lives.

**REFERENCES**

Ahmed, A. (2018). Perceptions of using assistive technology for students with disabilities in the classroom. *International Journal of Special Education*, *33*(1), 129-139.

Al-Dababneh, K. A., & Al-Zboon, E. K. (2022). Using assistive technologies in the curriculum of children with specific learning disabilities served in inclusion settings: teachers' beliefs and professionalism. *Disability and Rehabilitation: Assistive Technology*, *17*(1), 23-33.

Alghamdi, R. (2022). Teachers' perceptions of assistive technology use for students with disabilities. *Journal of Digital Learning in Teacher education*, *38*(2), 56-70.

American Occupational Therapy Association. (2014). *Occupational therapy practice framework: Domain & process.*

American Occupational Therapy Association. *(2024). What is occupational therapy? American Occupational Therapy Association.* https://www.aota.org/about/what-is-ot

Assistive Technology Industry Association (n.d.) *What is AT? Assistive Technology Association*.https://www.atia.org/home/at-resources/what-is-at/

Ayon, V., & Dillon, A. (2021). Assistive Technology in Education. *The International Journal of Information, Diversity, & Inclusion*, *5*(3), 174-184.

Bartfai, A., & Boman, I. L. (2014). A multiprofessional client-centered guide to implementing assistive technology for clients with cognitive impairments. *Technology and Disability*, *26(1), 11-21.*

Black, A., Costello, R., Craft, A., & Katene, W. (2015). 'It's all about developing the whole child' An examination of the 'legacy' benefits of Youth Sport Trust's school-based inclusion initiatives. *European Physical Education Review, 21*(3), 362-378.

Boger, J., Jackson, P., Mulvenna, M., Sixsmith, J., Sixsmith, A., Mihailidis, A., & Martin, S. (2017). Principles for fostering the transdisciplinary development of assistive technologies. *Disability and Rehabilitation: Assistive Technology*, *12*(5), 480-490.

Brandt, Å., Samuelsson, K., Töytäri, O., & Salminen, A. L. (2011). Activity and participation, quality of life and user satisfaction outcomes of environmental control systems and smart home technology: a systematic review. *Disability and Rehabilitation: Assistive Technology*, *6*(3), 189-206.

Borg, J., & Östergren, P. O. (2015). Users' perspectives on the provision of assistive technologies in Bangladesh: awareness, providers, costs and barriers. *Disability and Rehabilitation: Assistive Technology*, *10*(4), 301-308.

Burne, B., Knafelc, V., Melonis, M., & Heyn, P. C. (2011). The use and application of assistive technology to promote literacy in early childhood: A systematic review. *Disability and Rehabilitation: Assistive Technology*, *6*(3), 207-213.

Canadian Occupational Performance Measure. (2024). *The COPM is an individualized, client-centered outcome measure*. https://www.thecopm.ca/

Clouder, L., Cawston, J., Wimpenny, K., Mehanna, A. K. A., Hdouch, Y., Raissouni, I., & Selmaoui, K. (2019). The role of assistive technology in renegotiating the inclusion of students with disabilities in higher education in North Africa. *Studies in Higher Education*, *44*(8), 1344-1357.

Coleman, M. B., Cady, J. A., & Rider, R. A. (2015*). "* The Idea of Accessibility and the Reality of Accessibility Are Very Different!" Using a Wheelchair Experience to Teach Preservice Special Educators about Accessibility. *Physical Disabilities: Education and Related Services*, *34*(2), 32-54.

Dahlberg, R., Blomquist, U. B., Richter, A., & Lampel, A. (2014). The service delivery system for assistive technology in Sweden: current situation and trends. *Technology and Disability*, *26*(4), 191-197.

Delaware Access Project. (n.d.). *Adapting curriculum & classroom environments for student success*. University of Delaware. https://www.deaccessproject.org/speacs/introduction-to-speacs/

Dratsiou, I., Metaxa, M., Romanopoulou, E., Dolianiti, F., Spachos, D., & Bamidis, P. D. (2021). Eliminating the gap between the use of assistive technologies and the inclusion of people with intellectual disabilities in leisure activities. *Health Informatics Journal*, *27*(2).

Freeman-Green, S., Williamson, P., & E. Cornelius, K. (2023). Promoting Inclusive Practices in Education: Bridging Gaps and Fostering Independence. *TEACHING Exceptional Children*, *56*(2), 68-69.

Cunningham, R. (2018). *Children's PIADS (Psychosocial Impact of Assistive Devices Scale) user manual*. https://piads.at/wp-content/uploads/2020/01/Childrens-PIADS-User-Manual.pdf

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989*).* User Acceptance of Computer Technology: A Comparison of Two Theoretical Models. *Management Science*, *35*(8), 982–1003. http://www.jstor.org/stable/2632151

Dunn, W., Brown, C., & McGuigan, A. (1994). The ecology of human performance: A framework for considering the effect of context. *The American Journal of Occupational Therapy*, *48*(7), 595-607.

Farmer, T., Robinson, K., Elliott, S. J., & Eyles, J. (2006). Developing and implementing a triangulation protocol for qualitative health research. *Qualitative Health Research*, *16*(3), 377-394.

Faura-Martínez, Ú., & Cifuentes-Faura, J. (2022). Building a dynamic indicator on inclusive education in higher education. *European Journal of Special Needs Education*, *37*(4), 690-697.

Fernández Batanero, J. M., Rueda Montenegro, M., Cerero Fernández, J., & García Alonso, S. (2022). Challenges and trends in the use of technology by hearing impaired students in higher education. *Technology and Disability*, *34*(2), 101-111.

Giancola, S. (2020). *Program evaluation: Embedding evaluation into program design and development*. SAGE

Hehir, T., Grindal, T., Freeman, B., Lamoreau, R., Borquaye, Y., & Burke, S. (2016). *A Summary of the Evidence on Inclusive Education*. Abt Associates.

Hemmingsson, H., Lidström, H., & Nygård, L. (2009). Use of assistive technology devices in mainstream schools: Students' perspective. *The American Journal of Occupational Therapy*, *63*(4), 463-472.

Huls, A. (2022, January 31). The evolution of technology in K-12 classrooms: 1659 to today. *EdTech Magazine*.

Hunt, P. F. (2021). Inclusive education: The case for early identification and early intervention in assistive technology. *Assistive Technology*, *33*(sup1), S94-S101.

Individuals with Disabilities Education Act. (2017, July 7). *Sec. 300.105 assistive technology - Individuals with Disabilities Education Act*. Individuals with Disabilities Education Act. https://sites.ed.gov/idea/regs/b/b/300.105

Jahan, A. M., Guitard, P., & Jutai, J. W. (2024). Assistive devices non-use, abandonment, or non-adherence? Toward standard terminology for assistive devices outcomes. *Assistive Technology*, 1-11.

Khalil, A. I., & Hantira, N. Y. (2022). Special education teachers' knowledge and attitudes toward the use of assistive technology for disabled children management: impact of an educational intervention. *Creative Education*, *13*(3), 821-845

Kolb, A. Y., & Kolb, D. A. (2009). The learning way: Meta-cognitive aspects of experiential learning. *Simulation & Gaming*, *40*(3), 297-327.

Lamond, B., & Cunningham, T. (2020). Understanding teacher perceptions of assistive technology. *Journal of Special Education Technology*, *35*(2), 97-108.

Larsson Ranada, Å., & Lidström, H. (2019). Satisfaction with assistive technology device in relation to the service delivery process—A systematic review. *Assistive Technology*, *31*(2), 82-97.

Liebenberg, L. (2018). Thinking critically about photovoice: Achieving empowerment and social change. *International Journal of Qualitative Methods*, *17*(1), 1609406918757631.

Lohmann, M. J., Owiny, R. L., & Boothe, K. A. (2019). Low-tech solutions for utilizing the UDL framework in the inclusive mathematics classroom. *In Universal Access Through Inclusive Instructional Design* (pp. 120-131). Routledge.

Lyner-Cleophas, M. (2019). Assistive technology enables inclusion in higher education: The role of Higher and Further Education Disability Services Association. *African Journal of Disability*, *8*(1), 1-6.

Mahoney, J., & Hall, C. (2017). *Using technology to differentiate and accommodate students with disabilities*. *E-Learning and Digital Media*, *14*(5), 291-303.

McNicholl, A., Desmond, D., & Gallagher, P. (2023). Assistive technologies, educational engagement and psychosocial outcomes among students with disabilities in higher education. *Disability and Rehabilitation: Assistive Technology*, *18*(1), 50-58.

Murchland, S., & Parkyn, H. (2011). Promoting participation in schoolwork: Assistive technology use by children with physical disabilities. *Assistive Technology*, 23(2), 93-105.

Moulton, D. (2021, November 16). *How opportunities for professional growth and development enhance workforce experience.* Deloitte.https://www2.deloitte.com/us/en/blog/human-capital-blog/2021/importance-promoting-professional-growth.html

NeuroLaunch. (2024, October 1). *Occupational therapy core values: Guiding principles for effective practice*. NeuroLaunch. https://neurolaunch.com/occupational-therapy-core-values/#:~:text=The%20Magnificent%20Seven%3A%20Unpacking%20the%20Core%20Values%20of,7.%20Prudence%3A%20The%20Art%20of%20Making%20Smart%20Choices

Office of Special Education and Rehabilitative Services (OSERS). (2023). *Welcome to OSEP*. https://www.ed.gov/about/ed-offices/osers

Owuor, J., Larkan, F., Kayabu, B., Fitzgerald, G., Sheaf, G., Dinsmore, J., McConkey, R., Clarke, M, & MacLachlan, M. (2018). Does assistive technology contribute to social inclusion for people with intellectual disability? A systematic review protocol. *BMJ open*, *8*(2), e017533.

Onion Mountain Tech. (n.d.). *LoTTIE Kits! Low-tech AT tool kits!!!* [Fact Sheet]. https://www.lexingtonma.org/wp-content/uploads/2019/04/LoTTIEKitsHandout.pdf#:~:text=According%20to%20the%20Onion%20Mountain%20Website%20%28the%20folks,out%20simple%20devices%20before%20automatically%20requiring%20more%20sop

Research and Training Center on Promoting Interventions for Community Living. (n.d.). *The assistive technology act* [Fact Sheet]. http://rtcil.org/sites/rtcil/files/documents/ATA%20Fact%20Sheet%202.15.2021--Fixed.pdf.

Rodrigues, A. L., Cerdeira, L., Machado-Taylor, M. D. L., & Alves, H. (2021). Technological

skills in higher education—different needs and different uses. *Education Sciences*, *11*(7),

326.

Scherer, R., Siddiq, F., & Tondeur, J. (2019). The technology acceptance model (TAM): A meta-

analytic structural equation modeling approach to explaining teachers' adoption of digital

technology in education. *Computers & Education*, *128*, 13-35.

Schladant, M., Ocasio-Stoutenburg, L., Nunez, C., Dowling, M., Shearer, R., Bailey, J., Garilli,

A. & Natale, R. (2022). Promoting a culture of inclusion: impact of professional

development on teachers' assistive technology practices to support early literacy. *Journal

of Early Childhood Teacher Education*, *44*(2), 147-166.

Simón, C., Martínez-Rico, G., McWilliam, R. A., & Cañadas, M. (2023). Attitudes toward

inclusion and benefits perceived by families in schools with students with autism

spectrum disorders. *Journal of Autism and Developmental Disorders*, *53*(7), 2689-2702.

Steel, E. J., & de Witte, L. P. (2011). Advances in European assistive technology service

delivery and recommendations for further improvement. *Technology and

Disability, 23*(3), 131-138.

Strack, R. (n.d.). *What is photovoice? A brief summary* [Fact Sheet]. University of North

Carolina Greensboro. https://communityengagement.uncg.edu/wp-

content/uploads/2019/11/What-is-Photovoice-A-Breif-Summary_Strack-Dec-2017.pdf

The Research and Training Center on Promoting Interventions for the Community Living.

(2021). *The Assistive Technology Act* [Fact sheet]. Assistive Technology Act Fact Sheet

(ku.edu)

United Nations International Children's Emergency Fund. (2021, November 9). *Nearly 240 million children with disabilities around the world, UNICEF's most comprehensive statistical analysis finds.* UNICEF for Every Child.  https://www.unicef.org/press-releases/nearly-240-million-children-disabilities-around-world-unicefs-most-comprehensive

United Nations. (2022, May). *Assistive technology: a 'life changer' for those most in need.* U. S. News Global Perspective Human Stories. https://news.un.org/en/story/2022/05/1118212

U.S. Department of Education. (2024). *Assistive technology program.* https://www.ed.gov/about/doing-business-ed/jobs-at-ed/onboarding-documents/assistive-technology-program

U.S. Department of Education. (2024). *Free appropriate public education (FAPE).* https://www.ed.gov/laws-and-policy/civil-rights-laws/protecting-students/free-appropriate-public-education-fape

Warwick Medical School. (n.d.). *The Warwick-Edinburgh Mental Wellbeing Scales-WEMWBS.* The University of Warwick. https://warwick.ac.uk/fac/sci/med/research/platform/wemwbs

World Health Organization. (2024, January 2). *Assistive technology.* World Health Organization. https://www.who.int/news-room/fact-sheets/detail/assistive-technology

World Health Organization & United Nations International Children's Emergency Fund. (2022, May 16). *Almost one billion children and adults with disabilities and older persons in need of assistive technology denied access, according to new report.* World Health Organization. https://www.who.int/news/item/16-05-2022-almost-one-billion-children-

and-adults-with-disabilities-and-older-persons-in-need-of-assistive-technology-denied-

access--according-to-new-report

World Health Organization. (2016). *Improving access to assistive technology* (No. EM/RC63/4).

World Health Organization. Regional Office for the Eastern Mediterranean.

Zabala, J. (2024). *SETT scaffold for consideration of AT needs.* Joy Zabala, Ed.D.

https://www.joyzabala.com/links-resources

Zilz, W., & Pang, Y. (2021). *Application of assistive technology in inclusive*

*classrooms.* Disability and Rehabilitation: Assistive Technology, *16*(7), 684-686.

## APPENDIX A

## WEB-BASED SURVEY QUESTIONS

1. What best describes your professional role?

   a. Educator

   b. Educator Assistant

   c. Related Service Professional – Occupational Therapist

   d. Related Service Professional – Physical Therapist

   e. Related Service Professional – Speech Language Pathologist

   f. Assistive Technology Specialist

   g. Caregiver

   h. Other

2. Approximately how many years have you served in this role?

   a. 0 – 3

   b. 4 – 7

   c. 8 – 10

   d. 11 – 15

   e. 16 – 20

   f. 21 – 25

   g. 26 – 30

   h. 30+

3. Assistive technology impacts students' academic participation

   a. Strongly agree

b. Somewhat agree

c. Neither agree nor disagree

d. Somewhat disagree

e. Strongly disagree

4. Assistive technology impacts students' home and community participation

a. Strongly agree

b. Somewhat agree

c. Neither agree nor disagree

d. Somewhat disagree

e. Strongly disagree

5. Assistive technology impacts students mental health and Wellness

a. Strongly agree

b. Somewhat agree

c. Neither agree nor disagree

d. Somewhat disagree

e. Strongly disagree

6. Assistive technology is too expensive

a. Strongly agree

b. Somewhat agree

c. Neither agree nor disagree

d. Somewhat disagree

e. Strongly disagree

7. I know which AT options are readily available through my school district

    a. Strongly agree

    b. Somewhat agree

    c. Neither agree nor disagree

    d. Somewhat disagree

    e. Strongly disagree

8. I know what AT options are readily available through my state

    a. Strongly agree

    b. Somewhat agree

    c. Neither agree nor disagree

    d. Somewhat disagree

    e. Strongly disagree

9. I am confident when recommending and using at with my student/child

    a. Strongly agree

    b. Somewhat agree

    c. Neither agree nor disagree

    d. Somewhat disagree

    e. Strongly disagree

10. If I received training, I would be more likely to integrate AT

    a. Strongly agree

    b. Somewhat agree

    c. Neither agree nor disagree

d. Somewhat disagree

e. Strongly disagree

11. Adequate training is provided when AT is recommended for my student/child

 a. Strongly agree

 b. Somewhat agree

 c. Neither agree nor disagree

 d. Somewhat disagree

 e. Strongly disagree

12. The frequency in which I use AT in the classroom is best described by which of the following

 a. AT is used daily in the classroom (1 or more times per day)

 b. AT is used weekly in the classroom (3 or more times per week)

 c. AT is used seldomly in the classroom (less than 3 times per week)

 d. AT is not used in the classroom

 e. I do not work with the student/child in the classroom

 f. other

13. The frequency in which I use AT with my child in the home or community is best described by the following

 a. AT is used daily in the home or community (1 or more times per day)

 b. AT is used weekly in the home or community (3 or more times per week)

 c. AT is used seldomly in the home or community (less than 3 times per week)

 d. AT is not used in the home or community

e. I do not work with the student/child in the home or community

f. other

14. Please rank the barriers impeding your ability to use AT, with 1 being the greatest barrier and 8 being the least great barrier

a. Availability of AT

b. Limited training and education for using AT

c. Limited understanding for how to integrate AT in routines

d. Time allowed for determining and selecting AT

e. Time it takes to receive AT once it is selected

f. Time constraints for learning how to use the AT

g. Funding

h. Other

15. Please rank the training formats you feel would be most beneficial when receiving AT training and instruction

a. In-person group

b. In-person individual

c. Virtual group

d. Virtual individual

e. Other

16. Are you interested in being contacted for a virtual interview containing additional questions on this topic?

a. Yes

b. No

**APPENDIX B**

**Interview Questions**

1. What is your role as it relates to this interview?

2. What is your highest level of completed education?

3. What category best describes your age?

   18-25 years

   26-33 years

   34-41 years

   42-49 years

   50-57 years

   58+ years

4. What category best describes the area in which you work?

   Urban

   Suburban

   Rural

5. Can you describe your training in the use of AT? For example, was it part of your college curriculum, ongoing training at your place of employment, a one-time training or continuing education course, etc.?

6. From whom or what do you currently seek support for AT-related questions?

7. What aspects of professional training do you feel are most effective? Examples may include hands-on opportunities, peer discussions and learning groups, having a choice of AT topics, flexibility for completion of the training, etc.

8. What options currently exist to trial or obtain AT in your school district, state, or healthcare setting, and can you describe the process?

9. According to disability classifications based on the individual with disabilities education act (Idea), what best describes the population of student(s) with whom you work?

Specific learning disability

Other health impairment

Autism Spectrum Disorder

Emotional disturbance

Speech-language impairment

Visual impairment (including blindness)

Deafness

Hearing impairment

Deaf-blindness

Orthopedic impairment

Intellectual disability

Traumatic brain injury

Multiple disabilities

10. What types of AT are being used by the children you assist? You can mention all that apply.

Audio players and recorders

Timers

Reading guides

Seat cushions

FM listening systems

Calculators

Writing supports (please describe)

Augmentative and alternative communication

Adapted paper

Other (please describe)

11. Based on the AT being used, who provided the training or information on how and when to use it?

Educator

Educator Assistant

Related Service Professional – OT

Related Service Professional – PT

Related Service Professional – SLP

AT Specialist

Caregiver

Other (please describe)

No training provided

**12.** Do you have any additional thoughts or experiences you would like to share regarding selecting, using, and integrating at?

# APPENDIX C

## SETT SCAFFOLD FOR GATHERING DATA

**SETT SCAFFOLD FOR GATHERING DATA–ANNOTATED**
**Collaboratively Gather and Analyze Information from a Variety of Sources**

Student: _____ Date: _____ Perspective: _____

| EXAMINING CURRENT CONDITIONS TO ESTABLISH EDUCATIONAL NEED | | |
|---|---|---|
| STUDENT | ENVIRONMENTS | TASKS |
| | | |

- CIRCLE FUNCTIONAL AREA(S) OF CONCERN
- UNDERLINE BARRIERS TO STUDENT PROGRESS
- STAR SUPPORTS FOR STUDENT PROGRESS

# SETT SCAFFOLD FOR GATHERING DATA
## Collaboratively Gather and Analyze Information from a Variety of Sources
(use as many sheets as necessary to build shared knowledge)

Student: _____ Date: _____ Perspective: _____

| DESCRIBE CURRENT CONDITIONS TO ESTABLISH EDUCATIONAL NEED | | |
|---|---|---|
| **STUDENT** | **ENVIRONMENTS** | **TASKS** |
| | | |

- CIRCLE FUNCTIONAL AREA(S) OF CONCERN
- UNDERLINE BARRIERS TO STUDENT PROGRESS
- STAR SUPPORTS FOR STUDENT PROGRESS

**APPENDIX D**



HOW TO USE

**PHOTOVOICE**

*for AT Data Collection*

**1** **What is Photovoice?**

Using photographs from students' everyday lives to record and reflect on needs, actions, policies, and experiences. Photovoice encourages diversity of viewpoints and collaboration to implement effective changes.

**2** **Goals of Photovoice**

- Improve communities by addressing the root of the problem
- Empower participants
- Encourage important discussions
- Engage with all involved stakeholders
- Develop supports for change

**3** **Steps of Photovoice for AT data collection in school**

1. Form a group
2. Explain photovoice, ethical considerations, and privacy protection
3. Document issues causing concerns
4. Discuss root causes
5. Create and write captions using the SHOWED method
6. Sort concerns into themes
7. Discuss and implement changes

**4** **SHOWED Method**

**S** – What do you **SEE**?
**H** – What is **HAPPENING**?
**O** – How does this relate to **OUR** lives?
**W** – **WHY** does this problem or situation exist?
**E** – How could this image **EDUCATE** others?
**D** – What can we **DO** about the problem or situation?

**5** **Considerations**

- Determine equipment needs
- Include key decision-makers in the process
- Ensure follow-up planning

(Strack, & al.)

**EXECUTIVE SUMMARY**

The use and integration of assistive technology (AT) in educational settings has transformed students' academic opportunities while contributing to life-long mental health and well-being (Hunt, 2021; Khalil, 2022; Mahoney & Hall, 2017; WHO, 2024; Moulton, 2021). These devices and products can enhance long-term student outcomes and improve inclusion experiences for all stakeholders (Mahoney & Hall, 2017; Schladant et al., 2022). Although there are proven educational benefits to integrating AT, there are also well-documented barriers contributing to non-adherence and abandonment (Jahan et al., 2024; Rodrigues et al., 2021). Currently, little research is available regarding the effectiveness of structured intervention and collaboration among IEP team members. This study highlights the impact of early introduction to AT and the navigation of the barriers that contribute to limited use and integration (McNicholl et al., 2020).

Educators and school staff face increasing pressure to provide inclusive education opportunities to students with various special learning needs. Integrating AT can support students with different learning needs, allowing for enhanced access to educational curricula while supporting the role of educators (WHO, 2024). With early introduction and an implementation plan executed with fidelity, AT can provide future opportunities for the user that he or she may not otherwise experience (Mahoney & Hall, 2017; WHO, 2024). These opportunities may include continuing higher education, increased career prospects, a greater sense of self-esteem, successful contributions to the community, and economic development (Moulton, 2021). Additionally, successful implementation of AT may result in decreased

undesired behaviors, fewer absences, reduced incarcerations, less drug use, and declining

homelessness (WHO, 2024; WHO & UNICEF, 2024).

By addressing the barriers commonly associated with the early introduction of AT, it is

possible to improve educational outcomes and long-term mental health and wellness throughout

the lifespan of the intended users (McNicholl et al., 2020). *Breaking Barriers AT School*

addresses commonly reported barriers faced by educators and school staff while also

encouraging the examination of the psychosocial impacts it can have on the student.

With increasing demands on teachers and the need to include students with special

learning needs, occupational therapists can support these teachers and students by utilizing AT

within the school setting. Students requiring these accommodations will gain additional

opportunities to be included in academic and related activities by consistently and appropriately

integrating AT, resulting in increased positive feelings of health and well-being (Schladant et al.,

2022). AT stakeholders, including caregivers, educators, and related school staff, believe that

integrating and using AT impacts the mental health and well-being of the direct users in various

settings, including school, home, and the community (Dratsiou et al., 2021; Hunt, 2021; Khalil,

2022; WHO, 2024). However, stakeholders and potential stakeholders often are uninformed of

available AT or face a variety of barriers to allowing initiation and sustained use once AT is

identified and available (Al-Dababneh & Al-Zboon, 2022; Hemmingsson & Nygard, 2009; Jahan

et al., 2024; Rodrigues et al., 2021). Identifying and implementing the appropriate AT requires

input from all of those involved (Borger et al., 2017; Hunt, 2021; Simon et al., 2023). When all

stakeholders can adopt the AT, the likelihood of non-use and abandonment decreases

significantly (Borger et al., 2017; Hunt, 2021; Simon et al., 2023).

Using AT within the school setting can produce various positive benefits within the school environment and have lasting impacts on an individual's community integration and success in adulthood (Moulton, 2021). It can improve educational opportunities while allowing for highly individualized learning tools to support the learner's needs (Mahoney & Hall, 2017; WHO, 2024). Students' curriculum can become more accessible, allowing for increased participation in regular classroom activities (Schladant et al., 2022). AT can offer opportunities for improved communication and engagement in social experiences (Schladant et al., 2022; WHO, 2024). With early adoption, particularly while the individual is in their early elementary years, the user lays the foundation for their familiarity, knowledge, and skill set for using AT (McNicholl et al., 2020). Possibilities for collaboration among multi-disciplinary teams and data-driven decision-making are more prevalent within the school setting (Hunt, 2021). The user will have additional opportunities to acquire needed skills essential for everyday tasks, including but not limited to ADLs and IADLs (WHO, 2024). With increased confidence, the user may experience higher self-esteem while reducing negative perceptions of oneself (Dratsiou et al., 2021, Khalil, 2022; WHO, 2024). The user can better advocate for their evolving needs while hopefully avoiding future AT non-use and abandonment (Jahan et al., 2024; Rodrigues et al., 2021).

Although numerous identified barriers exist, educators and related school staff often report that barriers commonly associated with AT include availability, limited training and education, and limited understanding of how it can be integrated into daily school-based activities and routines (Al-Dababneh & al-Zboon, 2022; AOTA, 2024; Borg & Östergren, 2015; Hemmingsson & Nygard, 2009; Murchland & Parkyn, 2011; Schladant et al., 2022). Oftentimes,

inadequate awareness of AT, in conjunction with limitations in the service delivery process,

further contribute to obstacles impeding integration within an elementary setting (Jahan et al.,

2024; WHO, 2024). A poor understanding of funding structures and resources may limit

the availability of AT options (WHO, 2024). Negative perceptions and hesitation with adopting

new technologies may deter some stakeholders from exploring and trialing potentially life-

changing AT options (Borger et al., 2017; Jahan et al., 2024). Feelings and perceptions of

cheating may arise when allowing some students to use AT in a school setting (Borger et al.,

2017; Jahan et al., 2024; Schladant et al., 2022). As a result, students face poor access to the full

curriculum and school-related activities. Time constraints for recommending and acquiring AT,

and providing the necessary training and education, also contribute to barriers to AT integration

within the school setting (Al-Dababneh & al-Zboon, 2022; AOTA, 2024; Borg & Östergren,

2015; Hemmingsson & Nygard, 2009; Murchland & Parkyn, 2011; Schladant et al., 2022).

Developed through the integration of an in-depth literature review and responses from an

original survey and semi-structured interviews, the researchers have developed an informational

and interactive framework for school-based occupational therapists to utilize in their practice

when supporting educators, their schools, and their districts with AT education and training for

their students with special needs and learning differences. The program intends to serve as many

stakeholders as possible when working with students who could benefit from the integration of

AT, with the key participants being educators and educator assistants led by an occupational

therapist. Additional program participants may include other school staff, related service

providers, administrators, and caregivers. The theories used to guide and develop this program

include the Experiential Learning Theory (ELT) and the Technology Acceptance Model (TAM).

Through ELT, four phases guide key points within the program. These include identifying the problem, reflecting on experiences, considering how to extinguish or minimize the problem, and making changes to the existing concept (Kolb & Kolb, 2009). Applying the phases of ELT to the research would entail identifying the need to support stakeholder awareness and engagement with available AT to support students within an elementary school setting. Secondly, one might ask why school staff might be una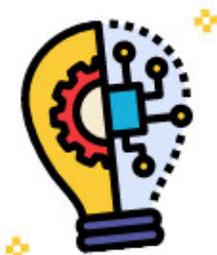ware of the available AT or why they are not using it. Preferred methods of training, education, and collaboration are then discussed as potential ways to minimize the identified problem. Implementation of the program leads changes set forth to directly address some of the main barriers to integration of AT within the elementary school setting. Moving into the informational and training framework, the researchers have selected to apply the TAM. This theory suggests that as a user perceives technology as easy to use, the more likely the user will be to adopt and use the technology (Scherer et al., 2019). Through awareness, education, training, and peer collaboration, users are expected to gain the necessary confidence to achieve increased positive perceptions and ease of use of the AT.

Implementation of this framework aims to provide program participants with a strong foundational knowledge of the definition of AT, attributes of those who may potentially benefit from AT, and increase awareness of available AT for a potential trial. Participants should also gain a stronger understanding of what factors contribute to AT non-use and abandonment. Collaboration and hands-on exploration of available AT will also occur throughout the framework's implementation. Upon conclusion of the program, participants should have a strong understanding of barriers contributing to integration of AT, have an increased confidence when

attempting to identify and feature match specific AT with an intended user, and be able to develop a data-driven implementation plan for future use.

**FACT SHEET**

# Breaking Barriers AT School
## An Education and Training Program for School Professionals
## Fact Sheet

## IMPORTANT DEFINITIONS

Assistive Technology 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 functional capabilities of an infant, toddler, or child with a disability

Assistive Technology Service: any service that directly assists an infant, toddler, or child with a disability in the selection of an AT device

## IMPORTANT FACTS

- More than 2.5 billion people need one or more assistive devices
- Approximately 3.5 billion people will need AT by 2050
- IEP teams are required to consider, provide, and fund AT devices and services if deemed necessary to provide FAPE
- AT can influence equal opportunities, participation in human rights, and living in dignity
- Common barriers to using AT include: perceptions, access, funding, and education and training
- Free resources are available to measure satisfaction for AT use among young students

## COMMONLY USED AT IN SCHOOLS

Low-tech: readily available, inexpensive, typically do not require batteries or electricity
- pencil grips
- adapted scissors
- page holders

Mid-tech: usually digital and may require batteries or another power source
- calculators
- audio books
- digital recorders

High-tech: typically computer-based, usually have sophisticated features, and can be tailored to specific needs of an individual
- tablets
- screen readers
- voice recognition software

CHILDREN'S PIADS

ASSISTIVE TECHNOLOGY FUNDING SOURCES

LIST OF AT & AAC LENDING LIBRARIES ACROSS THE COUNTRY

## THEORIES

### TECHNOLOGY ACCEPTANCE MODEL (TAM)

TECHNOLOGY ACCEPTANCE MODEL (TAM)

External Variables → Perceived Usefulness / Perceived Ease of Use → Attitude Towards Using → Behavioral Intention of Use → Actual System Use

### ECOLOGY OF HUMAN PERFORMANCE (EHP)

WITHOUT AT ---> LIMITED PERFORMANCE

PERFORMANCE — Executed Tasks

(DUNN ET AL., 1994, P.599)

WITH AT ---> IMPROVED PERFORMANCE

Skills/Abilities — PERFORMANCE — Executed Tasks

(DUNN ET AL., 1994, P.599)

CURRICULUM VITAE

# KRISTEN MANCHIN, MS, OTR/L

██████████████████████████

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## EXECUTIVE SUMMARY

Kristen is an occupational therapist with 12 years of experience working in school-based settings. She has worked with multidisciplinary teams across several districts, schools, and special programs. She also has leadership experience, including district-level instructional support and assistive technology teams, working as a team member on the Delaware Department of Education DPAS II Specialist Committee for Component IV Revision, and providing district-wide training on various OT and special services-related topics. In addition to her work experience, Kristen is pursuing her post-professional doctoral degree in Occupational Therapy at Temple University to advance her career and work toward professional growth and leadership goals. Kristen's personal mission statement is to provide every student with nurturing and accessible learning opportunities, motivate and foster professional growth and learning amongst herself and other professionals, continue collaboration among multidisciplinary teams to successfully impact positive change, and support school districts in becoming a model of excellence.

## EDUCATION

**Temple University – Philadelphia, PA, December**                    **2024**

**Doctor of Occupational Therapy**
Relevant Coursework: Leadership in Health Professions, Clinical Education and Fieldwork Supervision, Measurement and Analysis, Field Study and Professional Portfolio, Evidenced-based Practice, Theories and Participation

**Philadelphia University – Philadelphia, PA,**                       **2013**

**Master of Science in Occupational Therapy**
Relevant Coursework: Assessment & Interventions for Children & Youth, Assistive Device Design, Environmental Dimensions of Occupations, Dimensions of Human Movement, Interpersonal Relations, Conceptual Assumptions for OT, Evidenced-based Practice, Professional Issues and Trends, Innovative Practices in OT, Level I & II Fieldworks

**Towson University – Towson, MD**                                                        **2008**

**Bachelor of Science in Healthcare Management**
Minor in Business Administration
Relevant Coursework: Community Health Administration, Healthcare in the U.S., Principles of Financial Management, Financing and Organization of Healthcare in the U.S., Legal and Ethical Issues in Healthcare Administration, Legal Environment of Business, Writing for Business & Industry, Accounting Principles I & II, Macro and Micro Economic Principles, Health Economics, Principles of Marketing, Principles of Management, Internship in Therapy Services Hospital Human Resources Department

### PRESENTATIONS

Manchin, K. & Abbott-Gaffney, C. (2025). Breaking Down Barriers to the Integration of Assistive Technology – AOTA Inspire Conference, Philadelphia, PA.

Manchin, K. (2023). Occupational Therapy Accommodations in 504s - Christina School District, Christiana, DE.

Manchin, K. (2019). Using the LoTTIE Kit – Brandywine School District, Brandywine, DE.

### CORE COMPETENCIES

- Evaluate, treat, and consult using an occupations-based approach
- Collaborate with OT peers on best practices, assessment, and intervention strategies to support common and complex student populations
- Support multidisciplinary teams aimed at achieving students' goals associated with IEPs/504 plans
- Provide training for new occupational therapists and assistants, both new to the district and new to the field of occupational therapy
- Collect and use data to develop goals and track progress monitoring
- Provide skilled occupational therapeutic support for MTSS
- Utilize evidence-based strategies and interventions
- Evaluate and assess students and classrooms for the use and integration of assistive technology
- Recommend environmental modifications to encourage inclusion for all students
- Present data-driven findings at meetings with district and school leadership, SECs, IEP/504 team, and caregivers
- Supervise occupational therapy assistants and occupational therapy students
- Experience with students (pre-K through 21) and teams across a variety of special programs and settings
- Maintain therapeutic tools and equipment to ensure safety and cleanliness for use

- Use ClassLink Applications including PowerSchool, Data Service Center, eSchool, & PDMS
- Support students' IEP needs for summer programming

## PROFESSIONAL EXPERIENCE

**Christina School District – Wilmington, DE,** 2013 – 2016, 2023 - Present

- Work as an occupational therapist in the following schools and programs: Birth to Three, ChildFind, Christina Early Education Center, Stubbs Early Education Center, Pulaski Early Education Center, early education itinerant services, Pritchett Academy (elementary and middle schools), the REACH program (Pritchett and Exceptional Care for Children), and alternative programs (The Douglass School and Sara Pyle Academy)
- Facilitate caseload distribution and coordinate schedules with occupational therapy assistants, teachers, and other related service providers for assigned schools & programs
- Participate as a member of the Delaware Department of Education DPAS II Specialist Committee for Component IV Revision
- Lead the design and collaboration process for the construction and implementation of specialized sensory-related spaces totaling over $150,000
- Present and discuss the role of Occupational Therapy to district 504 coordinators
- Supervise up to two occupational therapy assistants at a given time

**Brandywine School District – Wilmington, DE,** 2015 – 2023

- Provide contracted occupational therapy services for assigned workload in support of Brandywine School District and contracted service provider (Therapy Services of Delaware & Pediatric Therapy Services)
- Work as an occupational therapist over several schools and special programs including the Bush Early Education Program, Early Childhood Assistance Program, Carrcroft, Claymont, Forwood, Hanby, Harlan, Lombardy, Mount Pleasant Elementary, P.S. duPont, Springer, Brandywine Specialized Autism Program (BSAP), Independent Learning Program (ILP), Emotional Support Program (ESP), homebound, and itinerant services
- Serve as the occupational therapist representative on the district's Assistive Technology Team and the district's Instructional Support Team
- Evaluate and assess students and classrooms for the use and integration of assistive technologies
- Facilitate implementation plan for assistive technologies among multidisciplinary team

- Train district-wide staff on low-high assistive technology options
- Educate occupational therapists and other staff members regarding the administration of various evaluations and protocols
- Disseminate and present classroom sensory strategies for educators during school staff meetings
- Develop evaluation templates used by district-wide occupational therapists
- Supervise occupational therapy assistants and occupational therapy fieldwork students
- Participate and provide support as needed for activities such as Special Olympics

**Red Clay School District – Wilmington, DE,** 2015 – 2016, Summer 2023

- Work as an occupational therapist at the Highlands School (2015-2016) and McKean High School Meadowood summer program (2023)
- Continue addressing goals within the student's IEP for the duration of the summer program
- Accompany and support students while attending outings and navigating the community

**Nemours Children's Health – Wilmington, DE,** 2010-2013, 2014 - 2015

- Work as an occupational therapist in In-patient Rehabilitation and Outpatient Therapy Services (per diem, 2014-2015)
- Work as a therapeutic aide, front desk receptionist, and administrative support within the Outpatient Therapy and Sports Medicine Departments (2010 – 2013)
- Participate in multidisciplinary team interviews for available occupational therapy positions
- Prepare treatment spaces and equipment to ensure cleanliness, organization, and safety for treating therapists and clients
- Inventory, order, and replenish therapeutic treatment supplies as needed for a multidisciplinary team, including occupational, physical, and speech therapists
- Greet, check-in, schedule, and verify insurance for new and returning clients
- Assist therapists as needed throughout treatment sessions

**Cigna Global – Claymont, DE,** 2008 - 2010

- Manage and analyze eligibility for client accounts
- Adhere to strict deadlines when responding to and resolving issues with client accounts
- Prioritize and effectively coordinate client requests of colleagues to ensure success as a team effort

## PROFESSIONAL MEMBERSHIPS

**American Occupational Therapy Association, AOTA,** 2011 – 2013, 2015 – Present

**Delaware State Education Association, DSEA,** 2023 – Present

## LICENSES, CERTIFICATIONS, & COMMITTEES

**Licensed Occupational Therapist in the state of Delaware, 2013 –** Present

**National Board for Certification in Occupational Therapy (NBCOT),** 2013 – Present

**School-based Practice Professional Certificate (AOTA),** In progress

**DE Depart. of Education DPAS II Specialist Committee for Component IV Revision,** In progress

**Christina School District Leadership Academy,** In progress