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AT Services During and After the COVID-19 Pandemic

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Assistive Technology Outcomes and Benefits AT Services During & After the COVID-19 Pandemic

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Assistive Technology Outcomes and Benefits Editorial Policy

Aim and Scope

Assistive Technology Outcomes and Benefits, published by the Assistive Technology Industry Association, is an open access, peer-reviewed journal that publishes articles specifically addressing the benefits and outcomes of assistive technology (AT) for Persons with Disabilities across the lifespan. The journal's purpose is to advance the AT industry by (a) fostering communication among stakeholders interested in the field of AT, including manufacturers, vendors, practitioners, policy makers, researchers, consumers with disabilities, and family members; (b) facilitating evidence-based demonstrations and case-based dialogue regarding effective AT devices and services; and (c) helping stakeholders advocate for effective AT devices and services.

Assistive Technology Outcomes and Benefits invites for consideration submissions of original papers, reports and manuscripts that address outcomes and benefits related to AT devices and services. These may include (a) findings of original scientific research, including group studies and single subject designs; (b) qualitative and mixed methods studies, such as focus group and structured interview findings with consumers and their families regarding AT service delivery and associated outcomes and benefits; (c) marketing research related to AT demographics or devices and services; (d) technical notes and usability studies regarding AT product development findings; (e) project/program descriptions in which AT outcomes and benefits have been documented; (f) case-based reports on successful approaches to service delivery; and (g) consumer perspectives on AT devices and services.

Submission Categories

ATOB welcomes scholarly contributions. However, many stakeholders engaged in the field of AT do not have an academic background. ATOB offers a unique opportunity for these stakeholders to contribute their expertise and experience in the context of achieving successful outcomes and beneficial impacts. ATOB understands that many potential authors may lack experience in authoring papers for peer-reviewed journal publication. Therefore, the ATOB Editorial Board is pleased to offer assistance in preparing and refining relevant submissions. Articles may be submitted under three categories:

Voices from the Field

Articles submitted under this category should come from professionals who are involved in some aspect of AT service delivery with persons having disabilities, or from family members and/or consumers with disabilities. Submissions may include case studies, project or program descriptions, approaches to service delivery, or consumer perspective pieces. All submissions should have a clear message and be written with enough detail to allow replication of results. See [ATOB Editorial Policy](#) for more details.

Voices from Industry

Articles submitted under this category should come from professionals involved in developing and

marketing specific AT devices and services. Case studies, design, marketing research, or project/program descriptions are appropriate for this category. See [ATOBO Editorial Policy](#) for more details.

Voices from Academia

Articles submitted under this category should come from professionals conducting research or development in an academic setting. Submissions are likely to include applied/clinical research, case studies, and project/program descriptions. See [ATOBO Editorial Policy](#) for more details.

Types of Articles

Within each of the voices categories, authors have some latitude regarding the type of manuscript submitted and content to be included. However, ATOBO will only accept original material that has not been published elsewhere, and is not currently under review by other publishers. Additionally, all manuscripts should offer sufficient detail to allow for replication of the described work.

Applied/Clinical Research

This category includes original work presented with careful attention to experimental design, objective data analysis, and reference to the literature.

Case Studies

This category includes studies that involve only one or a few subjects or an informal protocol.

Design

This category includes descriptions of conceptual or physical design of new AT models, techniques, or devices.

Marketing Research

This category includes industry-based research related to specific AT devices and/or services, demographic reports, and identification of AT trends and future projections.

Project/Program Description

This category includes descriptions of grant projects, private foundation activities, institutes, and centers having specific goals and objectives related to AT outcomes and benefits.

Approaches to Service Delivery

This category includes descriptions of the application of assistive technology in any setting (educational, vocational, institutional, home-life) to improve quality of life for people with disabilities.

Consumer and Caregiver Perspectives

This category offers an opportunity for product end users, family members, and caregivers to share their experiences in achieving successful outcomes and benefits through the application or use of AT devices and services.

Mandatory Components of All Articles

Authors must include a section titled Outcomes and Benefits containing a discussion related to outcomes and benefits of the AT devices/services addressed in the article.

Authors must include a short description of the article's target audience and indicate the article's relevance to that target audience. Authors may describe their work as it relates to more than one audience and should specify the value that each group may derive from the work.

Publishing Guidelines

Review detailed [Manuscript Preparation for Authors](#) for information on formatting requirements and submission guidelines.

For More Information

Please see ATOB's Editorial Policy at <http://www.atia.org/at-resources/atob> for more details regarding the submission and review process, ATOB's Copyright Policy, and ATOB's Publication Ethics and Malpractice Statement.

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AT Services During & After the COVID-19 Pandemic
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Introduction to Volume 16 Issue 1

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UNDERSTANDING THE IMPACT OF COVID-19 PANDEMIC ON ASSISTIVE TECHNOLOGY SERVICES

As citizens around the world celebrated New Year's Eve on December 31, 2019, few people could imagine how the year would actually unfold as a result of the emergence of the COVID-19 virus. In 2020, the specialized language of public health would enter the vocabulary of the ordinary citizen as they tried to make sense of topics such as coronavirus, pandemic, flattening the curve, asymptomatic, super-spreader events, social distancing, personal protective equipment (PPE), and ventilators (Patella, 2020). In a matter of months, the COVID-19 global pandemic would impact all aspects of society in every country (Burrell, 2021; Chan & Ridley, 2021). Efforts to manage this public health crisis involved government agencies at the national, state, regional, and local levels resulting in disparate policies, recommendations, and practices affecting citizen's daily lives (Christakis, 2020; Hayes, 2020; Tooze, 2021; Wright, 2021).

Within the education sector, the immediate impact of COVID-19 involved closing schools and offices in March 2020, and within a very short time period, transitioning children and adults to remote instruction and remote work. Richard Culatta, Chief Executive Officer of the International Society for Technology in Education described the chaotic pattern that would become common practice across three academic years:

Part of this whiplash that we keep getting is it's like, "Oh, online quick, it's all remote learning." And then, "Whew that's all over, back to normal, back into the classroom, let's not use technology." "Whoops. We're back to remote learning again" (Salman, 2022 paragraph 12).

Whereas the government has monitored the impact of these transitions using metrics such as the positivity rate, economic growth measures, and unemployment rates, reports about the impact of COVID-19 on the well-being of children and adults with disabilities, the demands on the social systems that support them, or the nature of the learning loss are only beginning to emerge (UNICEF, 2022). There is much more to be learned about the short- and long-term impact of COVID-19 on students, families, teachers, and the educational system.

This special issue of ATOB was created to provide a historical record of the impact of the COVID-19 pandemic on the provision of assistive technology services in schools. A call for manuscripts was released in February 2021 and we were fortunate to receive a number of submissions. The timing of this work was auspicious as many authors were able to collect data during the initial days of the pivot from classroom-based instruction to remote learning (March 2020), as well as the start of the new school year when the Delta variant began surging (Fall 2021) and the emergence of the Omicron variant in December 2021 (Center for Disease Control and Prevention, 2021). As we go to press, public health officials and politicians continue to assess and debate the efficacy of vaccines, masking, and the transition from a pandemic "seemingly unending state of emergency" to an endemic "a long, uncomfortable coexistence with SARS-CoV-2" (Powell, 2022, paragraph 5).

AT SERVICES DURING AND AFTER THE COVID-19 PANDEMIC

When designing the Call for Manuscripts for this special issue, the ATOB Editorial Board posed a number of questions: How did students receive new assistive technology devices during the pandemic? How did schools ensure that all digital curricula were accessible for students with disabilities? What role did AT teams play in supporting students and families during periods of remote instruction and engage in needs assessment? What changes were necessary for service delivery systems to be responsive to students, families, and teachers? And finally, what lessons were learned about what AT services might look like in a post-pandemic world? We received many manuscripts and were able to accept the six articles presented in this issue. The following sections provide a brief preview of each article before we conclude with some observations about the future of assistive technology services in schools.

In the first article, *Assistive Technology/Augmentative & Alternative Communication Implementation: School to Home during COVID-19*, authors Corduff, Lee, Rockinson-Szapkiw and Watson report on the results of a mixed methods study involving a national survey designed to understand the processes special educators, schools, and districts used to implement assistive technology (AT) and augmentative and alternative communication (AAC) tools during the pivot from face-to-face (F2F) instruction to virtual

instruction during the COVID-19 pandemic. This work is important as it provides a snapshot of AT/AAC implementation in January - May of 2021. Survey responses were received from 104 special educators and 45 parents. Follow-up interviews were conducted with 17 educators and parent participants. Among the key findings: 46.2% of teachers ($n = 48$) did note that their students used new software or subscriptions; 44.3% teachers reported no - or little to some - support from the school. All parent respondents (100%) reported that their children used AT/AAC for a variety of purposes, including physical, social-emotional-behavioral, communication, and academic/cognitive needs, supporting the high importance placed on access to and use of these technologies. 80% of the parents reported that their child used new AT/AAC hardware for the first time during the pandemic as well as new software and subscriptions (53.3%). Interestingly, there seemed to be a disconnect between how teachers and parents perceived students' familiarity with AT/AAC tools. Parents and teachers differed in their perceptions of actual use, performance expectancy, effort expectancy, social influence, and facilitating conditions associated with incorporating AT/AAC in learning situations during the COVID-19 pandemic. Effect sizes were moderate to large. Both teachers and parents expressed that their experiences with AT/AAC during the pandemic were chaotic because there were no clear rules, policies, and procedures regarding the structure of special education virtual classes with AT/AAC.

Transitions between schools are often challenging for students with disabilities. During the pandemic, Komlmeyer and Edyburn thought there might be heightened concerns regarding AT and student transition because of the circumstances surrounding remote instruction. In their article, *Virtual Parent Education on Assistive Technology: Pandemic Lessons Learned*, they report on the results of a virtual parent education program designed to assist in preparing parents of students with learning disabilities as their child transitioned from one school to another to address the concern that the transition would be seamless regarding the support and use of assistive technologies. Thirty-one parents were recruited from a special school for students with learning disabilities in the Midwest United States. Two modules were developed, AT literacy and AT advocacy, and were delivered via Zoom in 60 to 90-minute sessions. Dependent variables included pre- and post-tests of AT Literacy knowledge and AT Advocacy knowledge, and perceived confidence. Course satisfaction was also assessed. The results indicated statistically significant improvements with strong effect sizes across knowledge gained, perceived confidence, and course satisfaction. Overall, the program was judged to be effective as evidenced by the statistical outcome measures and subjective measures of participant satisfaction. The findings add to the existing literature that demonstrates parent improvement in navigating special education systems, advances in special education knowledge, and family empowerment following direct training in special education law and advocacy skills.

In the third article, *Providing Education to Students with Visual Impairments During the Pandemic*, Rhoads, Silverman, and Rosenblum analyze data collected as part of the *Access and Engagement II* survey in November 2020 to understand the impact of the COVID-19 pandemic on students' technology needs as reported by Teachers of the Visually Impaired (TVIs) and Orientation and Mobility (O&M) specialists. Data were analyzed from 369 participants from the United States and Canada; all participants were working as itinerant teachers. The results revealed challenges and barriers increased for visually impaired students, yet some seemed to thrive in the virtual learning environment. Among the key lessons

learned from the findings: educators must ensure that students have full access to all learning materials, students need early instruction in technology use, and professional development in technology needs to be readily available to educators. Concerns were raised about O&M concepts such as correct cane techniques, street crossing skills, and specialized braille concepts such as correct hand/finger positioning that could not be taught online and reportedly were not being addressed during periods of remote instruction.

The fourth article, *A Digital Walk Through Digital Talk: Lessons Learned*, also focused on issues of AAC use during the pandemic. In this mixed-methods case study, von Hellens, Skubik-Peplaski, and Keener sought to evaluate the impact of a parental education program during COVID-19. The focus was on a single parent of a non-verbal 8-year-old female diagnosed with Autism and Attention Deficit Hyperactivity Disorder who had previously been issued a complex communication device but had never used the device, either at home or in the community prior to the study. The activities of the project included providing parent education on device use and suggestions for managing the device and AAC app with the intent of increasing the number of communication opportunities to enhance the child's participation at home and in the community. The results of this family-centered project indicate that the parent learned a great deal about the AAC device and observed clear examples of the device's acceptance and use by the child and her sibling to engage in communication. The child demonstrated increased confidence in using the device and was able to teach her sibling and mother how to use selected features. Despite the challenges and stress experienced by the family during COVID-19, open and clear communications between the family and therapists was thought to have made the difference in the successful outcomes of the project.

Poss, Gregory, and Marotta describe how Communities of Practice (CoP) have supported, and had a positive impact, on the delivery of AT services within a virtual environment in their article, *A Journey to Build a Community of Practice During the COVID-19 Pandemic*. This work offers an invaluable contribution to our understanding of the demands placed on school-based AT service providers as they studied the Twitter community, #ATchat. What was originally envisioned to be a short-term set of town halls to discuss how to respond to school closures, instead evolved into an ongoing weekly live virtual meeting driven by the participants' needs to understand how to provide virtual AT services. The authors noted that a common theme that arose within the CoP was the generous sharing of ideas. They describe one example where a member was so appreciative of the technology tools she learned about, that she created videos to pay forward the support she had been given. They conclude that CoP are likely to continue as an essential form of professional development for in-service support.

In the final article, *The Assistive Technology Services Experience of the 20-21 School Year*, by Sisk, Carr, and Tracy describe the adaptations of rolling out AT services in a large urban school district. This school district has a unit specifically devoted to providing Assistive Technology Services (ATS) to their 200 schools. This article describes the processes their team used to pivot from face-to-face training and events to remote support. They recognized the need for an intricate device cleaning procedure to prevent the spread of COVID-19. In terms of direct services, the AT team worked to ensure that every student received a device with access to inclusive tools and customized learning experiences. They reflect on

the lessons learned from this experience and begin to anticipate what changes will continue to evolve as “new” normal emerges.

CONCLUSIONS

The authors in this volume have illustrated many themes regarding assistive technology services during the pandemic, including: the essential nature of home-school communication; the importance of teams and coordination among educational service providers; the need for universal screening to ensure that each child with a disability has access to appropriate assistive and instructional technologies; the persistent need for evaluating accessible educational materials; the on-going need for teacher professional development and communities of practice that support sharing and problem-solving; and the need for people and systems to be patient, creative, and flexible. Yet, there is so much more to learn.

The disruptions cause by COVID-19 have exposed a number of structural inequities within educational systems (Simon, 2021) such as unequal access to technology devices, lack of reliable high speed internet service, and lack of parent training (Dorn, et al., 2020). Yet, research has demonstrated that parents with children who have disabilities face more significant burdens than parents in the general population supporting their children in pandemic distance learning (Neece et al., 2020; Riberio et al., 2021). As a result, much more attention needs to focus on the needs of students with disabilities in order to understand the ways in which the pandemic has exacerbated inequities. Therefore, ATOB extends an invitation for all voices to submit future manuscripts to enable the field of assistive technology to understand more about the lessons learned from the pandemic.

Despite the many challenges associated with the COVID-19 pandemic there are some reasons for optimism. For example, in Ireland, the National Disability Authority (2021) published a report describing how the lockdown fostered innovation to provide new opportunities for people with disabilities. They sagely observed, “Disruption is a golden opportunity for change” (p. 32). In the United States, policymakers have funded the American Rescue Plan (U.S. Department of Education, 2022) to assist states and local school districts in making targeted investments to minimize the impact of learning loss with special attention for funding allocations for assistive technology, home internet services, accessible learning management systems, expanded teacher training opportunities and more.

Over the past three years, society has longed to return to a pre-pandemic normal. Yet the definition of “normal,” however, remains elusive (Edwards-Levy, 2022). “Disruption is a huge catalyst for accelerating innovation. But it is not a given” (Salman, 2022).

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Voices from Academia

Assistive Technology/Augmentative & Alternative Communication Implementation: School to Home during COVID-19

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ABSTRACT

This explanatory sequential mixed-methods study sought to describe the implementation process of AT/AAC from school to home during the COVID-19 pandemic, including the extent to which AT/AAC was used, how AT/AAC was used, and what, if any, support the school systems provided. A researcher-designed survey was completed by 104 special educators and 45 parents. Seventeen follow-up interviews were conducted with educators and parent participants. Results of the study demonstrated the importance of clear communication, explicit expectations and procedures for AT/AAC use, and collaboration among stakeholders if AT/AAC implementation is to be as effective as possible.

Keywords: assistive technology (AT), augmentative alternative communication (AAC), COVID-19, virtual learning, special education

ASSISTIVE TECHNOLOGY/AUGMENTATIVE AND ALTERNATIVE COMMUNICATION IMPLEMENTATION: SCHOOL TO HOME DURING COVID-19

The emergence of COVID-19 led to many challenges and opportunities for educators and parents. One of those challenges was the need for educators to pivot from face-to-face (F2F) classes to virtual delivery models. This has been especially challenging for parents, teachers, and therapists responsible for the education of students with disabilities. In order to understand the timeline of our study, it is important to recognize that the pivot from F2F to virtual or hybrid learning occurred in three distinct windows of time.

1. Pre-COVID: Traditional teaching and learning during the 2019–2020 academic year. This ended in March of 2020.
2. Emergency remote teaching (ERT). Preliminary findings of current research (Courduff et al., 2021) suggest that a majority of states across the nation announced the abrupt closure of schools and pivoted to virtual learning in mid-March of 2020. What was to be a three-week break from school lasted through the end of the academic year, May/June 2020. Teachers were provided with very little information, less guidance, and few resources (Bozkurt & Sharma, 2020; Fournier et al., 2020).
3. Transition to virtual teaching and learning supported by online learning pedagogy. This started in August/September of the 2020–21 academic year. Although schools and districts provided more resources and opportunities for professional development, this varied from district to district and state to state (Marshall et al., 2020). No federal guidelines were provided and information from state leadership varied (Marshall et al., 2020). Our research team has divided the 2020–2021 academic year into two distinct halves:
 - a. August–December 2020: Preparing/Implementing Assistive Technology/Augmentative & Alternative Communication (AT/AAC) remote learning
 - b. January–May/June 2021: Implementing/Evaluating AT/AAC remote learning

Target Audience and Relevance

In this study, we focused on the state of AT/AAC implementation from January through May of 2021. The results of this study are relevant to parents, special educators, support therapists, general education teachers, and all others who work to support students with disabilities.

***Author note: The research team uses the terms special education teachers and special educators interchangeably. Additionally, these terms encompass all those who work with students with disabilities, including, but not limited to, speech-language pathologists (SLP), occupational therapists (OT), assistive technology consultants (ATC), physical therapists (PT), applied behavior analysts (ABA), board certified behavior analysts (BCBA), and others.*

Purpose of the Present Study

Schools and districts across the United States transitioned to virtual learning during COVID-19. For

special educators, the pivot to emergency remote teaching (ERT) intensified an already complex system (Hodges et al., 2020; Sakarneh, 2021). The problem of practice addressed in this study is that researchers and practitioners possess a limited understanding of the processes that districts, schools, and special educators used to implement assistive technology (AT) and augmentative and alternative communication (AAC) tools during the pivot from face-to-face (F2F) instruction to virtual instruction during the COVID-19 pandemic. An emergence of research is beginning to appear in the literature, but the main focus of existing studies regarding AT/AAC has been on tools that have been used by educators in F2F instruction prior to the pivot to virtual learning (Edyburn, 2020). Some scholars have addressed the obstacles faced by educators during the transition to ERT. For example, Ferri et al. (2020) identified three key obstacles in remote teaching, including technological, pedagogical, and social challenges. Additionally, some research has focused on applicable tips for online teachers and strategies for organizing online classrooms (Schuck & Lambert, 2020). However, there is a paucity of literature regarding the process through which special educators, including therapists, paraprofessionals, and parents, were able to implement AT/AAC tools at home via virtual learning. There is limited literature on the specific processes schools and districts used to support accessible, fully online learning for special educators and the students they teach (Boot et al., 2017; Edyburn, 2014; Edyburn, 2020). There is no literature on the efficacy of using AT/AAC during virtual learning that occurred due to the COVID-19 pandemic. Therefore, this study seeks to fill this gap in the existing empirical literature.

The purpose of the study was to investigate special education teachers' and parents' experiences with the use of assistive technology (AT), including augmentative and alternative communication (AAC), in Pre-K–12 virtual settings during the COVID-19 pandemic. We sought to describe the implementation process of AT/AAC from school to home, including the extent to which AT/AAC was used, how AT/AAC was used, and what, if any, support the school systems provided.

METHODS

Design

The explanatory sequential mixed-method design allowed for examining quantitative and qualitative data over time and across participants. We utilized the UTAUT survey to gain an understanding of the technological aspects of participants' experiences in the transition and support of AT and AAC from school to home. Further, we utilized interviews to understand participants' experiences through their personal stories of AT/AAC transition and support from school to home. This study was intentionally designed to answer the proposed research questions and assess study objectives (Creswell & Plano Clark, 2018). The utilization of the mixed-methods design also enabled triangulation of data collection and analysis results (Creswell & Plano Clark, 2018).

The Universal Theory of Acceptance and Use of Technology (UTAUT) is based on the premise that performance expectancy, effort expectancy, social influence, and facilitating conditions contribute to developing an intention to use and actual use of AT in learning situations (Admiraal et al., 2017; Venkatesh et al., 2003). The theory guides this explanatory sequential mixed-methods study that examines teachers' and parents' perspectives regarding the use of AT/AAC in PreK–12 virtual settings

during the COVID-19 pandemic. A descriptive study design was used to investigate the extent to which AT/AAC was used, how AT/AAC was used, and what support, if any, the school systems provided to teachers and students who used AT/AAC. A comparison study sought to ascertain the differences between teachers' and parents' perceptions of the actual use, performance expectancy, effort expectancy, social influence, and facilitating conditions associated with incorporating AT/AAC in learning situations during the COVID-19 pandemic.

Participants and Setting

The study sample was garnered using convenience sampling and snowball sampling (Creswell & Guetterman, 2019). Upon gaining approval from the institutional review board, we posted an invitation to participate in a Qualtrics survey on professional educational organization discussion forums, such as the International Society for Technology in Education (ISTE, n.d.) and the Quality Indicators for Assistive Technology (QIAT, n.d.) online forums, and social media groups, such as educational Facebook groups and Twitter feeds, for four weeks in the Spring 2021 semester. We also invited participants attending special education technology training in Tennessee to participate, accounting for the large portion of the sample from Tennessee and Mississippi. Participants were invited to provide their names and email addresses for a follow-up interview. Otherwise, names were not collected on the survey. Once the survey was closed, the data were downloaded from the Qualtrics survey system and exported into the Statistical Package for Social Sciences (SPSS) for analysis.

Procedures

Parents and teachers completed an online survey, which consisted of a researcher-created, self-report instrument to measure demographics, actual use, and theoretical constructs. Survey data were analyzed using descriptive and analysis of variance (ANOVA) analyses.

Following the survey, a semi-structured interview protocol was developed by the researchers to conduct individual interviews with select parents and teachers. Interview data were then analyzed using case study analysis methods (Yin, 2014) to identify: 1) how, if at all, learning situations during the COVID-19 pandemic influenced the use of AT/AAC; 2) how school-to-home communication and support affected the process of learning with AT/AAC at home during COVID-19; and 3) how the various constructs of the UTAUT facilitated or hindered incorporation of AT/AAC in learning situations during the COVID-19 pandemic. Interview transcripts were individually coded by the research team for preliminary codes. The research team then met and compared codes, finalizing a list of codes to be sent to interviewees for feedback and member checking. Codes were then triangulated with quantitative data and researcher memos in order to ensure accuracy of data reporting.

The sampling frame consisted of 104 special education teachers after deleting 15 incomplete survey responses. The majority of participants were White ($n = 67$, 64.4%) women ($n = 91$, 87.7%) between the ages of 30–39 ($n = 51$, 49.0%) and 40–49 ($n = 30$, 28.9%). Thirteen (12.5%) of the teacher participants identified as men. Twenty-five (24%) participants identified as Black, seven (6.7%) as Asian, four (3.8%) as Hispanic, and one Other. Almost half of the teacher participants ($n = 48$, 46.2%) were early career educators, reporting 1–5 years of experience in their teaching role. Twenty-two teachers (21.2%) reported

6–10 years of experience, 12 teachers (11.5%) reported 11–15 years of experience, 20 (19.2%) reported 16–20 years of experience, and only two participants (1.9%) reported more than 20 years of teaching experience. The majority of the sample ($n = 91$; 87.5%) were special education teachers, while 10.6% ($n = 11$) of the educator sample were Speech Language Pathologists (SLPs) and two participants selected “Other” to describe their educator roles. The participants reported being located in states across the United States, with the majority of participants ($n = 62$, 59.6%) being from Tennessee. No data were collected on languages spoken in the home. However, the survey and interviews were conducted in English only. Additional descriptive statistics for the school settings of the teacher participants are reported in Table 1.

Table 1: Descriptive Statistics of School Settings for Special Education Teacher and Parent Samples

		Teachers	
School Setting		Percent (%)	Frequency
School Level	High School	8.7%	9
	Pre-K, Elementary	66.3%	69
	Pre-K, Elementary, Middle School	3.8%	4
	Pre-K, Elementary, Middle School, High School	20.2%	21
	Pre-K, Elementary, Middle School, High School, Transitional Adult	1.0%	1
School Location	Rural	27.9%	29
	Suburban	26.0%	27
	Urban	46.2%	48
School Learning Approach (During COVID-19)	Hybrid learning: A combination of in-person and virtual	11.5%	12
	Virtual learning: 100% of the learning delivered online	88.5%	92
		Parents	
School Setting		Percent (%)	Frequency
School Level	Pre-K	8.9%	4
	Elementary School	44.4%	20
	Middle School	26.7%	12
	High School	15.6%	7
	Transitional Adult	4.4%	2
School Location	Rural	40.0%	18
	Suburban	42.2%	19
	Urban	17.8%	8
School Learning Approach (During COVID-19)	Hybrid learning: A combination of in-person and virtual	0.0%	0
	Virtual learning: 100% of the learning delivered online	100%	45

The sampling frame also consisted of parents. Forty-five parents responded to the survey after deleting 7 incomplete survey responses. The majority of parents identified as White ($n = 28$, 62.2%) women ($n =$

35, 77.8%) between the ages of 40–49 ($n = 26$, 57.8%). Ten (22.2%) of the parent participants identified as men. Eleven (24.4%) participants identified as Black, two (4.4%) as Asian, and four (8.9%) as Hispanic. Most participants ($n = 30$, 66.7%) reported having one child in their household with a special education classification. The participants reported being located in states across the United States, with the majority of participants being from Mississippi ($n = 12$, 26.7%), Pennsylvania ($n = 12$, 26.7%), and Tennessee ($n = 13$, 28.9%). Additional descriptive statistics for the school settings of the parent participants are reported in Table 1.

Nine special educators and eight parents agreed to participate in optional interviews. The interviews were conducted in a password-protected online meeting room, then transcribed and coded using case study analysis methods (Yin, 2014). Interview questions were derived from researcher-selected components of the UTAUT and from the research-based Survey of Assistive Technology User's Needs in Massachusetts (<https://www.massmatch.org/documents/ATSurvey-1107.pdf>; see Appendix A).

Instrumentation

The quantitative portion of this study focused on understanding the use of AT/AAC in Pre-K–12 virtual settings during the COVID-19 pandemic from both teacher and parent perspectives. As no instrument had been previously developed to measure the constructs of UTAUT as they were specifically related to AT/AAC during this unique historical event, we designed the What Have We Learned: The School to Home Assistive Technology Use Survey [teacher and parent version] to ascertain teachers' and parents' perceptions and experiences. Table 2 outlines the constructs of UTAUT and how they were adapted for this study. The instrument that was used for the study may be obtained by contacting the corresponding author.

Table 2: UTAUT Constructs and Definitions

Construct	Definition
Actual Use	The teacher/parent's and student/child's use of AT/AAC for learning in a virtual setting during the COVID-19 pandemic
Facilitating Conditions	The belief in the availability of the necessary organizational and technical infrastructure, including training, information, and provision of tools, for enabling the use of AT/AAC for virtual learning settings during the COVID-19 pandemic
Social Influence	The importance accorded to the expectations and opinions of others (e.g., teacher, parent, child/student) regarding his/her use of the AT/AAC with the child/student for virtual learning during the COVID-19 pandemic
Performance Expectancy	The belief regarding the learning benefits that the children/student drew from using AT/AAC in virtual learning settings during the COVID-19 pandemic, which includes the parent/teacher's perceptions of how the AT/AAC supported them in facilitating the child/student's learning
Effort Expectancy [Student]	The belief regarding the child's ease of using AT/AAC for virtual learning settings during the COVID-19 pandemic
Effort Expectancy [Teacher/Parent]	The belief regarding the teacher/parent's ease of learning to use, training the child/student to use, and also using AT/AAC for virtual learning settings during the COVID-19 pandemic

The instrument was developed following a thorough review of the empirical literature examining assistive technology (AT) and augmentative and alternative communication (AAC) (Edyburn, 2020). Theoretical literature related to UTAUT (Venkatesh & Davis, 2000; Venkatesh et al., 2003), Fishbein and Ajzen's (2010) Theory of Planned Behavior and Theory of Reasoned Action, and Davis's (1989) Technology Acceptance Model also informed the instrument development. The teacher version consisted of 47 items, and the parent version consisted of 36 items. The Cronbach's alpha coefficients for each subscale on the teacher version of the survey demonstrate that the instrument has good reliability (i.e., facilitating conditions = .84 [8 items], social influence = .98 [3 items], performance expectancy = .96 [6 items], teacher's effort expectancy = .87 [3 items], student's effort expectancy = .98 [3 items], and actual use = .98 [23 items; student/teacher use [6 items] = .96, teachers' use for instruction, facilitation and design = .97, teacher's use to promote an inclusive environment = .94) (Cohen, 1977). Similarly, the Cronbach's alpha coefficients for each subscale on the parent version of the survey demonstrate good reliability (i.e., facilitating conditions = .82 [9 items], social influence = .98 [3 items], performance expectancy = .91 [6 items], parents' effort expectancy = .85 [3 items], child/students' effort expectancy = .99 [3 items], and actual use = .97 [6 items] (Cohen, 1977). Additional questions about demographics, classifications of students, and experience with AT/AAC were also asked.

DATA ANALYSIS

Quantitative survey data were analyzed using descriptive and correlation analyses, including frequencies, means, standard deviations, medians, bivariate correlations, and a multiple regression. Qualitative data in the form of recorded interviews were individually coded by each team member. We met twice a month to discuss preliminary codes, then cross coded for significant statements. Then, we met to discuss combining the statements into themes. Finally, we developed descriptions of experiences based on what participants said happened, and how it happened. We condensed the descriptions into the essence of participant experiences.

RESULTS

Special education teachers and parents were asked to describe their experiences with AT/AAC when COVID-19 required changes in students' learning situation, namely when working in a hybrid or virtual environment. Teachers and parents were also asked to rate their experiences with AT/AAC when COVID-19 required changes in students' learning situations. Agreement with statements was measured on a 7-point Likert-type scale (i.e., 1 = not important at all, 7 = extremely important; 1 = extremely negative, 7 = extremely positive; 1 = none, 7 = a lot). Table 4 provides the results; percentages are reported. Both teachers and parents rated assistive technology (AT) and/or Augmentative Alternative Communication (AAC) as extremely important or very important (teachers = 100%, parents = 100%) to students' ability to complete learning tasks successfully during the pandemic [COVID-19]. Teachers' ratings were mainly favorable concerning the overall experience, particularly when looking at their rating with the overall experience as being somewhat positive (78.8%), even though the majority reported that they were provided with no school-sponsored training (55.8%) or only some school-sponsored training (43.3%).

“There was no mandatory training for us, just mandatory standards on what is expected. However, even though they can come into your classroom at any time, there is nothing that’s truly monitoring what’s going on with regards to the approach like adequate use of technology” (T2).

Moreover, teachers reported no or little to some (44.3%) support from the school. “We were kind of on an island...as we had to pivot to figure out how we were going to be teaching virtually and teaching with AAC device on” (T1). Participants felt that significant school-sponsored training and support were a priority for administration. 51.9% of teachers ($n = 54$) reported that their students had previously used all AT/AAC tools in school or at home before the pandemic. Only two teachers noted that their students used new hardware (e.g., laptop, mobile device, screen covers, Braille keyboards, etc.). However, 46.2% of teachers ($n = 48$) did note that their students used new software or subscriptions (e.g., websites, software, closed captioning, signing, apps). Teachers may have also been self-directed and sought their own needed resources to compensate for training and support that were not provided by the school. “There was no systematic support...I had to do a lot of research on how to navigate through this on my own because we hadn’t had the connection with the speech teacher” (T1). “I’m in person, five days a week; however, tech personnel were only seeing him [my student] two days a week, and it was the other three days that I was on my own to just figure things out” (T1).

Parents expressed more mixed experiences with the overall transition with AT/AAC during the COVID-19 pandemic. While the majority were extremely (48.9%, $n = 22$) or somewhat positive (28.9%, $n = 13$), 22.2% ($n = 10$) were somewhat negative. All parent respondents (100%) reported that their children used AT/AAC for a variety of purposes, including physical, social-emotional-behavioral, communication, and academic/cognitive needs, supporting the high importance placed on access to and use of these technologies. Interestingly, there seemed to be a disconnect between how teachers and parents perceived students’ familiarity with AT/AAC tools. One parent, who is also in the middle of her special education pre-service student teaching, explained, “I feel like I did all of it alone, unfortunately, but I do reach out to friends and colleagues. It’s very separate between them speaking to mom vs. co-worker or future educator, so there is that fine line with them. I only started doing research for everything that could have helped him [my son] this year” (P5).

A majority of the parents surveyed (80%, $n = 36$) reported that their child used new AT/AAC hardware for the first time during the pandemic as well as new software and subscriptions (53.3%, $n = 24$). Parents reported that training was provided through a variety of avenues, including in virtual classrooms (24.4%), virtual workshops (42.2%), and during already scheduled teaching or therapy sessions (28.9%). The majority of parents (51.1%) agreed with teachers that little AT/AAC tool support was provided by the school and reported that they often sought support from vendors (40%) or a specific point of contact within the school, likely their child’s teacher (28.9%). “She’s [assistive technology support person] not always accessible at the moments that we are struggling, or we pushed on something that now we’ve just wiped the device” (P2). This may indicate that parents had to seek out their own AT/AAC technical support and found it easier to gain information directly from vendors than to communicate with the school to address issues. “I did my own research and truthfully have been taking an AT class...I have downloaded speech-to-text and text-to-speech applications on his Chromebook” (P5; see Table 3).

Table 3: Teacher and Parent Perceptions and Expectations with AT/AAC

Item/ Scale	Teacher		Parent (n=45)	
	n	%	n	%
<i>How would you rate your students' overall transition with AT/AAC when COVID-19 required changes in schooling?</i>				
Somewhat negative	22	21.2	10	22.2
Somewhat positive	82	78.8	13	28.9
Extremely positive	0	0	22	48.9
<i>How important was access to assistive technology (AT) and/or Augmentative Alternative Communication (AAC) regarding your students' ability to complete learning tasks successfully during the pandemic [COVID-19]?</i>				
Extremely important	68	65.4	35	77.8
Very important	36	34.6	10	22.2
<i>How would you describe the information and training you received from the school about the AT/AAC tools?</i>				
None provided	58	55.8		
Some provided	45	43.3		
A lot provided	1	1.0		
<i>How would you describe the AT/AAC tool support (e.g., help desk, tech support, support personnel for questions) you received from the school?</i>				
None provided	57	54.8		
A little provided	1	1.0	23	51.1
Some provided	45	43.3		
A lot provided	1	1.0	22	48.9*

Parents and teachers also reported their perceptions of actual use, performance expectancy, effort expectancy, social influence, and facilitating conditions associated with incorporating AT/AAC in learning situations during the COVID-19 pandemic. One-way Welch's ANOVAs were conducted to determine if their perceptions across these areas were different. The Welch's ANOVA was selected given the unequal number of teachers and parents. Prior to conducting the ANOVAs, assumption testing was conducted. There were no extreme outliers, as assessed by boxplot; however, data was not normally distributed for either group across any of the variables, as assessed by Kilmagornov-Sminov tests ($p < .05$). One-way ANOVAs are, however, fairly robust when deviations from normality exist, even when the group sizes are not equal (Lix et al., 1996). This is especially the case as the sample size is not small and the groups are similarly positively skewed (Maxwell & Delaney, 2004; Sawilowsky & Blair, 1992). Normality violations in these cases do not usually affect Type I error. Therefore, we decided to conduct the ANOVAs rather than the nonparametric alternative, the Kruskal-Wallis H test. Homogeneity of variances, as assessed by Levene's test of homogeneity of variances, was not violated for most variables; it was violated for social influence and performance expectancy. Data for the means and standard deviations as well as each ANOVA are presented in Table 5. Parents and teachers differed in their perceptions across all of the variables. Effect sizes were moderate to large.

Parents reported significantly less favorably than teachers about facilitating conditions, reflecting that parents, on average, were less likely than teachers to believe that school systems' organizational and technical infrastructure, including training, information, and provision of tools, was set up to enable the use of a AT/AAC for virtual learning settings during the COVID-19 pandemic. "There was a lack of knowledge on how to use the AT. There was really no follow-through in virtual learning" (P5). "They didn't use the tool during the virtual learning time...so I can't really talk about this team too much because they weren't right there with her tool, but they saw me model it right...I modeled for them the whole time, but nobody did that, because everybody said, 'oh yeah she's not using the tool.' Everyone hindered the process because they didn't follow the plan...teachers were never taught how to use the tool [AAC]" (P2).

Parents were also significantly less favorable than teachers about the ease of using, training their child to use, and supporting their child's use of AT/AAC for virtual learning during the COVID-19 pandemic. However, parents compared to teachers were significantly more variable in all other areas, reporting favorably about the benefits and how easy their children found using AT/AAC in virtual learning settings during the COVID-19 pandemic. Parents reported their and their child's actual use of AT/AAC for learning in a virtual setting during the COVID-19 pandemic as higher than teachers, and parents recognized and attributed greater importance to the expectations they had placed on them by significant others (e.g., children and teachers) to assist their child with AT/AAC for learning. "He does really well this current year, because they provided the structure, they set up a Google Classroom, they loaned him the Apple MacBook and they had the MacBook completely set up with (I won't get the lingo right) his bar with all of his programs on it" (P1). This makes sense, given the more immediate nature of parents' ability to assist children with their use of AT/AAC in the home during virtual learning.

Table 4: Means, SDs, and ANOVAs for UTAUT Subscales

Item/Scale	Teacher		Parent		Welch's <i>F</i>	<i>p</i>	η^2
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		-	
Actual Use [All teacher items]	5.57	.86	-	-		-	
Actual Use [6 items]	5.76	.88	6.81	.36	61.044	>.001	.293
Facilitating Conditions	5.24	.86	3.34	.90	148.492	>.001	.503
Social Influence	5.60	.91	6.80	.76	60.094	>.001	.290
Performance Expectancy	5.63	.94	6.43	.61	27.416	>.001	.082
Effort Expectancy [Student/Child]	5.38	.97	6.20	.87	23.605	>.001	.138
Effort Expectancy [Teacher/Parent]	5.11	.89	4.52	.97	13.119	>.001	.157

There were 10 parent responses to the open-ended survey questions. Parents noted that they often had to train teachers and therapists on how to use tools and/or remind them that they needed to use the tools in virtual settings. This may explain why parents felt they were provided with training but not facilitated overall (see Table 4).

Additional Qualitative Results

Qualitative interview questions were designed to align with quantitative survey questions and to provide an opportunity for participants to add personal perspectives regarding AT/AAC implementation during the pandemic. Interestingly, several additional themes emerged in the qualitative analysis. This might be due to the semi-structured nature of the interview questions. Teachers and parents provided additional information and context that might not be revealed in a survey.

Daily/Weekly Organization and Follow-Through

Two parents described the home teaching and learning environment as extremely structured. P8 explained that a team approach is critical to successful learning with technology because “...not everyone knows everything about what’s available.” Her son flourished in virtual learning because of a deep commitment from everyone involved—parents, classroom teacher, SLP, vision and hearing specialists, AT, and OT. “They found ways of working with each other and with me...everyone (including family) knows what’s being used and how to use it” (P8). P6 explained that “...it takes everyone. The ABA created a daily schedule that everyone—BCBA, SLP, OT, special education teacher—followed.” High levels of collaboration were perceived as key to successful AT/AAC implementation.

Levels of Parent AT/AAC Implementation at Home

Teachers revealed that home conditions could either support or hinder the process of AT/AAC implementation. The range includes three levels: 1) Follow-through is challenging because parents don’t believe that there is a need to use devices at home; 2) Follow-through is challenging because of a chaotic environment; 3) Follow-through is supported by families where at least one parent can be home to implement devices, are highly structured, and have high expectations for how their child should use the device for communication. “For some families, I have less expectation of follow-through, simply because there’s so much going on at home that it’s hard to keep to a schedule. There’s a lot of noise, there’s a lot of responsibility on kids to watch other kids. For those families, I really see my time with the kid as sort of our quiet time, one on one, to really focus on what we’re focusing on” (T3). Other challenges included multiple disabilities in the home, no quiet place to learn, no reliable internet, multilingual families, and families in low socioeconomic or uneducated backgrounds.

P1 explained that she enrolled her son with CP in a dual language program. “What we believed was that he could do it, and if he could get through it, he would benefit in two ways; one would be the cognitive development, the learning of two languages, the other would be that if he only went as far as high school, he would have an added skill for employment” (P1).

Implementation must be consistent. “He has his device; he’s able to carry it everywhere. He goes, it goes with him; and if we don’t have a webcam because sometimes, he has days, where he’s like, I don’t want to see it, we carry a laminated paper version of it” (P3).

Hidden Sense of Humor/Area of Talent

Students with severe communication challenges often take longer to respond to others using an AAC device. Teachers and parents explained that it takes a lot of time to get to know some students and to understand their wit and talent. The students are really smart technologically and artistically, and use kindness and humor when they use their voice [AAC]. T1 stated that her student,

...loves to tell knock-knock jokes and he will, purposefully, when I’m asking him a question. He’s very, very smart in a lot of ways that I think most people don’t give him credit for, and again, unless you’ve developed that relationship with somebody [the student]. But you’re not going to pick up on those things, you’re going to think that that’s a miss hit and it’s not. It’s his way of interacting with you, and unless you really know that, you’re not going to understand him” (T1).

Additional comments revealed: This is possible when there is help in school and at home. AAC must be consistently implemented by everyone. “It works when all the players work together” (P7). “The right teacher makes a huge difference” (P8).

Just in Time Training

When asked about how he provides training on AAC devices, T3 stated that after a session with a student, he makes the task relatable at home. “I situate follow-up on tasks within a family’s day to day [routine], and I give them something bite-sized and doable to accomplish.” P8 said that this has been a great year for her son. “He is one of the kids who really excelled in remote learning this year.” She attributed part of her son’s success to the district’s “self-serve app” where students could access and download a wide variety of district-approved apps for learning. Her son was empowered by the ability to choose and use apps for learning, investigating, and creating. He is “...empowered to access the apps to create things important to him” (P8).

OUTCOMES AND BENEFITS

The results of this research provide insight into the experiences of special educators and parents as they navigated the challenges of remote learning during the COVID-19 pandemic. They also provide practical information for school districts to consider as they reflect on the ways in which their structures facilitated, or failed to facilitate, effective use of AT/AAC in pre-K–12 virtual settings during the COVID-19 pandemic. For this research, a total of 104 special educators and 45 parents responded to the survey and 17 teachers/parents were interviewed during April–June 2021. Their authentic voices and unique

perspectives identified areas where schools and school districts may improve the effective implementation of AT/AAC technologies for special education students and families. Specific outcomes and benefits are discussed below, followed by authors' recommendations for AT/AAC implementation strategies for the future.

DISCUSSION

Three research questions were established:

- What support structures did schools and districts implement to best provide assistance to students and parents for AT/AAC during remote learning January–May 2021?
- What were the barriers to effective AT/AAC implementation January–May 2021?
- Based on data, what recommendations can we make for improved implementation of AT/AAC in remote learning environments?

Two respondents expressed positive outcomes with AT/AAC implementation for the following reasons: 1) Parents, teachers, and therapists worked together to develop an organizational structure that was conducive to the student and all of those who supported them; 2) AT/AAC was implemented consistently at home and during virtual instruction; 3) resources and training were provided for all in a timely manner; and 4) stakeholders focused on student strengths rather than only on barriers and challenges. Additionally, survey results were generally positive or neutral with regard to the constructs of the UTAUT and teachers' and parents' experiences using AT/AAC for remote learning during the pandemic.

However, 16 of the 18 interviewees (teachers and parents) expressed ineffective and inefficient experiences with AT/AAC during the virtual classroom settings since COVID-19. They raised many issues that contributed to the ineffectiveness of students' learning situations. The three most serious issues that were identified by teachers were: 1) teaching; 2) relationships; and 3) system issues. The concerns related to teaching were identified as critical and 48% of concerns were expressed in this category. For example, teachers expressed that there was a lack of timely training/workshops provided, the training was developed for general education teachers, or it was hard to obtain relevant technologies, materials, and information. The relationship issues included special education teachers not feeling supported by school administrators (districts), parents, or general education teachers.

Parents shared concerns that were a bit different. Forty percent of the concerns parents shared were about system issues. For example, ineffective virtual classroom settings, ineffective systems for evaluating AT/AAC implementation, and hiring unqualified teachers or teachers new to the profession. Lack of supervising systems was addressed as a major cause of the ineffectiveness of virtual learning. In addition, parents also addressed relationship issues (such as ineffective communication between teachers and students/families) and personal issues (such as educating themselves, finding appropriate resources, understanding their rights under IDEA, etc.).

Both teachers and parents expressed that their experiences with AT/AAC during the pandemic were chaotic because there were no clear rules, policies, and procedures regarding the structure of special

education virtual classes with AT/AAC. In addition, both groups agreed that the collaborative work between teachers and parents has the potential to increase students' success in education.

Ironically, we found a cycle of blame among the three groups. Teachers blamed the ineffective education for their students mainly on parents (e.g., their lack of technological and content knowledge). Special education teachers blamed general education teachers for a lack of commitment to following the learning plans for students, and parents blamed teachers and school administrators. Blame was communicated as a negative or as a neutral concept. Some teachers and parents noted that although the system had challenges, it seemed that everyone was doing their best, given the circumstances.

In order to apply the results of this research to the special education setting effectively, we recommend the following three guidelines, which would improve the facilitating conditions for AT/AAC use.

First, when a school (or school district) initiates an assistive technology-related project, the big picture regarding shared goals, action plans, and timelines should be communicated clearly and thoroughly, and shared with all stakeholders (e.g., school administrators, special and general education teachers, parents/guardians/families, students). One critical aspect of this is to provide detailed daily procedures and routines for the student, the family, and the educational stakeholders. Ongoing communication is essential among all stakeholders during the project through regular checkup meetings and formative feedback sessions.

Second, setting expectations thoroughly and defining roles clearly could increase the likelihood of success of the project. We heard many voices of teachers and parents together in which unclear rules, lack of accountability systems, vague roles between teachers vs. parents/families, general vs. special education teachers, administrator/staff vs. teachers, caused unnecessary stress and burden. Further, expectations and roles must be identified and implemented by all stakeholders. The expectations should be created under the assumption that some home situations are complex, and streamlined implementation might prove more difficult than it appears from the teachers' perspectives.

Finally, providing necessary training programs, workshops, required resources, and information would be another recommendation for implementing the project successfully and effectively. Ongoing communication from home to school and from school to home regarding needed training and regular support is the key factor for the success of AT/AAC projects. As one SLP stated, "... give them bite-size training—give them what they need in the moment and there will be buy-in" (T3).

Limitations

While these study results have valuable implications for the implementation of AT/AAC and the support of special education students during a pandemic, this study is not without limitations. First, while the survey instrument was developed using both empirical and theoretical literature and demonstrated strong reliability, it was created by the authors and had not been validated prior to its use in this study. Further validation of the instrument with a larger sample of participants would further strengthen the results of the present study. Additionally, the participant sample was regionally weighted, with a majority of the

teacher and parent survey participants residing in the southeastern United States. It is possible that a more geographically diverse sample may have yielded different results. Additionally, the teacher sample was made up predominantly of White women. While this is representative of the persistently problematic lack of diversity in the general K–12 teaching population (NCES, 2019), a more diverse teacher sample should be sought in future studies. The use of a self-report survey can also yield over-positive results (Brenner & DeLamater, 2016). This should be taken into consideration when viewing our study results. Finally, we provided recommendations for strategies that practitioners might consider in order to improve the facilitating conditions for AT/AAC use. However, determining the actual effectiveness of these recommendations would require that some follow-up research be conducted to identify how, if at all, implementing these recommendations yields positive outcomes.

Implications for Future Research

There is still much to be done in the area of future research for AT/AAC service delivery. First, we need a more robust understanding of assistive technology service delivery procedures and systems at the district, school, and home levels. More research needs to be conducted on the relational aspects of service delivery, implementation, and support from both parent and teacher perspectives. Finally, more research needs to be done on how AT/AAC are perceived and used in the home in comparison to how AT/AAC are perceived and used at the school level.

CONCLUSION

In this study, we sought to investigate special education teachers' and parents' experiences with the use of assistive technology (AT), including augmentative and alternative communication (AAC) in Pre-K–12 virtual settings during the COVID-19 pandemic. Both quantitative and qualitative findings indicated that while special educators and parents/families found ways to provide the necessary support for special education students and their use of AT/AAC during remote learning, facilitating conditions were lacking. This created feelings of stress and confusion for those who felt the implementation of AT/AAC was chaotic. A key concern discussed by both special educators and parents was the need for clear, transparent communication among stakeholders. Education is communication. The comments below are from an interview with a special education teacher and a parent: "Things that weren't education, all you know we talked about educational, but it really is educational. It's communication...it is all about learning how to communicate—how to have a process of supporting what's the next step" (T4). "It is a team effort. It's a whole team. If somebody is lacking from one end, the bridge is going to fall. That's why everybody has to hold it up. if somebody is not putting their part, it's going to fail" (P1).

DECLARATIONS

This content is solely the responsibility of the author(s) and does not necessarily represent the official views of ATIA. No financial disclosures and no non-financial disclosures were reported by the author(s) of this paper.

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APPENDIX A

Interview Questions: Special Educators

- What support structures does your school implement to best provide assistance to students and parents for AT/AAC during remote learning January–May 2021?
- When implementing AT/AAC tools at home, what conditions helped the process?
- What conditions hindered the process?
- When implementing AT/AAC tools at home, what school personnel helped the process?
- If applicable, how did school personnel hinder the process?
- When implementing AT/AAC tools at home, how did the school level GenEd/SpEd team help the process?
- If applicable, how did the GenEd/SpEd team hinder the process?
- When implementing AT/AAC tools at home, what conditions facilitated usefulness of the AT/AAC tools?
- What conditions hindered the process?
- Overall, did the implementation process school to home help the student gain access to the tools necessary to be successful in reaching goals?
- What recommendations would you make for improved implementation of AT/AAC in remote learning environments?
- What lessons have you learned?
 - About yourself?
 - About your instruction?
 - About using AT/AAC tools in remote learning environments?

Interview Questions: Parents

- What support structures does the school implement to best provide assistance to you and your child for AT/AAC during remote learning January–May 2021?
- When implementing AT/AAC tools at home, what conditions helped the process?
- What conditions hindered the process?
- When implementing AT/AAC tools at home, what school personnel helped the process?
- If applicable, how did school personnel hinder the process?
- When implementing AT/AAC tools at home, how did the school level GenEd/SpEd team help the process?
- If applicable, how did the GenEd/SpEd team hinder the process?
- When implementing AT/AAC tools at home, what conditions facilitated usefulness of the AT/AAC tools?
- What conditions hindered the process?
- Overall, did the implementation process school to home help the student gain access to the tools necessary to be successful in reaching goals?

- What recommendations would you make for improved implementation of AT/AAC in remote learning environments?
- What recommendations would you make for improved implementation of AT/AAC in remote learning environments?
- What lessons have you learned?
 - About yourself?
 - About supporting your child's growth towards goals?
 - About using AT/AAC in your home?

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Voices from Academia

Virtual Parent Education on Assistive Technology: Pandemic Lessons Learned

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ABSTRACT

Parent involvement and assistive technology (AT) consideration in the special education process are federally mandated but not operationally defined, measured, or explicitly taught. Parents face many barriers navigating educational systems, especially when pandemic distance learning collides with educational transitions, such as when students move between classes, grade levels, or schools. This study identified the need for and developed a virtual parent training program. Two modules were created and presented to address: (1) AT literacy to increase parents' level of education and knowledge on the purpose and benefits of AT, and (2) AT advocacy so that parents of students with learning disabilities can be more informed and supportive, can be participatory team members, and can more confidently advocate for their students' needs. The results show statistically significant improvements with strong effect sizes across knowledge gained, perceived confidence, and course satisfaction. Study implications are discussed to inform the development and direction of future parent education programs.

Keywords: parent education, advocacy, assistive technology

VIRTUAL PARENT EDUCATION ON ASSISTIVE TECHNOLOGY: PANDEMIC LESSONS LEARNED

The use of instructional technology (IT), information and communications technology (ICT), and assistive technology (AT) in the field of education exploded due to the COVID-19 paradigm shift to distance learning, affecting the education of 1.6 billion learners—91% of the global student population (Basham et al., 2020). In the US, the crisis has touched 56.6 million elementary, middle, and high school students, of which 7.3 million receive special education services under the Individuals with Disabilities Education Act (IDEA; Institute of Education Science, 2021). Students with specific learning disabilities comprise the largest disability category in special education, 33% of all students with disabilities (Institute of Education Science, 2021).

The pandemic shift to online learning has created accessibility, affordability, flexibility, learning pedagogy, and educational policy challenges. One challenge is that parents who have children with disabilities face more significant burdens than parents in the general population supporting their children in pandemic distance learning (Neece et al., 2020; Ribeiro et al., 2021).

While the pandemic redefined “normal” and challenged the status quo in education, COVID-19 e-learning challenges have also created opportunities. Educators recognize the significance of family engagement, family empowerment, and stronger teacher-parent connections to support students’ learning, especially those with disabilities (AMA, 2020; Beaton et al., 2021). AT has played a significant role in the educational achievement and mental well-being for students with learning disabilities during COVID-19 e-learning. Remote and in-home support is vital to enabling successful and persistent assistive technology use (Seale, 2021).

This study evaluated the outcomes of interactive, online webinars on AT literacy and AT advocacy designed for parents of students with learning disabilities during the COVID-19 pandemic. The intended learning outcomes included increasing parent knowledge, advocacy skills, and confidence levels to better support student learning, consistent AT across educational transitions, and parent participation in special education processes.

TARGET AUDIENCE AND RELEVANCE

This study targets parents, local educators, and practitioners, as well as national assistive technology specialists. The benefits of AT use will not transfer if strategies and tools do not transfer with students to new academic settings. Accessible, evidence-based parent education is critical because parents know their children best and are the only constant as students move through educational systems. Educators, AT providers, and parents need to recognize the benefits of AT and the potential decreased academic performance of students with learning disabilities due to the drop in AT use following educational transitions (Bouck et al., 2012; Tondeur et al., 2017).

LITERATURE REVIEW

Assistive Technology Defined

Assistive technology (AT), defined as any item, piece of equipment, or product system—whether acquired commercially off the shelf, modified, or customized—that is used to increase, maintain, or improve the functional capabilities of a child with a disability. AT usually moves beyond what is readily available in the classroom, and provides a greater level of specialized support than a majority of IT and UDL tools (Authority: 20 U.S.C. 1401[1]; GovTrack, 2022).

COVID-19 Impact

Since first publicly identified in January 2020, COVID-19 has had an international impact. Yet, we are just beginning to understand the impact in many sectors. Whereas the economic toll has not yet been tallied, there are indicators that COVID-19 has had a negative impact on employment and government tax revenues (Dadayan, 2020). As schools pivoted from face-to-face instruction in Spring 2020 to remote instruction, real-time dashboards (U.S. Department of Education, 2021) have sought to provide a glimpse of the nature of schooling during the pandemic while questions have been raised about quantifying the amount of learning loss students experienced (Morgan, 2021). Parents of children with disabilities were particularly concerned as they sought extra assistance for their children (Chung, 2020). Ongoing efforts have sought to distill lessons learned from these experiences (Hattie, 2021).

Pandemic Online Learning Challenges for Students with Learning Disabilities

The sudden shift from an in-person classroom to distance learning created challenges for school personnel, students, and parents. Barriers included access to technology, connectivity issues, parental support, and lack of teacher expertise (Roff, 2021). Financial constraints limited some school districts' ability to provide equipment, hardware, and Wi-Fi access which illuminated digital inequality. Schools' decreased capacity and lack of internet access often left students' diverse learning needs unmet. Seale (2021) identified decreased access, lack of organizational structure and practices, and lack of family support as significant barriers that limited the use and benefit from technologies during at-home learning for students with learning disabilities.

Ad hoc resources compounded challenges to differentiating instruction for students' learning needs and learning styles which can reduce the effectiveness of remote learning and necessitate greater parent involvement (Brindley, 2013). Up to 85% of professionally active teachers had never conducted any online classes before the pandemic, and according to Valentine (2002) this lack of experience is a significant barrier to remote learning (Roff, 2021). E-learning can also compromise outcomes for students with learning disabilities when specific "reasonable accommodations" are not provided or when Universal Design is not sufficiently considered when implementing tools and devices across learning environments (Petreto et al., 2021).

Decreased parent availability, content knowledge, pedagogy, communication, and resources exacerbated distance learning challenges, especially for students who use AT (Garbe et al., 2020). The transfer from traditional teaching to e-learning increased expectations of parental involvement, particularly for those students in special education (Knopik et al., 2021; Touloupis, 2021). Many families of students with learning disabilities report needing additional resources for home learning in addition to training, support, and specialists' guidance to meet their students' educational needs (Asbury et al., 2021; Pokhrel & Chhetri, 2021; Toseeb et al., 2020). Parent training is a critical component to the academic success of students with learning disabilities (Francis et al., 2018).

Legal Basis for Parent Training, Advocacy, and AT

IDEA mandates that parents have opportunities for active and meaningful participation in Individualized Education Program (IEP) team decision-making processes (Burke, 2016; Burke et al., 2019; Goldman & Burke, 2017; IDEA, 2004). IDEA also mandates the inclusion of AT consideration in special education as well as in the transition process, while the Assistive Technology Act of 1998 emphasizes family involvement for goal setting, skill maintenance, and generalization across locations (GovTrack, 2022 Houchins, 2001; Nochajski et al., 1999).

While education laws govern many factors, such as testing procedures and constitutional rights, they do not guide parents in gaining the skillsets needed to accomplish objectives such as "meaningful participation" in special education processes. A lack of operationalized protocols raises the question: How do parents gain special education knowledge and advocacy skills to effectively collaborate, advocate for student needs, ensure the effectiveness of educational programming, and become involved in school accountability? There is a need for parent training regarding special education processes and advocacy, especially on AT.

AT Benefits

A substantial body of literature supports the benefits of AT use for students with learning disabilities. A systematic review by Maor et al. (2011) identified that AT was beneficial in increasing literacy skills, speech abilities, and other tested academic areas. Students who reported receiving AT in school had more positive post-school outcomes (Bouck et al., 2012). Additionally, AT provided by a multidisciplinary team can significantly impact IEP goal improvement for students in special education relative to other interventions (Watson et al., 2010). Students and parents reported greater independence completing schoolwork and improved quality of work when using a laptop with AT (Schock & Lee, 2016). Other noted benefits were positive perceptions as a learner, which included increased self-confidence, independence, and feelings of greater inclusion and academic achievements, as well as improved problem-solving skills (Schock & Lee, 2016; Young, 2012). AT can also empower students with learning disabilities when they transition to public high schools (Walker, 2017). Given the myriad of documented benefits, parents need to be equipped with skillsets to gather resources, monitor progress, and advocate for the use of AT for their children with learning disabilities across brick-and-mortar and virtual learning environments.

Barriers to AT use in School Settings

Systemwide policies that hinder accessibility, a lack of resources for training and implementation, and

limited communication between educators, administrators, IT staff, and parents, interfere with students with learning disabilities' use of AT in school settings (Schock & Lee, 2016; Wisdom et al., 2007). Studies also identify teacher influences on students' use of AT, such as pedagogical beliefs about "good" education and inadequate AT knowledge, skills, and classroom integration (Aldunate & Nussbaum, 2013; Atanga et al., 2020; Ertmer et al., 2012).

Students who reported barriers to AT use include feeling "different," decreased comfort, and reduced independence with use. Other challenges reported included managing the technology, a lack of AT availability and integration in learning situations, peer reactions, and negative self-image (Hemmingsson et al., 2009; Schock & Lee, 2016). Specht et al. (2007) identified four themes that impacted the AT use of students with learning disabilities when they enrolled in high school: (1) communication about and openness to AT use in the new academic environment; (2) adequate teacher training to support AT use; (3) assessment of AT "goodness of fit"; and (4) AT advocacy on the part of students, teachers, and parents.

Barriers to Parent Involvement in Special Education and Transition Processes

Research identifies a myriad of factors that negatively impact parents' levels of involvement and advocacy in the special education system, such as a lack of understanding of their rights, special education jargon, and placement and support service options (Burke, 2016; Burke & Hodapp, 2016; Burke et al., 2019; Burke & Sandman, 2017; Goldman & Burke, 2017). Parents feel inadequate and intimidated in special education meetings due to perceived power imbalances (Gershwin, 2020; Hirano et al., 2018). Marginalized and culturally or linguistically diverse families may face additional obstacles due to language barriers, for example, documents that are only available in English, ineffective interpretation/translation of special education terminology, and a general lack of information and access to services (Hirano et al., 2018; Jones & Gansle, 2010).

The literature reports similar barriers to parent participation in the transition process. Parents struggle with school bureaucracy and report perceptions of stigma, negativity, and predetermination in IEP planning and meetings. Parents also report feeling the need to "fight" for quality education for their children (Defur et al., 2001; Robinson & Mueller, 2020). Educators' lack of preservice training, time constraints, stress levels, and interactions can make families feel isolated, mistrustful, and tangential to the transition team (Gershwin, 2020; Goss, 2019).

Many social, personal, and economic factors affect AT abandonment across educational transitions (Beigel, 2000; Johnson & Evan, 2005; Laure et al., 2016). A recent study by Kohlmeyer (2021) found that 57.1% of parents of students who recently transitioned to mainstream schools reported that their students used AT tools less than during their attendance at a school for students with learning disabilities. While change is inevitable and ongoing, parents are a constant presence throughout students' educational journey. It is imperative that parents have assistive technology knowledge and advocacy skills so students can benefit from consistent AT use across educational transitions, for both in-person, and virtual learning environments.

COVID-19 E-Learning Opportunities

Understanding the bigger picture of AT service delivery and AT users' lived experience before and during the COVID-19 pandemic can inform reexamination of both health and educational systems, and create opportunity for positive change (Layton et al., 2021). Pre-pandemic, AT services were often centralized and difficult to access. Pandemic and post-pandemic responses related to AT need to be user-inclusive, recognized as essential services, decentralized, and supported (Layton et al., 2021; Oldfrey et al., 2021).

Research on the educational system's response to COVID-19 reiterates some of what we know, and offers several key lessons that policymakers and educators can use to build a better future: (1) online learning and teaching are effective only if students have consistent access to the internet and computers and if teachers have received targeted training and supports for online instruction; (2) home schooling works well for students for whom intentional, personalized, and sufficient resources are available; (3) reduced learning time has impeded student learning and affected the development of the whole child, necessitating evaluation of potential models to attempt to make up for the missed amount and quality of learning time; (4) there is an urgent need to provide appropriate support to children who are least prepared and at risk of becoming disengaged and eventually dropping out; and (5) a lack of contingency planning exacerbates the negative impacts of recessions, natural disasters, and pandemics on learning (García & Weiss, 2020).

Peltretto et al.'s literature review (2021) supports, expands, and helps to operationalize Garcia and Weiss's (2020) findings. Research on the relationship between pandemic distance learning, e-learning, and the skill acquisition of students with learning disabilities reported positive outcomes such as advantages related to attention, self-regulation, academic abilities, and engagement in learning. There is increased recognition that educational models, accessibility of sites, platforms, and learning materials need to take greater account for individual differences in learning to facilitate student success (Petretto et al., 2021). The literature also reports the importance of student- and teacher-specific training to increase adherence to the use of e-learning and ICT (Petretto et al., 2021). Finally, greater attention toward how the school community can promote student coping strategies, continuity in learning, and communication can impact student outcomes, especially for students with learning disabilities (Petretto et al., 2021). In fact, some schools found that online learning deepened the interchange between teachers and families. Some parents felt they had the necessary resources to support their children's learning, were more comfortable interacting from home, and developed a greater understanding of the complexity of their children's learning profiles during e-learning (Beaton et al., 2021).

These favorable e-learning experiences warrant further development and continuation beyond the pandemic (Seale, 2021). While IDEA (2004) mandates that parents are active special education team members, and that AT consideration occurs yearly, those mandates vary widely, especially during pandemic distance learning. Surprisingly, parent education related to AT knowledge and advocacy—so that students can continue to use their AT tools as they move through various educational environments—has not yet been addressed in the literature.

To fill this gap, this study evaluated the outcomes of a virtual parent education program on AT literacy

and advocacy delivered during the COVID-19 pandemic. The objectives of the intervention were to increase parent knowledge and advocacy skills to support learning and consistent AT use by students with learning disabilities across educational transitions.

METHODS

Participants

Parents of children attending a special school for students with learning disabilities in the Midwest United States that anticipated transitioning into mainstream schools within one to two years were invited to participate. Sixty-four families (124 parents) were recruited, 36 parents expressed interest, and 31 participants fully completed the webinars and outcome measures (14% attrition rate). Table 1 summarizes the participant demographics. Thirty-one parents completed both educational webinars. Most participants were employed, middle-aged women of middle-school students with family support. Ninety-seven percent had a college or advanced degree, and one hundred percent were Caucasian. All parents were proficient in English.

Table 1: Participant Demographics

	% (n)
Gender Identity	
Female	90.3% (28)
Male	9.7% (3)
Age	
35-44 years	6.5% (2)
45-54 years	61.3% (19)
55-64 years	25.8% (8)
65-74 years	6.5% (2)
Ethnicity	
White	100% (31)
Highest Degree of School Completed	
Some college credit, no degree	3.2% (1)
Bachelor's degree	35.5% (11)
Professional degree	12.9% (4)
Master's degree	29% (9)
Doctorate degree	19.4% (6)
Marital Status	
Single, never married	6.5% (2)
Married or domestic partnership	87.1% (27)
Widowed	3.2% (1)
Divorced	3.2% (1)
Employment Status	
Employed for wages	45.2% (14)
Self-employed	25.8% (8)
Out of work; looking for work	3.2% (1)

	% (n)
Homemaker	19.4% (6)
Retired	3.2% (1)
Unable to work	3.2% (1)
Current Grade Level of Student	
3rd Grade	3.2% (1)
4th Grade	0% (0)
5th Grade	9.7% (3)
6th Grade	9.7% (3)
7th Grade	32.3% (10)
8th Grade	45.2% (14)
Gender Identity of Student	
Female	51.6% (16)
Male	48.4% (15)
Years in Attendance	
One	3.2% (1)
Two	38.7% (12)
Three	19.4% (6)
Four	12.9% (4)
Five	9.7% (3)
Six	12.9% (4)
Seven	3.2% (1)
Prior Educational Setting Type	
Parochial school	16.1% (5)
Private school	25.8% (8)
Public school	58.1% (18)

Procedures

Parents were contacted via direct email, US mail, and digital newsletters to solicit participation in the education modules. Participants needed access to the Internet and Zoom. Parents who indicated interest were emailed a pretest via Google Forms one week before each module. After completing the pretest and other pilot outcome measures, participants were provided the link to access the Zoom webinars.

The webinars occurred synchronously and were repeated for two different time slots for each content area to provide attendance options and facilitate participant interaction with smaller groups; sessions lasted 60–90 minutes. Each webinar had approximately 15 attendees. Asynchronous recordings were offered for those parents that completed all measures but had conflicts with the presented times ($n = 5$ for the AT advocacy webinar).

Participants were instructed in two modules. The AT literacy module was presented first, followed by the AT advocacy module approximately a month later. A perceived confidence measure related to integrated content from both modules was distributed before the AT literacy and following the AT advocacy module. A posttest and a parent satisfaction questionnaire were distributed via Google Forms immediately

following each parent education module. Parents were requested to complete all post-measures within a week of their distribution.

Curriculum Development

The needs assessment, literature review, and principles of backward design, a framework for designing course content via considering desired goals first, informed program content (Wiggins & McTighe, 2011). Information was obtained from online, print, professional, and organizational resources that serve special education, learning disabilities, AT, and family advocacy. To establish the validity of the instructional modules, the content was reviewed by school administrators, content experts, and parents whose students had transitioned to mainstream schools within the last two to three years, and appropriate changes were made prior to the training.

Curriculum Content

The parent education program contained two modules: an AT literacy module (module one) and an AT advocacy module (module two), each of which was one to one and a half hours long. The AT advocacy content included (1) an overview of special education law and legal tenets related to AT; (2) the AT consideration process and documentation of AT in the IEP; and (3) suggestions on how to navigate potential barriers to the provision of AT services and tools (e.g., specific language to use in IEP meetings). The content related to AT literacy included (1) the purpose and basic categories of AT often used with students with learning disabilities (e.g., text-to-speech, speech-to-text, editing tools); (2) function vs. functionality of programs (e.g., embedded spell-checker, flexible spelling engine with topic dictionaries); (3) suggestions on how to articulate and demonstrate the need/benefit of AT (e.g., potential outcome measures to demonstrate benefit); and (4) systemic, student, educator, and parent factors that impact AT abandonment.

Curriculum Delivery

Parents attended each module one time during either a lunch hour or an evening time with the option to review the recorded session. Webinars consisted of AT tool demonstrations, IEP case examples, polls, and opportunities for questions and answers amongst participants and the investigator to maximize parent engagement on a virtual platform. The Zoom platform allowed parents to participate despite a wide geographical distribution and restrictions on in-person gatherings due to the COVID-19 pandemic. The investigator provided additional resources on AT literacy and advocacy to participants upon completion of both webinars and all program outcome measures for future reference.

Intended Outcomes

At the end of the AT literacy module (intended to increase knowledge of AT tools), parents would be able to: (1) describe the potential benefits of AT use for students with learning differences; (2) define the difference between Universal Design for Learning (UDL) and AT tools and auditory/digital text; (3) articulate the concept of feature matching, function, and functionality of AT tools; and (4) identify common reasons for AT abandonment.

At the end of the AT advocacy module, parents would be able to: (1) demonstrate awareness of parent roles/rights in the special education process and special education language; (2) describe AT consideration and documentation in the IEP; (3) identify efforts to prevent decreased use of AT tools during educational transitions; (4) articulate language and communication channels to advocate for AT tools in educational settings.

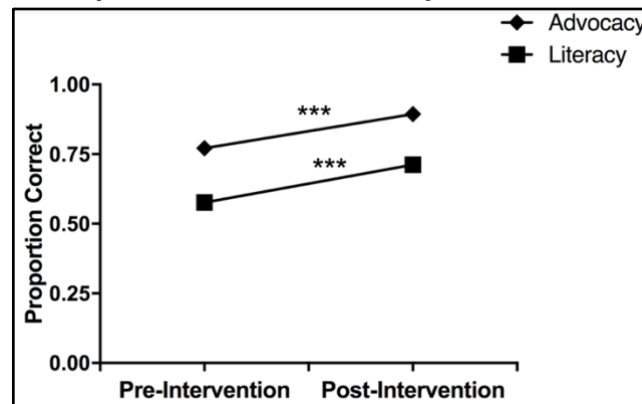
Overall, 10-15-item pre- and post-assessments measured content knowledge gained from each webinar. A summative questionnaire measured perceived confidence related to content incorporated in both webinars. These instruments are available upon request by contacting the first author.

RESULTS

Pre-/Posttests of AT Literacy and AT Advocacy

All participants scored higher on the AT literacy and AT advocacy posttests than on the pretests (see Figure 1). Results of paired t-tests showed score changes were statistically significant at $p < .001$ with a strong effect size across both measures. Overall, participants demonstrated greater AT knowledge following module instruction, as expected from an instructional intervention.

Figure 1: Mean Score Improvement on AT Literacy and AT Advocacy Pre-Post Tests

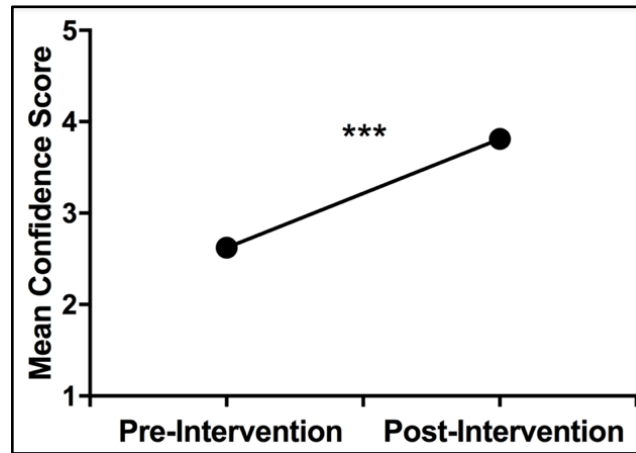


***indicates statistically significant at $p < 0.001$

Perceived Confidence

Participants also scored higher on the confidence measure post-webinars (see Figure 2). Eighty-four percent of the participants expressed increased confidence in their ability to work with their children's new school (see Figure 3), access resources, and prepare for and discuss their AT needs in a special education meeting (see Figure 4). Seventy-four percent of parents stated that they were more confident in their ability to collaborate with the educational team at an IEP meeting (see Figure 5) and communicate with school personnel at various levels to problem-solve AT difficulties their child might encounter (see Figure 6).

Figure 2: Mean Score Improvement on Pre-Post Intervention Perceived Confidence Measure



***indicates statistically significant at $p < 0.001$

Figure 3: Parent Confidence Level in Working with Students' New School Pre- and Post-Webinars

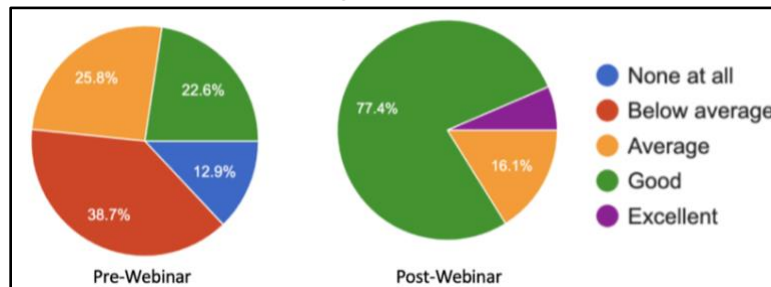


Figure 4: Parent Confidence Level in Ability to Access Resources to Prepare for Discussions of Student AT Needs in a Special Education Meeting Pre- and Post-Webinars

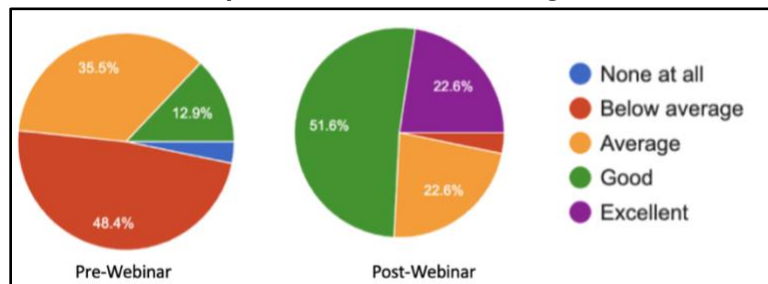


Figure 5: Parent Confidence Level Regarding Their Ability to Collaborate with the Educational Team at an IEP Meeting Pre- and Post-Webinars

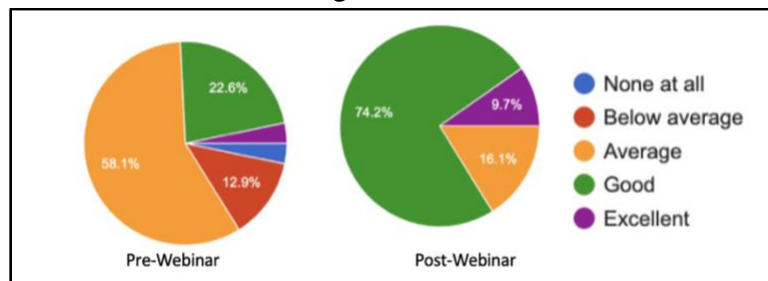
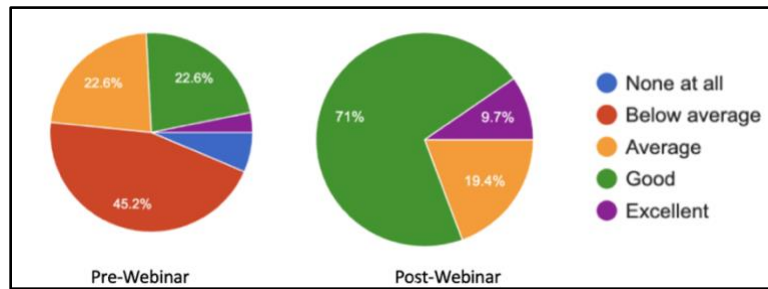


Figure 6: Parent Confidence Level Regarding Their Ability to Communicate with School Personnel at Various Levels to Problem-Solve AT Difficulties Their Child May Encounter Pre- and Post-Webinars



The 10-item Perceived Confidence Scale showed strong internal consistency and reliability with Cronbach's alpha = 0.89. The paired t-test showed that score changes were statistically significant at $p < .001$ with a strong effect size (see Table 2).

Table 2: Paired T-tests Pre- and Post-Intervention Responses Across All Outcome Measures
Pre- and Post-Intervention Responses (N = 31)

	Pre-Intervention		Post-Intervention		$t(30)$	p	Cohen's d
	X	SD	X	SD			
Advocacy evaluation scores	0.771	0.155	0.894	0.103	3.95	<0.001	0.71
Literacy evaluation scores	0.576	0.112	0.712	0.105	6.23	<0.001	1.1
Confidence (average)	2.62	0.628	3.81	0.411	8.94	<0.001	1.6
Confidence (composite)	26.2	6.28	38.1	4.11	8.94	<0.001	1.6

Course Satisfaction

Approximately 97% of participants agreed that the webinar AT literacy content provided was informative (see Figure 7), while 93.5% indicated that the information was helpful for parents with students transitioning to a new educational environment (see Figure 8). Seventy-seven percent of participants found receiving information on the AT tools and their functions most useful in the AT literacy module. In an open-ended question, participants suggested the following changes: in-person format (6%); shorter presentation length (6%); greater clarification of UDL and AT (6%); slower pace (6%); and more detailed explanation of AT tool features (6%).

All the participants agreed that the AT advocacy webinar content provided was informative (see Figure 9) and helpful for parents with students transitioning to a new educational environment (see Figure 10). Course participants perceived the following as the most beneficial information obtained from the AT advocacy webinar: documentation of AT in the IEP (45%); specific examples of language to use in parent responses to AT barriers presented by school personnel (29%); and information on students' rights related to AT consideration and implementation (19%). Participants suggested the following course

changes in an open-ended question: slower pace; more broken-down material/content (12.9%); and more "real world" examples (9.6%).

Figure 7: Parent Satisfaction that Information Provided was Informative in AT Literacy Webinar

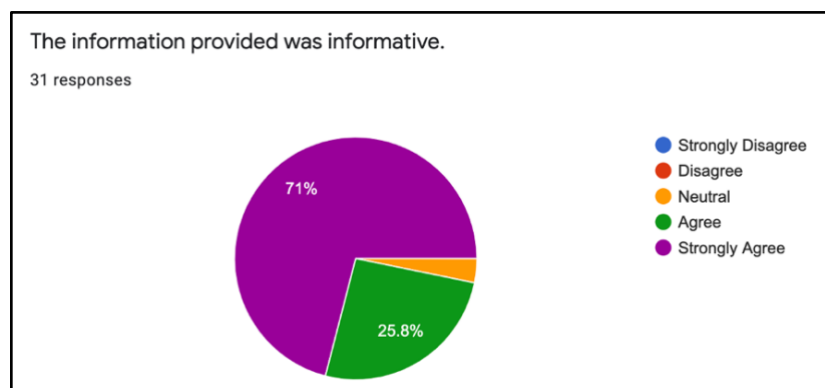


Figure 8: Parent Perception on How Helpful the Parent Education AT Literacy Module was for Transitioning to a New Educational Environment

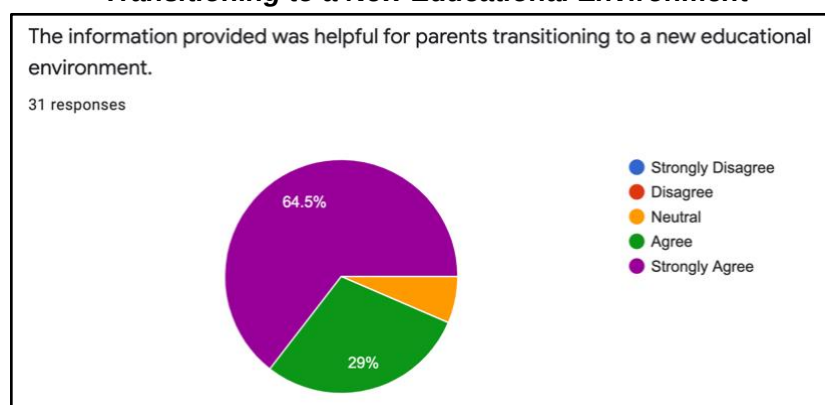


Figure 9: Parent Satisfaction with Information Provided in AT Advocacy Parent Webinar

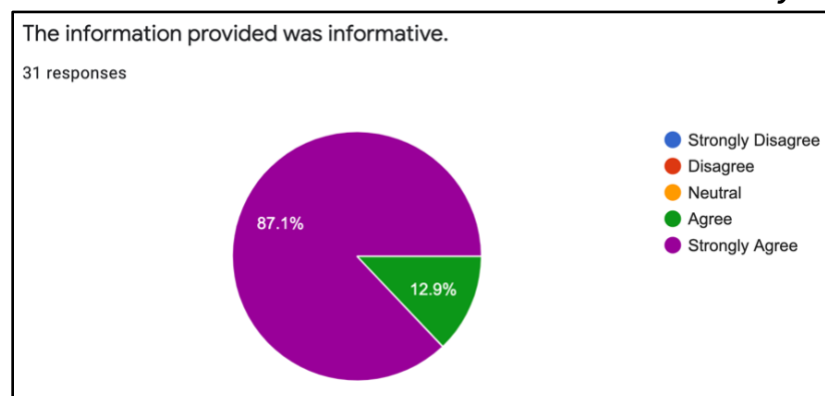
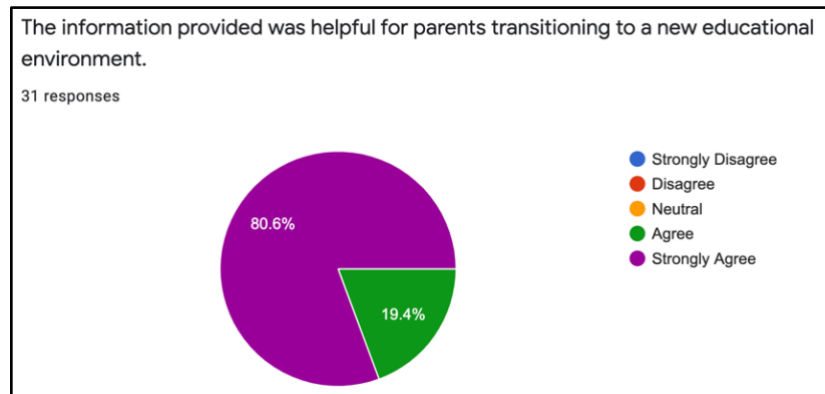


Figure 10: Parent Perception of Content Utility of Parent Education AT Advocacy Module Related to Transitioning to a New Educational Environment



OUTCOMES AND BENEFITS

This project describes a pilot parent education program on AT literacy and AT advocacy delivered virtually during the COVID-19 pandemic to support parents and facilitate student use of AT tools across educational transitions. In short, the program was a success as judged by statistical outcome measures and subjective measures of participant satisfaction. Findings align with and add valuable evidence to the body of literature that supports parent improvement in navigating special education systems, advances in special education knowledge, and family empowerment following direct training in special education law and advocacy skills (Burke et al., 2019; Goldman & Burke, 2017).

Outcomes of parent satisfaction questionnaires may inform the format of future presentations. Potential changes include shortening webinars to 45–60 minutes, tailoring the pacing to individual needs, adding a self-study component, and a more detailed explanation of the differences between UDL and AT tools. Lastly, parents requested in-person, hands-on training for AT tools, a consideration for future virtual and in-person training when pandemic restrictions subside (Burke, 2016; Burke & Hodapp, 2016; Burke et al., 2019; Burke & Sandman, 2017; Goldman & Burke, 2017).

A webinar format with variable offerings and an option to view recorded sessions offered flexibility for learning and potentially reached more parents across three campuses than in-person presentations. Conversely, parents may have declined participation due to the amount of screen time experienced during the pandemic or lack of technological familiarity. For example, one parent expressed a lack of familiarity with the Zoom platform and Google Forms outcome measures and was provided hard copies of questionnaires and a recorded webinar session.

Lastly, a commitment to meeting an unmet need for parents who are keenly engaged, educated, and concerned about their child likely influenced participation and reported outcomes. Most participants' children were transitioning to high school soon; thus, higher stakes for student performance may have increased parent interest and investment. Anxiety, hopes, and anticipated hurdles for positive educational

outcomes may have also spurred participation as many parents articulated prior negative experiences with special education services, support, and low student level of success.

Implications

Successful results of this pilot online parent education platform during the COVID-19 pandemic illustrate the need, benefits, and potential continued use of providing flexible, distant learning options for parent support. We need to recognize that continued use of online learning requires digital access, capability, and capital, as well as cooperative, collaborative parent partnerships (Seale, 2021). Consideration of service delivery redesign related to desired learning outcomes is paramount in overcoming both pre-and post-pandemic barriers inherent in the education of all learners, including students and parents (Basham et al., 2020; Beaton et al., 2021).

Study outcomes have important implications for parents, local practitioners, and national assistive technology specialists interested in AT literacy and AT advocacy. Parent education and access to resources regarding students' special education rights can provide a sense of empowerment and greater confidence for advocacy as well as increase meaningful collaboration (Goldman et al., 2020a; Goldman et al., 2020b). Online outreach and parent education can also increase home-based parental involvement and home-school communication (Ribeiro et al., 2021).

Parents need to understand the purpose, benefits, and basic functions of AT tools and advocate for their use to be active and informed educational team members to support their children's AT use and, ultimately, the possibility of higher academic success (Bouck et al., 2012; Schock & Lee, 2016; Young, 2012; Walker, 2017). AT tool use is critical so that students can fully access the curriculum and maximize their learning potential, especially in an e-learning environment (Searle, 2021). Educational teams have various AT knowledge and experience levels and are typically less familiar with new students' learning profiles; therefore, parents are the only constant for students as they progress through the school system. Informed parents with advocacy skills can help meet students' needs and perhaps identify additional educational needs, especially during times of transition. The goal of educating parents is to help promote students' independent access to the curriculum, increase educational opportunities, and improve educational outcomes for both in-school and at-home learning.

School service providers may or may not provide AT services for students with learning disabilities, depending on their area of expertise. However, all educators need knowledge of the purpose of AT, drop in usage, and resulting impact after educational transitions. A lack of access and use of AT tools can negatively affect students with learning disabilities' academic performance and successful engagement in student occupations. Support services can promote interprofessional collaboration around AT services and provide direct service and parent education so that students can maximize their academic potential. Informed, actively engaged parents can significantly influence student outcomes, especially during educational transitions, remote at-home learning, and when educators have difficulty meeting students' AT needs.

School administrators might provide systemic parent education on special education processes, special education language, and advocacy to strengthen family partnerships, thus, improving student outcomes (Bouck et al., 2012; Maor et al., 2011; Watson et al., 2010). A perception that more informed parents may increase demand for additional or different special education services might be a disincentive for providing parent education in this context. Pre-service and post-professional training on AT for educational team members, especially teachers and special education support staff, might increase integration of AT tools across classroom settings (Edyburn, 2013). Similarly, pre-service and post-professional training on family collaboration can help foster better educational partnerships (Atanga et al., 2020; Perelmutter et al., 2017). AT specialists need to support receiving educational teams to help prevent decreased AT use across transitions and resulting challenges (Houchins, 2001; Schock & Lee, 2016; Specht et al., 2007; Wisdom et al., 2007).

Study Limitations

Several factors may have influenced participation in and training outcomes of the AT literacy and AT advocacy parent education modules. Sampling and selection bias may have occurred with parent identification and participation. The sample size was relatively small, homogeneous, and skewed to parents of middle school students. Level of anxiety related to the transition process, prior knowledge, and pandemic stress may have also influenced participation. In addition, that the investigator was the curriculum developer, instructor, and project evaluator could have unknown consequences on the results. Outcome measures were not tested for reliability and validity. Another limitation is that knowledge doesn't always transfer to increased AT usage. Finally, future studies should look at whether parents demonstrated increased AT advocacy skills at IEP meetings.

Future Research

In the post-pandemic era, assumptions, models, practices, and tools will need to be reassessed and likely changed as educators, students, and families work between traditional and online settings (Basham et al., 2020). Based on parent-reported struggles, moving forward, educators and policymakers need to provide parents with resources and tools for vital pedagogical concepts, teacher-student-parent communication, and learners' needs, such as knowledge of AT tools (Garbe et al., 2020).

While this study can inform future parent education design, measurement tools, and content delivery to meet parent education needs related to AT literacy and AT advocacy, there are still many aspects of parent education on AT that need further research to contribute to the current literature. Examination of factors that influence the effectiveness and benefits of parent training might include differentiation of the format and types of interventions for various parent demographics. Some parents face more barriers than others in their pursuit of special education services for their children (Basham et al., 2020; Goldman et al., 2020a). We need to tailor interventions based on variable levels of parents' knowledge and experience with special education and assistive technology. How do we maximize and measure the effects of training processes to improve outcomes for students with learning disabilities (Goldman et al., 2020b)? What else can be harnessed for the post-pandemic era (Ribeiro et al., 2021)?

Preliminary evidence points to increases in special education knowledge and advocacy skills as proximal outcomes of training programs for special education advocates (Goldman & Burke, 2017). Future considerations include: (1) a study to examine whether parents who received training demonstrate increased AT advocacy skills at IEP meetings; (2) a comparative study of longitudinal educational outcomes of students with parents who participated in the parent education series as opposed to those that did not; (3) additional translational research that further identifies, develops, evaluates, embeds, and expands parent education programs in various types of delivery models for a variety of educational and community settings; and (4) the development of an age-appropriate student curriculum so that students gain necessary self-awareness and advocacy skills as they mature and progress through school.

Conclusion

This project provides a roadmap to create a successful, evidence-based parent education program to facilitate collaboration between families and educational teams. While designed for a specific setting, the education modules can be replicated, modified, or generalized to other settings and targeted toward other parent education topics and objectives. Parents are the best resource in understanding the struggles of their children with learning disabilities, and they need skills to effectively advocate for their successful academic futures. Though federal law dictates yearly AT consideration and parent involvement in educational team meetings, no one operationally defines or teaches parents' "meaningful participation." As a result, parents are often underutilized team members in the special education process. Knowledge and language to effectively communicate, collaborate, and advocate for their children's needs empowers parents. Accessible, acceptable, evidence-based parent education practices are necessary to inform and prepare them, because they are the only constant factor for students with learning disabilities as they move through educational systems.

DECLARATIONS

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Voices from Academia

Providing Education to Students with Visual Impairments During the Pandemic

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ABSTRACT

As part of a larger study, the authors examined how the COVID-19 pandemic was impacting access to technology for students with visual impairments. In November 2020, 369 educators of students with visual impairments completed an online survey where they shared their experiences with the accessibility of digital learning tools, their students' improvement of skills, and providing instruction through the use of technology. Key lessons learned from the findings include: educators must ensure that students have full access to all learning materials, students need early instruction in technology use, and professional development in technology needs to be readily available to educators.

Keywords: blind, low vision, education, digital access, assistive technology

PROVIDING EDUCATION TO STUDENTS WITH VISUAL IMPAIRMENTS DURING THE PANDEMIC

The COVID-19 pandemic caused most school systems to shift from educating students in brick-and-mortar buildings to providing, or not providing, education virtually. The unprecedented disruption to the education of U.S. and Canadian students brought to the forefront systemic issues that impacted the delivery of high-quality special education services to students with visual impairments, including those with additional disabilities and deafblindness (the term visual impairment is used in this article). The pandemic also created its own unique set of issues that affect education for students with visual impairments, including how to teach students skills that involve hand-under-hand guidance, how to provide learning opportunities in the community when community travel was prohibited, and how to support students to access inaccessible teacher created videos.

At the same time, the COVID-19 pandemic has resulted in positive outcomes in special education services. Some educational teams have forged deeper understandings of each individual's role, online professional opportunities have increased, and in some cases, administrators have come to recognize the unique impact that a visual impairment has on a learner (Rosenblum et al., 2020; 2021).

During the pandemic, access to curriculum, availability of AT for students, training in the use of mainstream and AT for families and educators, and the opportunities technology afforded students with visual impairments often took center stage. The short-term and long-term impacts of the COVID-19 pandemic on students' technology needs and use are yet to be realized. However, there is much to consider as we examine the future of education for students with visual impairments.

LITERATURE REVIEW

The American Printing House for the Blind (APH) had a total of 56,137 students with visual impairments registered in their programs as of January 2, 2019 (APH, 2019). Students with visual impairments are served by educators who work as teachers of students with visual impairments (TVIs) and orientation and mobility (O&M) specialists. Key responsibilities of TVIs include conducting specialized assessments to understand the unique impact of a visual impairment on the learner, adapting instructional materials so that they are accessible to learners, supporting other educators in using appropriate instructional strategies for learners, and providing instruction in the nine areas of the expanded core curriculum (ECC; Allman & Lewis, 2014; Zatta, 2016). One of the nine areas of the ECC focuses on AT instruction. O&M instruction supports students in developing a conceptual understanding of their environment and the travel skills they need to be safe and independent/interdependent travelers within the community (Fazzi, 2014; Herrera et al, 2016).

According to the Individuals with Disabilities Education Act (IDEA), AT is defined as “any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities” (IDEA,

2004). The use of AT can empower someone with a visual impairment to gain a sense of independence and self-determination (McNear & Farrenkopf, 2014); thus, the stakes for teaching students to use AT are indeed high. Students with visual impairments use their AT to access curriculum and complete educational tasks such as accessing print media; accessing digital text; authoring, editing, and preparing materials for themselves in alternate formats such as Braille; accessing multimedia; and working with data (Siu & Presley, 2020).

For students with visual impairments, AT can include high-tech tools such as hardware (physical devices) or software (program applications; Siu & Presley, 2020). These tools can be specialized for people with disabilities, such as with screen magnification or screen reader software, or include mainstream technologies that were designed for universal use, but allow customization to meet a range of needs or preferences of the user. AT also includes low-tech or even no-tech tools such as Braille writers, bold ink pens, optical devices (magnifiers and telescopes), and talking calculators.

Technology is acknowledged as an increasingly important component of O&M instruction with tools such as Global Positioning Satellite (GPS) being specifically incorporated by O&M specialists into lessons. GPS-based tools, when used with skills taught by O&M specialists, provide students real-time environmental information and routing directions to a destination. The use of new technologies such as GPS, transit scheduling apps, and rideshare apps allows individuals with visual impairments to be more successful in community travel. Thus, it is critical that O&M specialists teach both fundamental O&M skills and technology skills to ensure that students are able to maximize their travel abilities in all environments (Corn & Rosenblum, 2020).

Even before the COVID-19 pandemic, both blended (i.e. hybrid) and fully virtual instruction had become increasingly common (Greer et al., 2014; Smith & Basham, 2014). Blended and online learning options can offer benefits to students with disabilities and particularly to students who are visually impaired, such as opportunities to individualize content, format, and pacing of instruction (Smith & Basham, 2014), and greater student independence in the classroom (Cranmer, 2020). However, in order to benefit students with disabilities, educational technology must be both accessible and usable (Smith & Basham, 2014). IDEA (2004) additionally includes a provision that all students who are blind must have access to print instructional materials, including textbooks in accessible format, free of charge, which makes it even more critical that materials and technology be accessible and usable. TVIs play a vital role in facilitating access for their students, often acting as liaison between the student, general education teachers, and educational technology vendors or developers (Siu & Emerson, 2017).

The research questions guiding this study were:

1. During online instruction, what digital learning tools, learning management systems (LMS), and videoconferencing software were reported by TVIs and O&M specialists to be accessible and usable by their students with visual impairments?
2. In the opinion of TVIs and O&M specialists, what mainstream and AT knowledge, skills, and tools must students have to be successful in online education?

3. How did TVIs and O&M specialists report supporting students with visual impairments during online learning?

TARGET AUDIENCE AND RELEVANCE

The audience for this article includes educators, administrators, and technology companies and publishers that produce educational materials for children. Through reading this article, educators and administrators will increase their awareness of what AT students need when participating in online learning and the impact on learning when digital learning tools, LMS, and web conferencing tools are not accessible. Having a deeper understanding of what makes a product both accessible and usable will enable technology companies to consider Universal Design from the beginning of product development. All readers will recognize that coordinated efforts, clear communication, and resources are necessary for the success of students with visual impairments in our highly technology-oriented education system.

METHODS

The *Access and Engagement II* study was conducted in November 2020. The study was approved by the American Foundation for the Blind's (AFB) Institutional Review Board. Participation in the study was voluntary. The study was open to U.S. and Canadian family members of children with visual impairments, TVIs, and O&M specialists. The 662 study participants represented 206 children with visual impairments via family member report, and 475 individuals who worked as TVIs and O&M specialists. In this article we report findings from 369 participants who worked as TVIs, O&M specialists, in both roles, or as student teachers/interns and serving students in the general-education setting.

Participants

There were 369 U.S. and Canadian participants. The sample included 224 TVIs, 64 O&M specialists, 77 dually-certified professionals serving as both TVIs and O&M specialists, and 4 student teachers/interns. All participants were working as itinerant teachers, meaning that they traveled from school to school, often within more than one school district. The participants were primarily female (88%) and White (84%). About two-thirds of the participants were over 46 years of age. Participants were from 47 U.S. states, and four Canadian provinces.

Analytic Procedures

Descriptive statistics were calculated for quantitative data. Qualitative data was coded using the constant comparison method (Stern, 2008). With the constant comparison method, the researchers compare all responses to an open-ended question to identify themes. Coding continues until no new themes are identified. Researchers using the constant comparison method are focused on finding relationships among the themes that emerge as they review the responses (Chun Tie et al., 2019; Stern, 2008).

RESULTS

Accessibility of Mainstream Digital Learning Tools

Participants were given a list of 35 mainstream tools, including digital learning apps and websites, videoconferencing tools (e.g., Zoom, Microsoft Teams), and LMS (e.g. Canvas, Google Classroom). They were asked two questions regarding each tool: (a) Were their students expected to use the tool by their general or special education teachers? and (b) Was the tool inaccessible to their students because of their students' visual impairments and/or additional disabilities? Table 1 lists learning tools that at least 15 participants reported their students were expected to use. For each tool, Table 1 shows the number of participants who stated that their students were expected to use the tool and the number and percentage of participants who also reported that the tool was inaccessible. The five tools that were rated most inaccessible by participants were iReady, IXL, Kahoot, EdPuzzle, and NearPod.

Table 1: Use and Reported Inaccessibility of Technology Tools, Organized by Percentage Inaccessible

Tool	Number of participants whose students use	Number of Participants who rated the tool as inaccessible	Percentage of participants who rated the tool as inaccessible
iReady	62	31	50
IXL	72	30	42
Kahoot	126	47	37
EdPuzzle	45	16	36
NearPod	68	22	32
Seesaw	127	41	32
Quizlet	89	28	31
ThinkCentral	17	5	29
Schoology	92	24	26
Edmentum	16	4	25
Canvas	102	24	25
Edgenuity	32	7	22
Class Dojo	82	16	20
Clever	99	17	17
Google Hangout	42	6	14
Google Classroom	258	35	14
Zoom	261	35	13
Kami	55	7	13
Google Drive	226	24	11
Google Meet	202	19	9
FaceTime	41	3	7
Microsoft Teams	75	5	7
WebEx	20	1	4
Remind	65	3	4

Fewer participants rated videoconferencing platforms such as Microsoft Teams and Google Meet as inaccessible compared to digital learning tools. Thirteen percent of participants stated that their students could not fully access Zoom, the most commonly utilized videoconferencing platform.

When asked to describe students' experiences with digital learning tools, the participants emphasized the amount of time that students required to learn new technology tools and the many skills they needed to develop to be independent and proficient using digital learning tools. In open response questions, some participants shared that digital learning tools were not fully compatible with screen reader and screen magnification software. For example, while discussing Edgenuity, one TVI explained that "Videos are not described, pictures/diagrams are not described, navigation tools are inconsistent, [and educators] cannot access materials ahead of time for quizzes." TVIs often access student tests and quizzes ahead of time to ensure that they are accessible and to prepare any needed adaptations, such as actual objects rather than objects shown in pictures, tactile diagrams, or Braille (Spungin et al., 2017).

Participants also reported via open-ended questions that some of the challenges experienced by students were multiplied when students needed to access multiple digital learning tools and video conferencing platforms. Students with less technology proficiency, and those with cognitive or fine motor disabilities, were described by participants as having a particularly difficult time accessing digital learning tools, LMS, and video conferencing platforms. These students often depended on at-home family support in order to engage with the digital learning tools.

Some hardware was described by participants in the open-ended items as presenting accessibility challenges for students with visual impairments. For example, participants explained that Chromebooks were commonly provided to students by the school district. Though Chromebooks do have the screen reader ChromeVox, participants noted that this screen reader was not as robust as JAWS, which their students more often used. For some students, participants explained that the level of magnification available on the small Chromebook screen was not sufficient for their students with low vision. Some students required a large monitor to use in conjunction with their Chromebook, or another type of laptop. TVIs spent considerable time advocating with administrators to obtain the hardware, software, and other accommodations their students needed in order to access and fully participate in online learning.

TVIs also described in open-ended responses several workarounds that they coordinated to enable students to access digital content. Workarounds included providing students with tablets instead of Chromebooks or laptops; accessing the content on the LMS and converting the content to an accessible formatted document for the student's use; or accessing the student's device remotely to help troubleshoot issues. One TVI explained, "I have used remote access to the students' computers while meeting on Zoom. I am able to help them navigate or troubleshoot computer issues in real time." The participants additionally reported that they needed to work closely with students' families, paraprofessionals, and general/special education teachers to ensure that students were able to participate and access learning opportunities during online instruction. Yet, even by November 2020, there were students who did not have access. An O&M specialist explained, "I had a student go on quarantine. I was the first (as her O&M) to contact the family and meet virtually. My student and her parent had not yet been taught how to

access the platform needed for virtual education visits, so in November, I was the first to address this with that particular family. She had the device but had not been trained how to use it.”

Improvement of Skills as a Result of Increased Technology Use

As a result of the shift to online education due to the COVID-19 pandemic, many TVIs and O&M specialists explained that their students’ technology skills have improved. Improvement occurred more frequently for students in the higher grades who were academic learners. Specific skills the students gained included use of multiple LMS, AT skills (e.g., screen reader or Braille device familiarity), keyboarding skills, self-advocacy skills, and problem-solving skills. For example, some students were reported to have improved their skills using Chromebooks, Zoom, and YouTube. During O&M instruction, students increased their skills with mapping tools and internet searches. However, it should be noted that participants reported that students with additional disabilities, with severe disabilities, and those who were medically fragile, did not typically make the same gains as academic learners. One O&M specialist explained, “For some things, like ECC [skills], looking at schedules, working on O&M planning and independence skills, I am all about [online instruction]. It is a great way to interact and I don’t feel rushed like I have to jet off to the next school when I can do things virtually in my schedule. However, virtual instruction just does not cut it for working on all of the O&M skills that need to be repetitive and hands-on in person to ensure a student’s safety.”

Many participants also reported improvement in their own skills, particularly with accessing web conferencing programs and online teaching platforms. One TVI shared, “I have always been techy but this [time of online learning due to the COVID-19 pandemic] has really made me expand my skills. With how to access remotely and guide my students without me just doing the ‘fix’ myself. There is more problem solving on both of our parts.” Some participants shared, however, that they or their students did not have adequate time or supports to master new technology skills as quickly as was required to keep up with teaching and learning. One dually-certified professional noted that the time during the pandemic has been a “crash course in learning. It has become a sink or swim type of learning [for my students] and focus has been on whatever one skill is needed to access and complete an assignment.”

Providing Instruction Through the Use of Technology

Part of the challenge for TVIs and O&M specialists were the different methods, including technology, they could use to support their students’ learning. Participants were provided with lists of methods they could use to support their students and families; Table 2 for TVIs and Table 3 for O&M specialists. Dually-certified professionals were provided with both lists. The lists included items that did not incorporate technology, such as dropping off or mailing materials to students’ homes.

TVIs in Table 2 reported that their top three methods of providing instruction were meeting with students/families online to consult or give suggestions, virtually observing students do a task and providing feedback, and sharing websites, blog posts, etc. with students/families. O&M specialists in Table 3 reported that their top three methods of providing instruction were meeting with students/families online to consult or give suggestions, having students complete online assignments created by O&M specialists, and sharing websites, blog posts, etc. with students/families.

Table 2: Technological Methods Used by TVIs

Method for Providing Instruction	Number of TVIs Using Method
Meeting with students/families online to consult or give suggestions	237
Virtually observing students do a task and providing feedback	230
Sharing websites, blog posts, etc. with students/families	186
Attending class with students virtually	180
Meeting with students to describe material not accessible to them in class	169
Accessing teachers LMS to access content to adapt	168
Collaborating with paraprofessionals	168
Learning about technology tools students can use	149
Meeting and reviewing assignments with students	144
Sending families videos to watch with their children	127

Challenges of Remote Instruction During the Pandemic

In their responses to open-ended questions, participants reported that it was challenging to teach specific concepts online, particularly specialized O&M concepts such as correct cane techniques, street-crossing skills, and specialized Braille concepts such as correct hand/finger positioning. Such skills are much more effectively taught in person in the same physical space. Many participants reported that students were not currently receiving instruction in these skills. Participants reported that it was especially challenging to deliver online instruction to students who were very young and those who had additional disabilities. These students frequently required intensive in-person support to manage the technology and to help them stay engaged. Due to a variety of family factors, such support was not consistently provided to students. For example, one TVI shared, “One of my pre-Braille students is only 4 years old. Parents don’t speak English. But I am expected to meet with her on Zoom for 30 minutes 5 days a week. Her attention span is short, materials at home are limited, home is chaotic, and I’m taking mom away from her other kids the whole time... I feel like after 15 minutes we are done.”

Successes of Using Technology for Instruction

In addition to the students’ technology skill gains, participants observed a variety of successes that emerged from online instruction. Students had the opportunity to socialize with other students who were visually impaired from other schools and states. Additionally, through teachable moments, students were able to enhance and increase their independent living skills, and families were able to observe what their children were truly capable of accomplishing. TVIs and O&M specialists were able to spend more time with their students, since they did not have to drive between schools. Participants felt that their coaching skills had improved through this experience. Another major benefit of online learning was increased communication between participants and their students’ family members. One TVI stated, “One of the positives that I have found in meeting online with students and families is that it has strengthened the relationships between parents and myself. Since I need parent assistance, at times, to be able to teach my lesson, the parents have a better understanding of how I am helping their child and how they can support this at home.”

DISCUSSION

In their roles as itinerant teachers, the 369 participants had to adapt instruction and ensure that their students had the ability to use technology to engage in online learning. Often, they had to support their students to gain access to instructional content that was not accessible to them due to their visual impairment and/or their additional disabilities. With little time to prepare for the switch to online instruction, many participants had to increase their own technology skills to meet their students' needs. They reported that they used technology in multiple ways to deliver and support instruction.

Lessons Learned

As Rice and Ortiz (2021) noted, the use of digital learning tools and digitized instructional materials have grown tremendously in K–12 education. Participants reported that students had greater success when they had access to technology tools with AT, accessible web conferencing and digital learning tools, as well as adequate skills to use them independently. When the web conferencing, LMS, or digital learning tools were not accessible, participants had to provide support to students. Rice and Ortiz (2021) explained that even when students are engaged with educators in person, the use of digital learning tools and digitized instructional materials are an integral part of the curriculum. When these materials are not accessible, students are disadvantaged. Educators of students with visual impairments and other disabilities must work to ensure that whether education is delivered in person, through a hybrid model, or fully online, students have full access to all learning materials. It is also important to recognize that materials may technically be accessible, but their usability by a student is problematic for the student (Cranmer, 2020; Smith & Basham, 2014). Educators must continually evaluate both the accessibility and usability of digital learning tools and materials.

Though it is part of the role of the TVI to prepare accessible materials (Siu & Emerson, 2017; Spungin et al., 2017), TVIs have many additional responsibilities. Thus, it is imperative that educators, administrators, and policymakers work together to maximize accessibility of digital learning materials, online platforms, and LMS (Rosenblum et al., 2020, 2021) so that TVIs do not find themselves having to neglect their other responsibilities because they are spending a disproportionate amount of time on accessibility-related issues. Meyer (2017) speaks to the importance that those in charge of procurement only purchase accessible materials. Resources such as the National Instructional Materials Access Center (NIMAC, n.d.) provide those producing Braille materials access to some publishers' files for conversion into Braille. However, unless language is written into procurement contracts to require publishers to provide the necessary files, often school districts and state departments of education do not purchase print materials that can easily be made accessible for Braille readers. The NIMAC does not provide for the provision of accessible digital materials that are teacher created, openly licensed educational resources, or digital instructional materials that are interactive.

It is imperative that efforts are made to provide classroom teachers training on developing accessible materials. Educational product developers must design products that are born accessible. Students with visual impairments should be part of beta testing of products during field testing. TVIs and/or O&M specialists should serve on procurement committees, and they should share specific feedback with

developers on challenges encountered by students with visual impairments when using their products. As Rosenblum et al. (2020, 2021) suggested, school districts should only purchase web conferencing programs, digital learning tools, and LMS that have been shown to be both accessible and usable.

Of 299 participants who responded to the question, 286 (96%) reported that they provided direct instruction to students with additional disabilities. Children with additional disabilities require individualized instruction that is often hands-on (Erin, 2016; Zatta, 2016) and delivered in short increments of time due to limited attention spans. The same is true for children in early intervention. Most participants reported that they had to find ways to engage learners with additional disabilities and/or who were young during online instruction. Providing intervention and instruction to children receiving special education services has been found to be effective (McCarthy et al., 2019) including children in early intervention receiving O&M instruction (Dewald et al., 2015; Dewald & Smyth, 2013). As a field, we must develop resources to support TVIs, O&M specialists, and other educators in providing meaningful, individualized online learning for students who are young and/or have additional disabilities. We must work with family members to acquire the tools and resources they need to support their children during online learning (Dewald & Smyth, 2013). Participants did report that when family support was present, some students made educational gains, there were opportunities to provide coaching to family members, and the ability to teach within the child's home promoted greater student independence. We must capitalize on these successes and build in opportunities to increase students' skills through the use of online learning methods when appropriate, even when in brick-and-mortar buildings. For example, having a student use a GoPro camera (a camera worn on the head to give a first-person experience), allows a family member to be invited to join their child and O&M specialist during community travel, in order to learn strategies they can use to support their child when the family travels in the community.

There has been a recognized shortage of special education teachers, especially those serving rural areas and children with low-incidence disabilities, long before the COVID-19 pandemic (Jameson et al., 2019; Mason et al., 2000). The pandemic has brought to the forefront the need to be creative in the way we recruit future educators and the methods educators use to meet their students' needs. Rosenblum et al. (2021) recommended that educational teams be provided more time to problem-solve together, and, when appropriate, TVIs and O&M specialists be permitted to join their students online, even when their students are in brick-and-mortar buildings.

Students need strong technology skills, problem-solving skills, and self-advocacy skills to foster ongoing academic and lifelong success (D'Andrea, 2012; Kelly & Kapperman, 2018). Therefore, it is imperative that TVIs and other educators promote students' early skill development in a wide range of technology options and support them in deciding which tools to use for various tasks (McNear & Farrenkopf, 2014; Siu & Presley, 2020). Some participants commented on the technology and other ECC skill growth they had seen in their students, such as self-determination.

For students with visual impairments to successfully learn to use both AT and mainstream technology, they must have educators who themselves are well-versed in these tools (Siu & Emerson, 2017). Some participants reported that at the beginning of the pandemic they had much to learn about technology in

order to support their students. Many participants indicated that they had grown in their own technology usage during the pandemic. In an analysis of surveys completed by TVIs, Ajuwon and colleagues (2016) found that TVIs acknowledged that they needed to build their own AT and technology skillsets. The pandemic has brought to the forefront the importance of providing ongoing professional development in both AT and mainstream technology to educators, as they will be expected to support their students' educational participation and learning in the 2020s and beyond.

Limitations

The study was advertised online through postings on the AFB website, Paths to Literacy website, and Paths to Technology website. The study was also announced on national listservs such as AERNet and Braille and Teach and was shared by some states through their listservs (e.g., Arizona, Colorado, South Carolina). It was also announced on social media, such as Facebook groups for TVIs and O&M specialists. Individuals who did not see the study announcement online may have missed the opportunity to participate, as did those who do not choose to participate in surveys. Participants volunteered to complete the online survey. All data was self-reported and was not verified by the researchers.

Collecting information through self-report also has limitations. Participants are often biased when they report on their own experiences. There are many reasons that participants might express biased estimates of self-assessed behavior, ranging from misunderstandings of what a proper measurement is, a desire to please the researchers, or even a desire to present a certain persona despite the survey itself being anonymous (Rosenman et al., 2011).

CONCLUSION

This study, part of a larger study by Rosenblum et al. (2021), brings to the forefront the relationship between accessibility and education of students with visual impairments. When students do not have full access to curriculum, the skills and supports to use both AT and mainstream technology, and educators with adequate technology and AT skills themselves, there is a high probability their learning will suffer. Technology also has the potential to allow educators and families to work more effectively together to support children's learning. As we step back and evaluate both the short-term and long-term impact of the pandemic on the education of students with visual impairments, we must consider carefully the lessons learned from this study. A TVI shared, "I have always been very 'techy,' but I feel like I know so much more about technology and its lack of [or] ability to be accessible to students this year. I am pleasantly surprised when things work like they are supposed to."

DECLARATIONS

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Voices from Academia

A Digital Walk Through Digital Talk: Lessons Learned

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ABSTRACT

Communication is an essential part of who we are. The purpose of this study was to evaluate the impact of a parental education program during COVID-19. A parent utilized a communication device in order to increase the number of opportunities for their nonverbal child to engage and participate at home and in the community. A descriptive mixed-methods case study with a sequential exploratory design was used in this study. A single parent of a nonverbal 8-year-old female diagnosed with Autism and Attention Deficit Hyperactivity Disorder was previously issued a complex communication device but had never used the device in either the home or the community prior to the study. Following a parental education program, the results indicated that the parent increased communicative opportunities, led to engagement in meaningful family activities. The use of family-centered parental education resulted in positive communication outcomes for increased family connectedness while it enhanced a sense of belonging within the family.

Keywords: parental education, assistive technology, augmentative and alternative communication, participation, COVID-19

A DIGITAL WALK THROUGH DIGITAL TALK: LESSONS LEARNED

Target Audience and Relevance

All professionals who work with assistive technology need to provide client-centered support, not only to the client, but also to the family, at every level of competency. The knowledge gained from this study is integral to helping professionals provide informed education and intervention to assist families in addressing barriers and promoting a child's communication and participation.

Communication is essential for a person to engage and participate at home, school, and throughout the community (American Occupational Therapy Association, 2020a). Over 3.5 million Americans have significant communication issues requiring the use of augmentative and alternative communication (AAC) to participate throughout their life roles (Henderson & Doyle, 2003; Wendt & Lloyd, 2011). AAC refers to the use of devices or techniques that compensate and/or supplement a person's verbal communication (Wendt & Lloyd, 2011).

According to the Individuals with Disabilities Education Act (2004), a nonverbal student is to be provided with a communication device to allow them to participate in school activities. At a public school district where the primary investigator is employed, it was observed that students using communication devices rarely took the devices home on weekends or over the summer. In the summer of 2019, 60 students utilized a communication device in the schools and only 6 devices went home when school was not in session (von Hellens, 2019).

Parental involvement with communication is critical, because the more parents learn about AAC, the more they can recognize the benefits as the child becomes a competent communicator (Light & McNaughton, 2014; Therrien & Light, 2018). Furthermore, when there is a lack of training and support for parents, there is a risk of low device usage and even device abandonment (Anderson et al., 2015; Huang et al., 2008; Stadskeiv, 2017; Tegler et al., 2019).

A needs assessment (von Hellens, 2019) was completed by the primary investigator, which indicated the need for parent education and training to support their child who uses a communication device. Literature reviewed to support the needs assessment (von Hellens, 2019) indicated that the most significant finding was the importance of parent support for their child to utilize a communication device throughout all environments (Topia & Hocking, 2012). It is critical for nonverbal students to become competent communicators, so they can participate in any and every role they encounter (Light & McNaughton, 2014).

The purpose of this study was to evaluate the impact of a parental education program. The evaluation occurred through identifying which, if any, of the 13 factors on the Family Impact of Assistive Technology in Augmentative and Alternative Communication Scale (Ryan & Renzoni, 2015) had changed. The primary objectives for this research included the following:

- provide parent education on device use and management to enable the parents to learn about the app and device itself

- provide opportunities for parents to practice implementation strategies that they can apply at home and in the community to increase the number of communication opportunities to enhance their child's participation
- identify family strengths and impacted dimensions on the child's functional performance outside the school environment
- explore parental perceptions of AAC

Meeting these objectives provides the education, practice, and support parents need to increase the use of the communication device in all settings. Increased use of the device allows the child to participate and communicate in all their roles and activities. The desired outcome is to provide a program where parents learn specifics about communication applications, modeling, and providing the opportunities for their child to increase AAC device use, to improve the child's engagement and quality of life.

A year of planning went into researching and designing this 15-week study. When the COVID-19 pandemic arrived, parents and children were isolated, and the digital world grew exponentially. The statewide shutdown occurred in March of 2020, one month prior to recruitment and two months prior to the start of the study. This resulted in changing the timeline of the study as well as changing the original intervention program, designed as multiple families interacting together, to a virtual parental education. The pandemic mandated isolation and made contact with parents difficult. Additionally, the start of the 2020-2021 school year was delayed for safety and health concerns for the public. As schools slowly reopened, the primary investigator had to start and complete the study in just 6 weeks.

There are several definitions utilized in this research to provide a common understanding. Assistive technology (AT) is defined by the Assistive Technology Act of 2004, which states that an "assistive technology device means any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities" (29 U.S.C. 3001). For this research study, augmentative and alternative communication (AAC) is defined as a high-tech mobile device with a communication app installed. A communication opportunity is defined as a comment or question or choice provided by the parent to the child (Douglas et al., 2017).

LITERATURE REVIEW

A review of the literature identified several studies that confirmed the need for children who require AAC, usage in multiple environments, so that students may become competent communicators, able to participate and engage with others in all their occupational roles (Bailey et al., 2006; Biggs et al., 2019; DeCarlo et al., 2019; Light & McNaughton, 2014; Therrien & Light, 2018). The literature described the barriers that families face when a member is nonverbal, various types of parental education, and the effectiveness of using communication devices. Light and McNaughton (2014) found that parental involvement is critical. Other studies found that when parents saw the benefit to their child using an AAC device, there was improved communication within the family and the community (Bailey et. al, 2006). Kinney and Gitlow (2015) found that documented assistive technology outcomes were more successful

when therapists focused on the family, environment, and desired occupations. When parents learned how to manage the communication device and used the device to increase communication exchanges, it was easier for them to implement the device at home (Baxter et al., 2012).

Children crave a sense of belonging (Francis et al., 2012). Topia and Hocking (2012) reported that AAC devices need to be individualized, usable in all environments, and used with a variety of people. Copley and Ziviani (2004) found that parental involvement is necessary to help integrate the AAC device into home and community activities. For a nonverbal child, it is even more important to utilize the communication device during daily encounters, routine activities, special events, and parties, to create that sense of belonging and have meaningful interactions (Kantartzis, 2019). This, in turn, creates more opportunities for nonverbal children to successfully engage in their life roles.

Parents face multiple barriers that interfere with implementing communication devices. One barrier parents face is the lack of acceptance of assistive technology (Lorah, 2016) which can be observed when the parent doesn't use the AAC and continues to rely on the child's gestures and sounds to get needs met. Operational competency and acceptance are critical factors and are barriers when not addressed (Kent-Walsh & Light, 2003; Light & McNaughton, 2014; McNaughton et al., 2008). Other barriers include financial hardships, stress, and time constraints of taking care of other family needs (Mandak et al., 2017; Moorcroft et al., 2019). Another barrier can be device abandonment. Device abandonment or low device usage can lead to decreased communication opportunities for a child who relies on AAC. To help nonverbal children use AAC, parents need targeted, individualized support and intervention strategies beyond the use of handouts and other passive family education techniques (Parette & Huer, 2002). Hemmingsson et al. (2009) found that assistive technology devices are quickly abandoned when users perceive that they are different from others or when the child experiences a negative interaction with peers when using the communication device.

O'Neill et al. (2018) completed a systematic review of AAC interventions and found that interventions incorporating the AAC are effective when implemented through daily recurring environments. Schlosser et al. (2000) found that adult learning strategies can help parents overcome some barriers and provide an increase in opportunities for participation. Strategies, such as modeling AAC, can be effective by themselves or in combination with other interventions (Finke et al., 2017; O'Neill et al., 2018). However, it's important to note that AAC interventions need to focus on communication and not just operational competency (DeCarlo et al., 2019; McNaughton & Light, 2013). Interventions can create positive gains on a child's comprehension when using partner strategies such as open-ended questions, environment setup, least-to-most prompting, and modeling (Finke et al., 2017; Tegler et al., 2019; Therrien & Light, 2018). Cress (2004) researched parent perspectives and recommended keeping family priorities as the goal for the AAC intervention and utilizing functional interactions for the family to implement the AAC.

Professionals who work with assistive technology should provide client-centered support, not only to the client, but also to the family, at every level of competency. The knowledge gained from this study is integral to helping professionals provide informed education and intervention to assist families in addressing barriers and promoting a child's communication and participation.

METHODS

This research study utilized a descriptive mixed-methods case study with a sequential exploratory design. A case study was chosen to describe the client's response to a new intervention (Nelson et al., 2017). A semi-structured interview was utilized to explore the parental perceptions gained from the educational training. In addition, a pretest and posttest were utilized to see if there was a change due to the intervention (educational training), according to the 13 factors on the Family Impact of Assistive Technology Scale for Augmentative and Alternative Communication (FIATS-AAC; Ryan et al., 2015; Ryan & Renzoni, 2015). This study was approved by Eastern Kentucky University Institutional Review Board, and standards and ethics were strictly adhered according to the Occupational Therapy Code of Ethics by the American Occupational Therapy Association (2020b).

Study Outline

This study used the following research process plan: (1) obtain parental signature on the consent to participate; (2) complete pretest and semi-structured interview at parent convenience; (3) have participant watch videos and use written materials via Google classroom; (4) participate in four interactive educational sessions; and (5) complete the posttest six weeks after the pretest and answer any remaining interview questions.

Participants

Recruitment for a convenience sample of participants utilized flyers, emails, texts, and posts on social media for parents who have nonverbal children. Specific criteria for inclusion in this study required that the participant's first language must be English and must be the parent/guardian of a child who uses an AAC device. The exclusion criteria consisted of non-English speaking families and parents of a child who used only low-tech communication devices.

One parent responded to the flyer, provided consent, and participated in the study. For participant protection, the parent was addressed as Laura and her daughter as Tammy. Laura reported basic demographic information, including that she was working on finishing her bachelor's degree and that she was the single parent of two children. Her older child is a female who is nonverbal, who was 8 years old at the time; her younger child is a female who was 6 years old at the time and verbal. Laura reported that her older child, Tammy, was diagnosed with Autism and Attention Deficit Hyperactivity Disorder. Tammy attended a self-contained classroom at a local elementary school. Tammy had received an AAC device two years prior to starting school from an outside agency. However, no individual or family training was provided until Tammy received initial training at school.

Materials

Although the purpose of this study was to evaluate the impact of parental education, the COVID-19 pandemic required the primary investigator to adapt the initial intervention activities into a virtual format. Therefore, the investigator created four modules (see Table 1) to help parents (a) understand how to use AAC; (b) learn how to perform basic troubleshooting of an AAC device; (c) understand how to implement

strategies; and (d) receive a list of meaningful activities that parents can do with their child using the device.

Table 1: Information in Google Classroom Modules

Module	Contents
Introduction	• Basic Navigation within the Google Classroom • Goals and Objectives of AAC parental training
Mechanics of the iPad	• Diagram of iPad • Troubleshooting tips for the iPad
Implementation	• Video on Myths and Realities of AAC • Video on how to be a good communication partner • Video on modeling with an AAC device • Video on implementation strategies • Video on how to make a conversation using AAC • Video on activities and how to use AAC within an activity
Low Tech AAC Boards	• Low tech communication boards for various iPad applications
Other Resources	• Emergency Communication bag • Activities using core vocabulary for Parents and Children • Myths and Realities of AAC

Within the implementation module, there were six videos which covered the following topics: (a) myths and realities of using AAC; (b) strategies on how to be a good communication partner; (c) instructions on how to model with the device; (d) implementation strategies modeled; (e) instructions on how to have a conversation using an AAC device; and (f) instructions on how to use activities with the AAC device. These modules were placed virtually in a Google Classroom. The virtual platform allowed for ease of access to the material, not only for parent convenience, but out of necessity once the pandemic required social isolation.

Study Details

This study began with a telephone interview for the pretest as well as a semi-structured interview (Appendix A) that lasted 30 minutes. Once the pretest interview was completed, the participant received an emailed invitation to join a Google Classroom titled AAC Training for Parents. Laura did not have access to a computer after work hours; therefore, she participated in the first intervention by telephone. Subsequent interventions took place face-to-face during her lunch breaks, each lasting approximately a half hour, per her request. Material from the Google Classroom was adapted, modified, and presented throughout each educational session.

During the first session, only modeling with the communication device and some myths/realities were covered, due to telephone limitations. The remaining interventions took place outside, while seated, observing social distancing guidelines. In the second intervention, modeling was reviewed, demonstrated, and practiced through role playing. In the third intervention, strategies for being a good communication partner were covered, along with the importance of having an emergency communication

bag. This bag is used in case of pandemic shutdowns (as was the case due to COVID-19), medical emergencies, severe weather, and other natural disasters. Recommended contents of the bag are an extra charger and battery pack for the communication device and low-tech communication boards that can be used anytime and anywhere. The fourth intervention utilized a meaningful activity with the entire family using the communication device. The final interview was completed face-to-face during Laura's lunch break, six weeks after the pretest. The remaining questions from the interview question guide (Appendix A) were covered during that visit.

Data Collection

Data was collected by the primary investigator via (a) a pretest and posttest, (b) semi-structured interview, (c) and the interventions.

Quantitative data was collected from the pretest and posttest, which utilized the Family Impact of Assistive Technology Scale for Augmentative and Alternative Communication Systems (FIATS-AAC, Ryan & Renzoni, 2015; Ryan et al., 2018). The FIATS-AAC was chosen for the outcome measures as it identified strengths and barriers on the impact of family roles and responsibilities through 13 factors (Ryan & Renzoni, 2015; Ryan et al., 2018). The FIAT-AAC results were used to determine what, if any, changes occurred since the initial interview and various interventions were provided.

For qualitative data, the primary investigator used a semi-structured interview, observations, and documentation. The interview took place throughout the research study using the formal question guide (see Appendix A) during the initial interview and the final interview. During the sessions, the investigator asked questions such as, "Did you use the communication device this past week?" and "How did it go?" Two interventions were audio recorded with parent permission and transcribed verbatim by the investigator.

The investigator utilized reflexive notes and transcripts of descriptive sessions to code, categorize, and find the themes that emerged through the parental education. This study also utilized an audit trail and reflexive journaling to enhance the rigor and trustworthiness (Stanley, 2014).

Data Analysis

Quantitative data analysis consisted of the standard deviations in each of the 13 factors of the FIATS-AAC from the pretest and posttest. The FIATS-AAC statistical data were analyzed using the worksheet that accompanied the protocol (see Table 2) to determine whether there was a notable change in any of the 13 dimensions beyond measurement error (Kron et al., 2018; Ryan et al., 2015; Ryan et al., 2018).

Descriptive thematic analysis was used by the primary investigator on the data obtained by the semi-structured interview. This consisted of the transcribed data that was coded and categorized by the primary investigator. Thematic analysis was used to identify themes and utilized participant's words to keep the richness of the participant's perspectives (Stanley, 2014).

Table 2: FIATS-AAC Results

Dimension	Pretest	Post-test	Difference	Change with 95% CL
Total FIATS-AAC	49.9	52.2	2.3	No
Behavior	4.5	4.3	-0.2	No
Care Giver Relief	4.6	3.3	-1.2	Yes
Contentment	4.9	5.4	0.6	No
Doing Activities	6.4	6.4	0.0	No
Education	5.1	5.6	0.4	No
Energy	4.2	4.2	0.0	No
Face-to-face Communication	2.0	3.5	1.5	Yes
Family Roles	3.0	2.9	-0.1	No
finances	3.0	1.6	-1.4	No
security	2.3	3.4	1.1	Yes
self-reliance	4.9	5.3	0.4	No
social versatility	2.3	3.9	1.6	Yes
supervision	2.9	2.4	-0.4	No

RESULTS

Quantitative Results

Results from the Family Impact of Assistive Technology Scale-Augmentative and Alternative Communication (FIATS-AAC, Ryan & Renzoni, 2015) questionnaire provided data regarding 13 factors of family strengths and barriers (Table 2) from the pretest and posttest. The FIATS-AAC results indicated that remarkable changes occurred in the family factors of caregiver relief and security, and in the child factors of face-to-face communication and social versatility. Table 2 presents the family and child factors, as well as the pretest and posttest score the parent gave for each factor. It should be noted that within these noteworthy changes, (a) face-to-face communication, (b) social versatility, and (c) security were improved, while (d) caregiver relief had a notable decrease.

Qualitative Results

Fourteen codes were analyzed, and the following three categories emerged: family history of device use, family ability to use the AAC, and meaningful activities used to incorporate AAC. Two themes developed from these categories (a) a mother's reluctance, discovery, and celebration, and (b) increased opportunities and increased family interaction.

A Mother's Reluctance, Discovery, and Celebration

Although Laura was interested in the educational training, as evidenced by her consent to participate, she was reluctant. For instance, after the initial interview, the investigator prompted the parent to join the Google Classroom multiple times. The parent rescheduled twice, and at the time of the first intervention, Laura still had not logged into the site. At the newly appointed time, Laura called the investigator instead

of joining virtually; therefore, Laura was not able to view any of the videos or resources provided prior to the intervention.

During the first intervention, the investigator explained modeling and the importance of everyone in the family using the device to make it a more normal way to communicate. The parent exclaimed, “I’d never thought of it like that before!” Laura reported later that learning to have everyone in the family use the device was a turning point for her. However, it took two more weeks before the device was implemented. Laura excitedly started off the third meeting as she wanted to recount that she had discovered how she was able to use the AAC device and Tammy’s reaction to it. Laura used the device for the first time as she typed out the message, “Tammy, clean up.” Laura then demonstrated how Tammy’s eyes opened wide with surprise, and then she [Tammy] laughed. Laura was astonished when Tammy was able to show her where everything was on the device. Laura said, “I’m like, can she handle this? and she showed me where everything was. I said, ‘Where’s the keyboard, Tammy?’ And she knew exactly what I was talking about, too.”

By the end of six weeks, Laura demonstrated her trust in the investigator as she successfully implemented strategies and saw the flourishing results. Once Laura started using the device, along with other family members, Tammy ceased fiddling with the device and started using it for communication. Laura was stunned as she said, “She doesn’t think it’s a toy anymore...now, she’s fine with it.” Laura celebrated the family’s newfound sense of connectedness as the communication and engagement increased among the family members.

Increased Opportunities, Increased Family Interaction

As Laura and her family used the communication device, not only did communication increase, but interactions were more meaningful to every family member, reported Laura. One example of the changed family dynamics came as the investigator orchestrated a modified version of the game Hedbanz. To play, each player places a card on their headband without looking at it, displaying it so that everyone else can see it. Then, each player had to use the communication device to ask questions in order to figure out what is on their own card. Playing the game taught each family member where items of food, animals, colors, and transportation were located on the device. Each player used the device to ask questions like, “Am I a food? Am I a fruit? Am I red?” Once the player decided what the card must be, the AAC device was used to say, “I am an apple.” When it was Tammy’s turn, she took her card down, looked at it, and then typed “I am a frog” and handed the device to her mom. Watching Tammy, Laura’s eyes got big as she exclaimed, “You see Tammy, she’s a cheater. I love it!” For the first time, this family engaged in a leisure activity filled with giggles and laughter as they interacted with one another. Each family member used the AAC device to ask questions until the item on the card was discovered. Laura commented later that she enjoyed seeing everyone participate and seeing “everyone’s personality come out.” Laura exclaimed, “I loved it!” It was inspiring for Laura to see her children interacting and sharing in the same leisure activity.

Once Laura implemented some of the strategies she learned from the educational intervention, such as modeling and waiting for a response, Laura appeared amazed as she watched her children interact in a

meaningful activity. She further explained, “We can all use it. It don’t [sic] make Tammy singled out. It is normal. That was big to me. Loved it.” The family dynamics changed for the better as each family member was included, socially engaged, and accepted, creating improved occupational identity and performance for all.

DISCUSSION

The purpose of this research was to evaluate the impact of parent training with targeted parental goals for their nonverbal child who uses an AAC device. This parent’s objective was to increase Tammy’s communication exchanges with more people and in more environments. Despite challenges and modifications required by COVID-19, this goal was successfully addressed as Laura watched her children engage and participate in meaningful activities. Research has found that parental involvement is necessary to help integrate a communication device, creating more opportunities for social engagement and interactions (Copley & Ziviani, 2004).

The results of FIATS-AAC indicated four noteworthy changes after a short-term use of the communication device. The first family factor that increased was security. Laura may have become more confident and secure for multiple reasons. First, Laura learned to trust the investigator. The trust was earned as the investigator utilized Laura’s narrative and addressed her questions and concerns. Once that occurred, Laura was able to learn about the AAC device, achieve operational competency, and gain acceptance for using the communication device. Acceptance of the device resonated with Laura when she saw the power of using the communication device with Tammy, as they had several meaningful exchanges. Third, Laura was more secure once she received a low-tech backup communication device, making her more prepared for unexpected emergencies. Laura’s acceptance and investment in the device supports multiple studies that found that buy-in is necessary (Lorah, 2016) and the lack of family and user support can become a constraint if not addressed (Kent-Walsh & Light, 2003; Light & McNaughton, 2014; McNaughton et al., 2008).

The second family factor, caregiver relief, became a significant barrier as Laura reported that she was more stressed in the past six weeks due to the current health pandemic. COVID-19 precautions led to the decrease of Tammy’s Applied Behavior Analysis services, and Laura was forced to miss work due to lack of childcare during the increased number of virtual school days. These results validate previous studies that parent barriers and family priorities must be addressed, as reducing even one barrier has a positive effect on social communication (Moorcroft et al., 2019; Therrien & Light, 2018).

The third and fourth remarkable changes in the FIATS-AAC occurred in the child factors of face-to-face communication and social versatility. These gains were associated with the use of the communication device and the training (Ryan et al., 2015). Laura learned how to use the device during meaningful activities, which allowed her to see her child’s personality emerge. For the first time, according to Laura, Tammy engaged in more communication with her sibling and with her mom. Copley and Ziviani (2004) found that parental involvement was necessary to help integrate the AAC device by creating communicative opportunities to engage in various activities. Family games provided a fun way for the

family to interact and increase communicative opportunities with the AAC device. People need to engage with others in meaningful activities, as it creates a sense of belonging and connectedness to one another (Kantartzis, 2019; Stanley, 2014).

OUTCOMES AND BENEFITS

Although the COVID-19 pandemic changed multiple aspects of this study, there were several impactful benefits and outcomes. Kantartzis (2019) and Francis et al. (2012) found that meaningful interactions help create that sense of belonging and improve the sense of self. Tammy's communication increased, and the family bonding increased, as a result of Laura incorporating the AAC device into family activities. The parental training provided Laura with the knowledge of AAC and how to model and naturally create communicative opportunities with the device.

Bailey et al. (2006) found that parents want to know about the specifics of working a communication device, and they need implementation strategies to utilize the device at home. Therefore, trainings from the school-based assistive technology team evolved from device management to implementing the device in various activities, making the training more meaningful and engaging. Parent education was needed to increase the number of communication opportunities for Tammy at home and in the community. The parent/family narrative and the initial FIATS-AAC assessment results provided an individualized intervention. Laura not only learned about the device, but she learned how to be a competent communication partner (Light & McNaughton, 2014). She also used various strategies to promote socialization and engagement through activities (Bailey et al., 2006).

Limitations

There were some limitations throughout this research study. One limitation was the lack of parent access to a computer after work hours. This made it impossible for the parent to access the virtual training. Therefore, the study was adapted for the parent as they completed the first intervention via telephone call; the following interventions were face-to-face. Another limitation was COVID-19, as the pandemic made contacting and recruiting parents difficult because isolation was encouraged, and group gatherings were limited to no more than three people. In addition, the fall school start was delayed, coinciding with the beginning of the study. The investigator shifted focus to see only one parent to provide the education. Single case study results need to be generalized with caution.

Implications

Implications from this study include, but are not limited to, the following: Explicit communication is necessary between community-based therapies, school-based therapies, and families to help prevent device abandonment. Another implication includes school personnel collaborating with parents/guardians when it comes to providing and/or adapting trainings during times of social isolation and virtual instruction. Teachers and parents will see an increase in acceptance and increased implementation of the AAC device after working with parents and addressing their concerns. Lastly, this study provided evidence

that an individualized, family-centered approach to intervention improved occupational performance for both the parent and the child.

Future research is needed, beginning with looking at the effectiveness of implementation of AAC using occupational performance as a measure with a larger sample for a longer length of time than the six weeks allotted in this study. Another area of focus would be evaluating the effectiveness of schoolwork utilizing the AAC device and seeing if there's a difference in usage between virtual class time and face-to-face class. Lastly, further research should be done on policy and procedures regarding parental education that is needed to support evidence-based practice in the educational setting.

CONCLUSION

Many lessons were learned during this COVID-19 pandemic. The most important lesson is that we must continue to be flexible and adaptable. This study evolved from a proposed integrated multifamily intervention to an all-virtual parental education, and then to a face-to-face intervention program. However, it evolved into an individualized parent training. It changed the dynamics of one family for the better when everyone had a “say” in all the activities. No matter the circumstances, we must remember to meet parents, teachers, clients, students, and children where they are. Actively listening to concerns and using family-centered goals will help families overcome some of their barriers. Family-centered interventions can equip parents with strategies to help their children who use AAC effectively communicate, engage, and participate in all their life roles.

DECLARATIONS

This content is solely the responsibility of the author(s) and does not necessarily represent the official views of ATIA. No financial disclosures and no non-financial disclosures were reported by the author(s) of this paper.

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APPENDIX A

Semi Structured Interview Questions Guide

1. What's the parent's educational background?
2. What's your child's formal diagnosis?
3. What age is your child? Siblings?
4. What's the age equivalent of your child's comprehension?
5. What's the age equivalent of your child's expressive language?
6. What's your child's most common educational setting?
7. What's your experience with augmentative and alternative communication?
8. How often is the communication device used at home?
9. What functional outcomes would you like to see with the communication device?
10. What routines or activities does your child use the device for?
11. What kind of training have you received in the past?
12. When did your child first receive her AAC device?
13. What are some of your child's favorite activities?
14. How do you think your child's life routines will change?
15. What do you think of this training experience?

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Voices from the Field

A Journey to Build a Community of Practice During the COVID-19 Pandemic

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ABSTRACT

As the COVID-19 pandemic emerged as a global health threat, Assistive Technology (AT) professionals and educators suddenly found that their work and professional development shifted to virtual spaces. Communities of Practice began to develop or adapt to focus on to aid professionals who suddenly had to change the way they supported users of. Through social media and via online video conferencing platforms such as Zoom, these communities focused on how to provide assistive technology services in the virtual world and have continued to be rich resources as the pandemic has continued to evolve and change how services are delivered.

Keywords: COVID-19, school closures, community of practice, virtual learning, assistive technology

A JOURNEY TO BUILD A COMMUNITY OF PRACTICE DURING THE COVID -19 PANDEMIC

A Community of Practice (CoP) has been defined as “a group of people who share a common concern, a set of problems, or an interest in a topic and who come together to fulfill both individual and group goals” (Edmonton Regional Learning Consortium, 2016). Wenger-Trayner and Wenger-Trayner (2015) emphasize CoPs as “groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly.” They explain that learning can be the primary reason that a CoP group comes together or can result from the members’ collaboration. Professional CoPs consist of individuals who engage in critical inquiry and reflection in a collaborative fashion in order to share best practices and create new knowledge to support their shared area of professional practice. According to Wojick (2015), within a CoP it is through this inquiry and reflection “that members develop, contribute to, and refine the corpus of knowledge for a given practice and, potentially, impact that practice” (p. 205).

As COVID-19 emerged as a global health threat and ultimately a global pandemic in early 2020, the need for human connection became increasingly urgent to many individuals. This held true not just for personal connections but also for professional collaborations. AT professionals quickly found the need to share ideas, troubleshoot unprecedented challenges, and continue to learn and grow without face-to-face professional development. This article examines how the authors created, joined, and expanded virtual CoPs focused on assistive technology.

Personal Statement

The authors of this article each experienced the pandemic through different lenses. Sarah Gregory is a school-based speech-language pathologist and assistive technology provider. She saw the day-to-day impact that school closures and the pandemic were having on the learners that she supported. Beth Poss, the Director of Educational Programs for LessonPix (a tool for creating visual supports), as well as a private consultant and trainer, most often experienced the pandemic through the lens of what could be done to support the adults providing educational and assistive technology services to students, including developing features that supported virtual learning with existing tools already in use. Mike Marotta is the Director of the state Assistive Technology Act of New Jersey, and experienced the pandemic through the lens of providing support to community stakeholders to ensure that assistive technology devices and services are effectively considered for individuals with disabilities. In addition, Mike Marotta is the co-moderator of the weekly #ATchat on Twitter. All the authors, however, sought out ways to connect with other assistive technology professionals and educators, both to give assistance and to learn from what others were doing.

Target Audience and Relevance

While this article is focused primarily on the impact that school closings had on the delivery of assistive technology services to students, the development of CoPs during the pandemic was not restricted to school-based professionals providing assistive technology services. The observations and reflections that follow may be relevant to many AT professionals, who found the sudden need to adapt how they

supported individuals who use assistive technology and looked to their AT colleagues for support on this unknown journey.

AT PROFESSIONALS AND CoP

In the field of assistive technology, the idea of CoPs is not new. The Quality Indicators for Assistive Technology (QIAT) listserv has served as a CoP since its inception in 1998 for its more than 3000 members, fostering collaboration among those providing AT services in a variety of settings (Edyburn 2005; Wojcik 2015). These have also evolved organically through repeated meetups at conferences, via social media such as #ATchat on Twitter, and through ongoing casual and organized collaborations among professionals such as ARPD, the Quality Indicators for Assistive Technology (QIAT) listserv, the Maryland Assistive Technology Network, and Indiana's Promoting Achievement through Technology and Instruction for All Students (PATINS) group. Given the wide range of professionals within the field, including Speech-Language Pathologists, Occupational Therapists, Teachers of the Visually Impaired, Special Educators, Physical Therapists, and Rehabilitation Engineers, those supporting assistive technology benefit from making connections with others with the same goals but differing training and expertise. And whereas some traditional communities of practice may take place within a specific physical space, such as a conference or meeting, virtual communities of practice allow individuals to connect online, reducing the professional isolation experienced by those who might be limited in their contact with others in their field. (Wojcik, 2015). During the pandemic, with schools almost universally moving to a virtual environment in March 2020, virtual CoPs focused on ensuring that the delivery of high-quality virtual assistive technology services could evolve.

Almost immediately, an existing, informal CoP, the #ATchat Twitter community, began to focus on the impact of the pandemic on access to the curriculum in virtual learning environments. The topic for #ATchat on 3/18/2020 was COVID-19, School Closures, and AT. One of the first questions asked during this chat was, "What type of plan is your school initiating to address #COVID19 and distance instruction? How has access for all students factored into the conversation?" (Marotta, 2020). The responses varied from, "No - no plans for learning during these three weeks. North of Boston. #ATchat" (Janowski, 2020) to "I feel like there are so many things to try to get ready all at once. Everyone is scrambling to get something up and ready to go. We are hoping to have a solid system up in the next couple of weeks. #ATchat" (Frost, 2020). As we know, school closures went on for much longer than anyone anticipated, and the response to the needs of students and others using assistive technology became an ongoing theme in #ATchat. To the authors, the weekly #ATchats become more meaningful than past conversations that were important but not immediately critical discussions. Participants shared that #ATchat became a lifeline as they were facing ever-evolving challenges in the provision of assistive technology supports and services.

Throughout the next 18 months, topics for #ATchat included *Talking Distance Learning Supports to AT Post COVID: The Good, the Bad, and the Ugly*. While not all topics were exclusively geared toward the response to the pandemic, many posts and responses ultimately touched on the ways that distance- and hybrid-learning spurred changes to how technology supports diverse learners and the ever-increasing

need to have adaptable, accessible technology available for all learners. The #ATchat community became a place to not only find information but to process the ongoing impact on AT professionals and educators as well. On 6/2/21, on the topic of Reflection to Action, @jschubring responded to the question, “Q1 In our busy lives, how do you find time for reflection? How often do you reflect on ur practice? #ATchat” (Janowski, 2021) with, “A1: My time to reflect is always in the car between appointments. I think that's why I struggled during virtual learning. That time was taken away and I was overscheduled. #ATchat” (Schubring, 2021). At press time, #ATchat continues to address the challenges of those who use and those who support users of assistive technology in the ever-evolving new normal that has followed the initial wave of COVID-19.

At the same time that #ATchat began to focus on the pandemic impact on assistive technology service delivery in education, The Richard West Assistive Technology Advocacy Center organized an AT Town Hall meeting on the topic of COVID-19 School Closures and AT. What was originally intended to be a short-term set of town halls to discuss how to respond to school closures, instead evolved into an ongoing weekly live virtual meeting driven by the participants' needs at the moment. This shift has been captured in the shift of subtitles of the weekly conversations. In the beginning, the subtitle was *COVID 19, School Closures and AT: What do we do?*, highlighting the immediacy of the need to quickly troubleshoot and solve problems. As time progressed, the subtitle shifted to *AT in Education: How do we embrace change and adapt?* to reflect the new normal that professionals are facing with providing assistive technology services in education.

With anywhere from 5 to 30 participants weekly, with many regulars returning week after week, the AT Town Hall became an additional virtual space for those with an interest in assistive technology to meet, vent, and discuss solutions to the barriers that the pandemic was presenting, specifically in educational settings. Not only did the AT Town Hall support individual professionals looking to connect, but school-based teams of professionals used the Town Hall time to gather and learn together while improving their own service delivery models. As the pandemic continues to impact the delivery of assistive technology services within the school setting, the contributors to the AT Town Hall strive to evolve to meet the needs of their community. Where this activity was started by one organization as a direct response to the pandemic, the AT Town Hall belongs to the community now, and community members will mold this into the learning experience they need to be better as professionals.

Following the success of the AT Town Hall, the staff of the Richard West Assistive Technology Advocacy Center has adapted this virtual CoP model for a new endeavor. In order to provide support to professionals providing assistive technology services to individuals with disabilities (both children and adults) in the community, the Makers Roundtable was born through a partnership with Scout Merry from the Missouri Assistive Technology Act project (at.mo.gov). This monthly CoP provides a platform for professionals to highlight unique assistive technology solutions created for individuals, as well as ask questions of the group. In fact, a highlight of the first Makers Roundtable was troubleshooting a solution to enable a young person with physical disabilities to independently bait a hook with a worm in order to go fishing. After lots of discussion in the group and brainstorming, a 3D printed model was created by Kip Lewis from Empower Abilities (empowerabilities.org) and after several iterations, success (see Figure 1)!

Figure 1: 3-D Printed Model for Baiting a Fishhook (created by Kip Lewis)



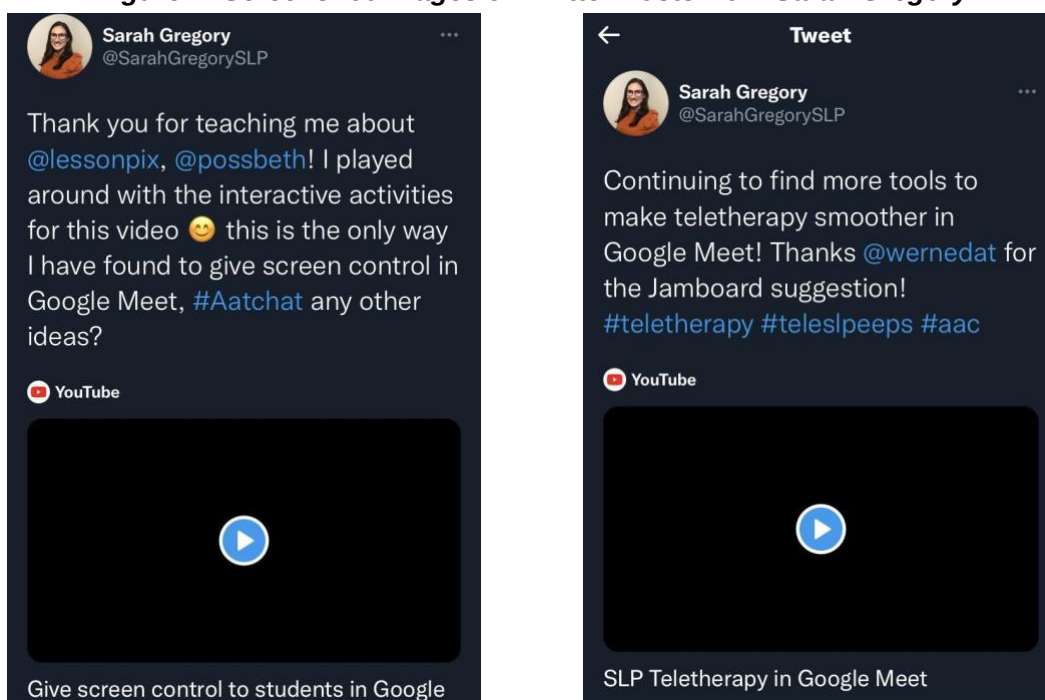
By utilizing a variety of communication platforms (#ATchat on Twitter; Maker Roundtable and AT Town Hall on Zoom), these CoPs were able to reach different professionals by tapping into different learning styles. Throughout the pandemic, the independent CoPs of #ATchat and the AT Town Hall have become more intertwined with comments/topics of conversation drifting from one activity to the other. These then became further promoted on varied platforms including Instagram, Facebook, and the QIAT listserv, where individuals in need of a CoP were able to learn how to join.

A common theme that arose among formal and informal CoPs was the generous sharing of ideas. As school buildings suddenly closed in March 2020, professionals who had experience with telepractice and virtual learning began generously sharing strategies, ideas, and resources on social media, such as the “AAC and Telepractice/Tele-Ed” group on Facebook. The resource sharing seemed to encourage even more support, collaboration, and innovation of digital strategies. These groups on social media also allowed educators to connect and learn from people from all over the globe. While this may have been possible before, networks and collaboration grew as evidenced by an increased number of practitioners actively participating in these social networks.

Many educators began navigating virtual learning for the first time, without preparation, in the spring of 2020. We had to learn how to log onto a video conferencing platform, find digital activities, and engage learners through a computer screen. As this sudden transition began, Sarah Gregory heard many of her school district colleagues struggling to get started with these new tools. Unfamiliar with Google Meet, she sat down to teach herself how to create a meeting link for a student and how to engage them in a virtual speech therapy session. Once she learned the basics, she screen-recorded a “how-to” video to send to her colleagues who had asked for help. As fellow educators shared how helpful the video tutorials were, she added them to YouTube and shared them in the Facebook groups where she had already received support in getting started with teletherapy.

Sarah slowly grew her technology and teletherapy skills through trial and error as well as the strong CoP network she had developed through #ATchat and the weekly AT Town Hall meetings. As she learned about technology tools, she created videos to pay forward the support she had been given. She took the support and ideas from her CoP colleagues and mentors, adapted them to be used in AAC teletherapy, and then shared them on social media platforms, as seen in the two tweets in Figure 2 with @possbeth and @wernedat (April 2020).

Figure 2: Screenshot Images of Twitter Posts from Sarah Gregory



Note: Text reads, "Thank you for teaching me about @lessonpix, @possbeth! I played around with the interactive activities for this video. This is the only way I have found to give screen control in Google Meet, #ATchat any other ideas?" and "Continuing to find more tools to make teletherapy smoother in Google Meet! Thanks @wernedat for the Jamboard suggestion! #teletherapy #teleslpeeps #aac"

As virtual learning continued, Sarah connected with AT colleagues who were similarly struggling with teaching themselves to become teletherapists and tele-educators. When questions came in, she reached out to her network and then created YouTube videos to share strategies more widely. Sarah focused on the fact that we do not have to be experts in order to support our students through a computer screen; we just had to focus on their engagement and slowly add tools to our toolbox.

OUTCOMES AND BENEFITS

The COVID-19 pandemic highlighted the human need we all have to connect with others, particularly around topics of common interest. In the world of assistive technology, it also created a very real need to find collaborators as problem-solvers for new barriers facing not only individuals who require assistive

technology, but also professionals looking to help them without being able to work face-to-face with these individuals.

CoPs, both brand new, such as the AT Town Hall and the Makers Roundtable, as well as existing communities, such as #ATchat, became critical resources and support for AT professionals. While these CoPs grew during the pandemic, there is clear evidence from the continued participation of both existing and newly added members that these CoPs will have ongoing benefits. Not only do AT professionals face the continuing challenges posed by COVID, but there is a consensus from many in the community that we should not go back to the way we served learners prior to the pandemic.

Virtual learning forced educators to consider how to make instruction and educational resources compatible with technology. There is the hope that lessons learned during online schooling will persist as learners and educators return to brick-and-mortar buildings. @SpedTechMia stated on June 9, 2021, “Reflecting on what worked from this year and what to keep add- like keeping some remote PD because of easier access for some people #Atchat” (Mia, 2021). @hillaryatp responded “We are keeping virtual IEP meetings- the flexibility for parents has been great and it keeps us focused. We can offer both options. #Atchat.” (Goldthwaite-Fowles, 2021). @emilydiazslp added, “I learned how to connect more with parents. Definitely need to grow in the area of parent training & buy-in! #Atchat” (Diaz, 2021).

LESSONS LEARNED

The COVID-19 pandemic propelled many in the field of Assistive Technology to become savvy with video conferencing tools, as well as social media tools such as YouTube, Twitter, and Instagram. At the same time, both new and well-established CoPs began targeted discussions and professional learning opportunities addressing the needs of both AT users and AT professionals in the context of the pandemic and virtual services. Even as the impact of the pandemic shifted, and schools and therapy practices returned to in-person learning, virtual CoPs continue to flourish, as the need for support and connection has not diminished, as evidenced by continued participation of AT professionals in weekly Town Hall virtual meetings, Twitter chats, and other interactive virtual and hybrid events.

CONCLUSION

When the COVID-19 pandemic began, AT professionals and educators were thrown into virtual learning and services with little to no preparation. As individuals struggled to figure out what best practices should be, AT professionals came together through new and existing CoPs to ask for help, share ideas, and serve as support systems. In an early AT Town Hall meeting, one of the participants, Elisa Wern, paraphrased the movie *Frozen II*, stating that right now “we just need to do the next right thing.” In the case of the sudden shift to virtual learning, “the next right thing” was becoming comfortable with the technology needed to connect with a student/client. Then, it was learning some new digital activities that could engage them, or learning how to incorporate their AAC system into a virtual meeting. We realized that we did not need to know it all, but finding “the next right thing” required us to rely on our network that

continued to grow as we became more comfortable with the digital world. One of the true silver linings of the pandemic are the CoPs who supported their participants through the most difficult of times and generously continued to share resources and knowledge to support each other as well as the learners on the other side of the screen.

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Voices from the Field

The Assistive Technology Services Experience of the 2020-2021 School Year

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ABSTRACT

Assistive Technology Services (ATS) is the central group of itinerants and resource staff directly working with students and schools to provide assistive technology accommodations within the Fairfax County Public School (FCPS) system in Virginia. When schools closed in March 2020 because of the COVID-19 pandemic, the group was required to make immediate, yet impactful adjustments to its daily operation. ATS worked within the purview of the evolving technology climate that was gradually occurring with the district's FCPSOn technology initiative. This initiative went from a yearly rollout to placing computer devices in all students' hands in the scope of a few months. Assistive Technology Services was able to collaborate with diverse groups in the school system, assist in safely providing access to technology devices, assess specific student assistive technology needs, and develop effective training practices within a new virtual learning environment. As concurrent learning emerged and students returned to school in January 2021, Assistive Technology Services adapted its standard operating procedures to that of the "new normal" that will continue to evolve not only as the pandemic subsides, but as emerging technologies continue to change the face of education.

Keywords: assistive technology, inclusive technology, assistive technology services, virtual instruction, assistive technology assessment

THE ASSISTIVE TECHNOLOGY SERVICES EXPERIENCE OF THE 2020-2021 SCHOOL YEAR

Fairfax County Public Schools (FCPS) is a large school district with nearly 200 school locations serving approximately 188,00 students while staffing nearly 25,000 employees (Fairfax County Public Schools, 2021). Assistive Technology Services (ATS) is the central group of itinerants and resource staff directly working with students and schools to provide assistive technology accommodations within the Fairfax County Public School system in Virginia. Thirty-two AT Coaches, two Assistive Technology Specialists, and a manager comprise the personnel supporting assistive technology use in a very diverse school district supporting over 200 schools and special education centers. ATS provides AT service by directly evaluating individual students for required classroom AT accommodations, training individual students and teachers on AT use, participating in IEP meetings, coaching large numbers of staff on the use of inclusive technology benefiting all student populations and are active members of school technology implementation teams. An Assistive Technology coach may regularly visit six to twelve schools in a two-week time period, directly supporting 100 students with IEP assistive technology accommodations and continuously evaluating new students who may or may not require AT placements.

The FCPS assistive technology (AT) program has been in place since 1989, and since that time, it has become accustomed to supporting students with disabilities in live classroom settings. By strange circumstance, a monthly live staff meeting was held on Thursday, March 12, 2020, and nearly all ATS staff were in attendance. There were questions and concerns about possible school closures. The school district fully closed the next day and did not fully reopen until late summer of 2021.

Personal Statement

Three people are acting as this voice from the field in this document. Jeff Sisk is the Manager of Assistive Technology Services. Jennifer Carr is an Assistive Technology Educational Specialist and Meaghan Tracy is an Assistive Technology Integration Specialist. The three of us have had experience as Assistive Technology Coaches in Fairfax County Public Schools and have diverse backgrounds as teachers and itinerants. Since more than one person is contributing, we will use a first person, plural perspective for our collective voice. Our aim is that this voice is not necessarily that of Jeff, Jennifer, and Meaghan alone, but all the Assistive Technology Services staff who continue to support students in FCPS in virtual, concurrent and evolving live settings.

Target Audience & Relevance

We will provide an account of administrative approaches to delivering AT within FCPS as changes occur within the 2020–2021 school year and continue as we move into following phases. This perspective will examine the assistive technology program as a whole and will recount decision making processes as they occurred over time. It is our hope that anyone who hears our story will be able to use our experience to enhance their own practices.

ADAPTING TO STUDENT ASSISTIVE TECHNOLOGY WITH ABRUPT, LONG TERM SCHOOL CLOSURES

The last time all Assistive Technology Services staff were in the same room together, we were already planning, guiding, and implementing change in our daily practices. Both internal and external influences were driving transformation within our field. Of those influences, two stood out: the internal “FCPSOn” initiative and the continuing advancement of traditional assistive technologies becoming more readily available to more groups of students. Our live meeting on Thursday March 12, 2020 included continued conversation around these topics. When schools closed the following day, those long-term trends did not simply vanish, but wound up becoming a part of our strategy to adjust to the immediate and drastically different student learning environment.

Assistive Technology and the FCPSOn Initiative

Assistive Technology Services was excited for the FCPSOn initiative when it began in the early 2010s. It started when Fairfax County received Virginia state grant funding for 1:1 computing for select groups of high school students. This trial group eventually expanded to include multiple grade levels across all high schools in FCPS and moved into middle school grades over several years. FCPS general instructional services drove the initiative, and it is not simply described as a 1:1 computing environment, but “...a transformation of learning for students and educators. At its core, it provides students with equitable access to meaningful learning experiences and technology to support their learning” (Fairfax County Public Schools, 2021). The FCPSOn initiative isn’t described simply as students having their own computers, but an instructional transformation capable of improved learning for diverse groups of students. ATS could not have agreed more.

Inclusive Technology in the FCPSOn Initiative

An example of specific change in instructional practice due to the FCPSOn initiative is found in the use of inclusive technology tools to the benefit of all learners. Inclusive technology implementation builds on Universal Design practices where students can self-select appropriate tools that customize their personal learning experience. Prior to the FCPSOn rollout, individual students may or may not have had immediate access to a computer. As every student in FCPS received a computer in the fall of 2020, all students, teachers, and families had consistent access to a broad set of technology accommodations. Voice typing, word prediction, text-to-speech, electronic graphic organizers and notetaking tools were a few examples of what was readily available to all in the district. ATS was thrilled to have a wide variety of technology tools for students in a single computing device and took an active role promoting the FCPSOn initiative. This also further supported emerging technology trends that were growing within the field of assistive technology itself.

While students continued to receive more and more access to computing devices, technology vendors also provided expanded access to software tools that may have once been considered more unique as assistive technologies. An example of this is word prediction technology, also known as predictive typing. It was not too many years ago when word prediction was specifically installed as a unique add-on to a

computing device, requiring a separate purchase and continued customization and integration into other software tools. Now, predictive typing can be found automatically built into many devices, such as text-typing on a mobile phone. As an alternative to word prediction and/or predictive typing, other writing tools, such as voice typing, became a cost-free and easily accessible tool for many students to use. Access to tools such as this is an example of assistive technology acting as “inclusive technology,” utilizing Universal Design for Learning concepts to allow students more customized access to diverse technology tools. In the larger picture, more students than ever had access to technology devices and tools to support their learning in varied classroom environments. These trends cast a framework to the adjustments we were soon to make with school closures after Friday, March 13, 2020.

The Growth in Technology Access with School Closures

A new and unexpected instructional landscape immediately emerged when students were no longer able to physically enter classrooms. FCPS administration immediately began planning for long-term building closures and virtual student instruction. The FCPS On initiative went from a multiyear project to rapid purchasing and deployment of computers for students accessing virtual instruction. Teleconferencing and modes of virtual instruction were explored as they were being delivered to students in their homes. With physical classrooms closed, FCPS schools had to determine how IEP goals would continue to be met in virtual environments. “Temporary Learning Plans” were created by Individualized Education Plan (IEP) teams to adjust prior student IEP goals so that they might be met by students in virtual settings. Temporary learning plans provided a short-term solution for adapting IEP goals for the spring of 2020 with sudden school closures until IEPs could be adjusted for the 2020–2021 school year. AT staff collaborated with IEP teams to ensure that required AT accommodations were considered. Many adjustments needed to be made quickly in FCPS at this time, and the demand for rapid change provided context to the planning and decision-making processes surrounding student assistive technology placements.

What Role Did AT Teams Play in Supporting Students and Families During Periods of Remote Instruction and Engaging in Needs Assessment?

2019-2020 School Year Adjustments

Assistive Technology Services quickly recognized the need to maximize communication to families participating in virtual instruction during school closures. With the sudden change in the landscape, we did not want to change our operational best practices for implementing assistive technology accommodations simply because the instructional setting was different. In April 2020, all students were in position to receive their own computing devices issued through their school. This presented a great opportunity to further convey our ongoing promotion of inclusive technology tools and strategies available to individuals. We had been providing live, school-based training on this subject throughout the 19–20 school year. We then needed to better promote our message to the public.

Inclusive technology training was a training focus for individual Assistive Technology coaches in the fall of 2019. Most had met with special education departments during staff meetings and spoke to the topic. AT coaches also provided training to schools through our ATS Teacher Outreach Program Support

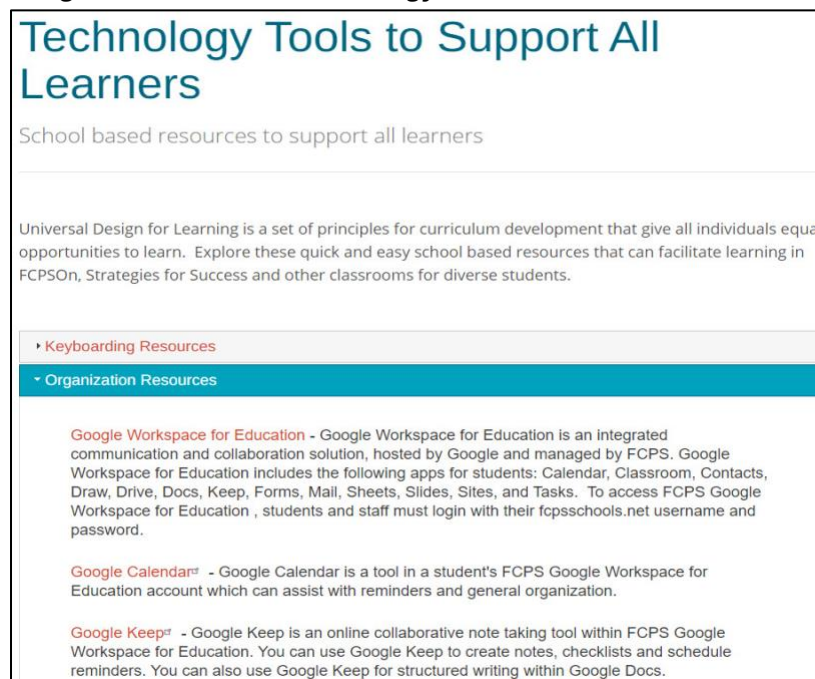
(TOPS) program. The TOPS program identified outstanding classroom teachers who provided leadership in implementing assistive technology accommodations to students. Schools were receiving live, centrally based training on varied AT topics in live settings prior to March 12, 2020 from respective AT coaches. TOPS training topics were decided based on trending assistive technology tools and strategies, and participating classroom teachers assumed a lead role in further training and classroom integration. We had constructed a strong resource base of training materials and strategies for using inclusive technology tools in live settings. Assistive Technology Services did not want to lose the benefits that live training or the TOPS program provided to schools. One of our first ideas regarding AT outreach to families in virtual learning environments was to provide these same resources to them as openly as possible. It was decided that the best vehicle to do so was a traditional one, our public website.

Assistive Technology Services staff held their first virtual staff meeting in April of 2020. There were obvious concerns as to how our work for supporting students would continue to function over an uncertain range of time. When we first asked AT coaches to expand training resources to be presented publicly in asynchronous, virtual settings, there was a positive reaction overall. This built on work started prior to closures and fell in line with emerging technology trends. Assistive Technology Services had used its public website to feature some of its inclusive technology tools and strategies. School closures required this communication environment to be expanded. ATS staff worked to further develop electronic resource items, such as video, through desktop screen capture, downloadable document files, and links to external resources that technology developers had to offer. New public-facing webpages were created and more detail was added to less descriptive ones. Focus was provided on common areas of student need, such as executive functioning, technology tools to support students with reading difficulties, technology tools to support writing, augmentative communication strategies, and technology supports for low-incidence curriculum. A few months past initial school closures, we greatly expanded our electronic resource base and communicated to families that there was a plethora of AT materials that were available to them. Others outside of our district could also view FCPS AT strategies and resources and we quickly received positive feedback from diverse groups. The public communication message constructed by ATS staff was able to help meet the needs of many families supporting assistive technology placements in home settings. The continuation of our publication of these types of resources was provided through the duration of pandemic closures and will continue to be a valued resource when buildings fully reopen (see Figure 1).

In addition to a broad outreach of inclusive technology tools available to all students, especially now that they all were in possession of computing devices, ATS worked to ensure that students who required specific assistive technology tools continued to have access to them in virtual settings. Many of the evaluations for using these assistive tools were initially determined by IEP teams in live classroom environments. That live landscape of instruction had obviously changed. Fairfax County Public Schools did not implement full IEPs for the 2020 school year from March to June. Instead, IEP teams constructed “temporary learning plans” that could focus on select student goals that would complete the instructional year in virtual environments. AT resource staff were active participants in those teams and ensured that students had access to specific AT tools needed as instructional accommodations. We adjusted our logistical delivery of these tools so that they could reach students safely. ATS staff became proficient in

delivering individualized virtual support and teleconferencing, which provided valuable practice for the continued school closures of the 2020–2021 school year.

Figure 1: Screenshot Example of Inclusive Technology Resources That Are Easily Accessible Through the Assistive Technology Services FCPS Public Website



2020–2021 School Year Adjustments

School climate and environments had drastically changed with initial school closures. Crash courses and immediate practice in teleconferencing allowed technology tools to become the regular mode of communication with FCPS staff as all continued to teach from home. If you had mentioned “synchronous” and “asynchronous” modes of virtual instruction prior to September 2020, very few people would have known what you were referring to. By the start of the 2020–2021 school year, those words were a part of regular conversation along with other familiar terms such as “unprecedented,” “pivot,” “PPE,” “social distancing,” and “new normal.” Students continued to virtually learn at home, but the shock of immediate closures had subsided to a degree. Assistive Technology Services had to continue to adapt its practices to the changing climate.

How Did Students Receive New Assistive Technology Devices During the Pandemic?

All FCPS students received a Dell Windows-platform laptop computer by April of 2020. Most of the Dell laptops were the same model, and if they happened to be a different model, all received an identical Windows operating system and software “image” so the application tools loaded on the devices were uniform. This provided a vehicle for Assistive Technology coaches to connect with students virtually, where they could, in many cases, provide specific accommodations. Cloud based AT tools, such as Texthelp’s Read&Write, allowed students the opportunities to explore AT while attending virtual sessions

with their Assistive Technology Coaches. In many instances, AT itinerants were able to join virtual classrooms and work with both students and teachers on how to use specific tools. Collaboration between school IT staff and AT coaches also proved to be beneficial in cases where assistance was needed installing software on remote computers. In addition, a huge emphasis was placed on exploring inclusive technologies that were readily available on all student computers.

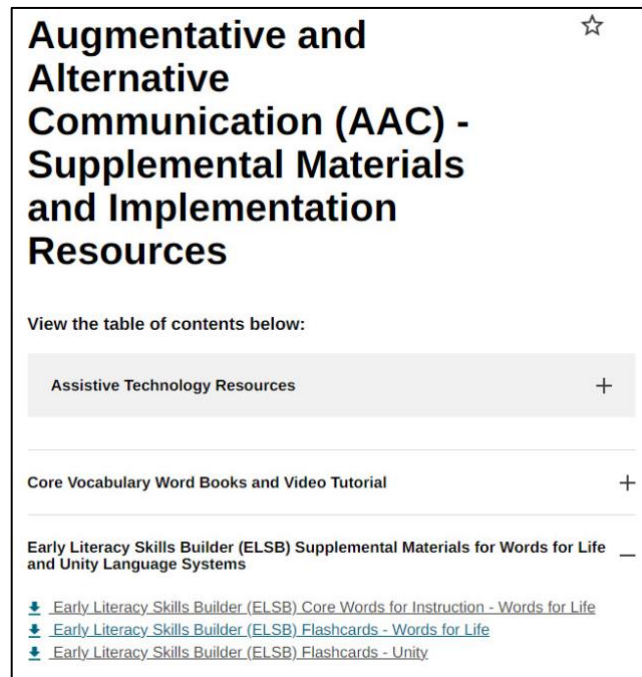
Providing needed software and cloud-based tools proved to be a workable challenge. However, many of our students needed additional AT equipment and devices to be placed in the home as part of their accommodations. This was a bit more cumbersome. Again, collaboration with school staff was critical as AT coaches worked to pick up equipment from school buildings and deliver it to students and families. AT Resources teachers needed to contact schools and follow their community guidelines for contact protocols. They then needed to reach out to families to set up meetings for delivery. Following guidance provided by our district to maintain safety, equipment was successfully allocated to the students who needed it in their homes.

As virtual learning continued, many new tools were identified as being essential for our special education students as they worked remotely. ATS worked closely with the Department of Information Technology to expedite technology assessments so that these tools could be added to the FCPS Digital Ecosystem. This ecosystem defines the accepted technology tools that can be used in FCPS. With the change to virtual learning, many new technologies surfaced to support distance learning; however, FCPS has a lengthy process for approving new technology. ATS worked closely with both the Department of Information Technology and Instructional Services to navigate through this process and expedite approval of tools that were appropriate and essential.

How Did Schools Ensure That All Digital Curricula Were Accessible for Students with Disabilities?

Assistive Technology Service ensured that assistive technology students are evaluated and implemented by students with special needs who require them. The office also continued to provide broader support to schools and central office groups to ensure that curriculum materials were accessible. As instruction was modified to be delivered in virtual classrooms, FCPS recognized that this change could be difficult for families, and worked to provide equitable access for all. Paper instructional packets were mailed to all families of students with special needs when schools closed in March 2020, and the mailings continued until the end of the 2020 school year. These packets were meant to provide instructional materials for use at home for the remainder of the 2019–2020 school year and could support a student's temporary learning plan. Assistive technology recommendations and strategies were included with the print materials, and could include items such as color-coded visuals, communication boards, and low-tech differentiation. Digital instructional materials were also posted for families through the district's electronic learning management system (see Figure 2). Assistive Technology Services not only added to these digital resources but provided direction for making these materials accessible to diverse users. We paid additional attention to copyright of visuals symbols and other items used with both print and digital resources and regularly communicated with technology vendors to clarify fair use.

Figure 2: Screenshot Example of AAC Resources Easily Accessible to FCPS Faculty Used for Virtual Instruction in 2020



Working to provide these print materials better prepared us for the 2020–2021 school year, and we began to better interpret how instruction might look in virtual environments. Internally, we partnered with our instructional services and information technology counterparts to prepare for the fall. As virtualized training and resource materials were developed for the upcoming school year, ATS staff voiced the need for accessible virtual instruction. We prioritized accessibility tools and features and assisted with promoting accessibility features in a broad range of technology tools. We participated in teacher training prior to the start of the school year, advocating for fully accessible instruction based on Universal Design principles. As some students returned to their classrooms to begin concurrent instruction in January 2021, ATS staff continued to participate in conversations supporting accessibility in the use of technology tools in live and virtual settings.

How Were AT Evaluations Conducted for Students or Employees When Working Remotely?

Assistive Technology Services has used several tools and protocols to assess the need for Assistive Technology as a required accommodation for students with Individualized Education Plans or 504 Plans. We use portions of the DeCoste Writing Profile (Don Johnston, 2021), uPAR (Protocol for Accommodations in Reading; Don Johnston, 2021), an iOS app called AAC Evaluation Genie (Hump Software, 2021), a version of Wisconsin Technology Initiative (WATI) and Student Information Guide Process forms (WATI, 2021) that were modified to fit our needs. In addition to various inventories, we partnered with staff, students, and families to provide us information and feedback as we tried possible AT to find the best accommodation to meet each student's needs. Our assessment process has been an evolution over the years based on best practices and our own trial and error. Early in the spring of 2020

a committee of AT staff was created to review our report process and procedures. Little did we know that with distance learning due to COVID-19, we would be doing more than just fine-tuning our current report process.

We began this process of virtualizing and streamlining our evaluation and report writing in the summer of 2020. The pandemic required that we be prepared for different possibilities. We had to have the option of virtual assessments in our toolkit for the upcoming year. Modeled after the WATI, we considered seven different areas of assessment which include: communication, reading, written expression, executive functioning, computer access, foundational skills, and math. This work was a heavy lift, and we welcomed all staff members to voice their opinions and expertise. FCPS AT coaches are a knowledgeable, creative and hard-working group that tackle any challenge that comes their way.

One area of particular focus was augmentative communication. We needed to be able to assess students who struggle with verbal communication, without being in the same physical room with them. We knew there would be collaboration with school staff and families, but before we could even get to that point, we needed to see how a student might access a suggested communication device. Google Workspace for Education was the primary mode of information sharing and instruction used in our schools. We leveraged the same method used in the AAC Evaluation Genie of having a student identify an icon of varying field size and varying visual complexity but using Google Slides as the tool. The AT coach and classroom teacher worked with the family and shared the Google Slides. A family member would provide feedback as to whether the student was able to accurately locate and touch the requested icon. If there is one constant in virtual assessments, it is that everything takes extra time and planning. Families are and have been welcome and valuable partners in the evaluation process for years, but this required an extra level of family involvement.

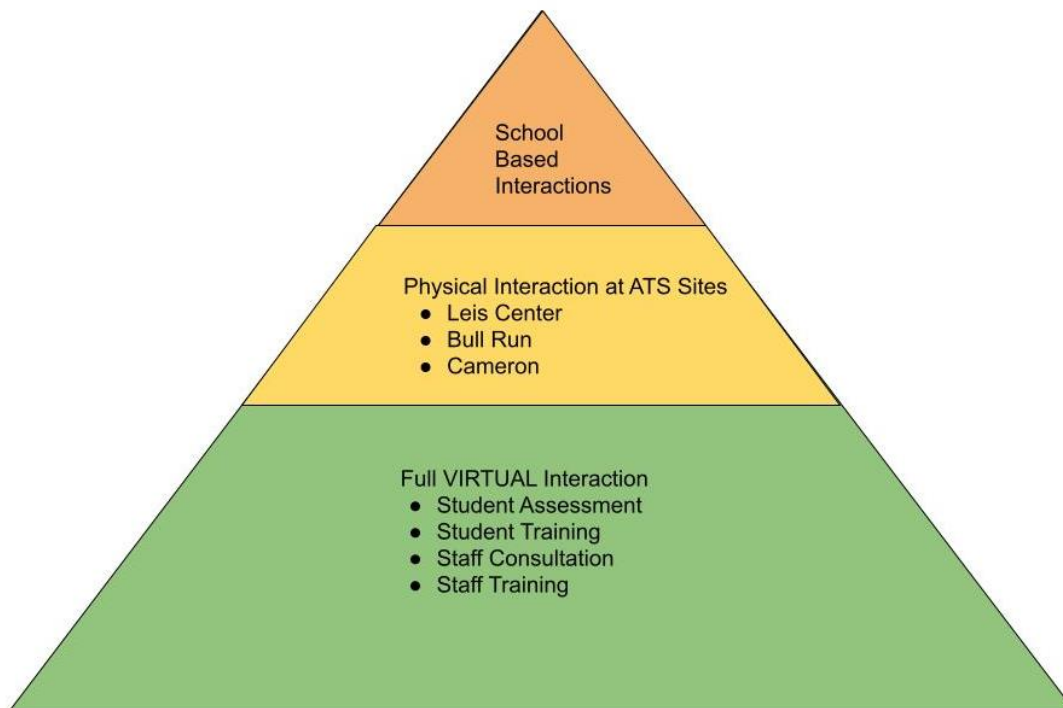
Once a tool had been selected, the AT coach collaborated with the school and family to deliver it to the student. The technology delivery may be virtual, such as screen sharing through a teleconferencing platform while a family and/or student installs a Chrome extension. A technology tool may also have to physically be placed in a student's hands, such as in the case of providing a communication device. Schools had been the distribution point for getting computing devices into student hands. To keep the approach consistent, we worked with schools to get the necessary devices to students.

An integral portion of supporting school staff and families has been training opportunities. This was even more important during the pandemic. Face to face training was obviously not an option. We harnessed our ATS internet site to offer resources that could support many student needs, such as Tech Tools to Support All Learners, Executive Function tools, and AAC videos and resources. We realized that there is something about live training that was missing from web-only resources. Teachers, families, and our staff all missed live interaction. To fill that need, we offered hour-long live training sessions. We invited staff to professional development that focused on supports they could implement in the classroom setting, whether in person or distance. For staff and families of students with communication challenges, we offered an hour-long introduction training on our most widely used communication devices and apps. Breakout rooms were an important component; they allowed school teams, families, and AT Coaches to

meet to discuss student needs in smaller settings. In a live setting, our AAC training had typically been three hours long. It was a wonderful opportunity to dive into AAC. However, three hours is too long for most in an online format, so we shortened it, kept the most important parts, and worked individually with schools and families as needs arose. With equity being at the center of what we do, we discovered this new training approach offered equitable access to training. Travel to specific locations was not required, nor was it necessary for families or staff to secure transportation.

There were instances when meeting with a student was necessary. Many times, it was an assessment of a very young student, one with multiple disabilities, or a student who was unable to work through a virtual assessment. We coordinated with families to bring the student to one of our centers. For the safety of everyone, we opted to work in our center, where we could more carefully control the physical environment, rather than relying on a school location. We had PPE, trial devices, and the ability to clean and house the AT when the appointment was over. If families were unable to go to one of our sites, we would offer to meet them at the base school. We collaborated with school administrators and staff to secure a room and follow all health and safety guidelines while meeting with the student.

Figure 3: Tiered Model Illustrating the Types of Interactions Required During the Pandemic



Since the onset of COVID-19, safety has been at the core of all that we do. Safety for families, school staff, and our AT staff. We took a tiered approach. Figure 3 illustrates a graphic that we used to guide the different interactions. We tried to accomplish as much as we could virtually; that was our preferred option. The shift was a big change for a group of people who thrive on collaborating and meeting in an in-person setting. We would continue up the pyramid as the situation required.

What Barriers and Supports Emerged as More Responsibility Was Thrust Upon Caregivers and Users?

Once staff and students all had access to a computing device, it still did not mean that they had an immediate understanding of how it might work in a virtual instructional environment. Many had never participated in computer teleconferencing. FCPS did not have a past expectation that this would be a primary instructional practice. Access to teleconferencing tools was not immediate, and it took several weeks until the FCPS platform was ready for widespread use. Once it was ready, there was an immediate expectation for proficiency. As FCPS staff were delivering synchronous instruction, there was additional reliance on them to support teleconferencing, as caregivers and students were even less familiar with the virtual platform. Supporting the platform required additional expertise. Assistive Technology Services also had to rapidly adjust to the new virtual environment and modify virtual technology accommodations that might look different in live classrooms. Experience and time are an asset with change, but that was not an initial luxury for teachers, students, and staff at the onset of the pandemic.

Unexpected external factors also presented barriers to caregivers and students participating in virtual learning, which also impacted assistive technology placements. Face to face interactions continued to change throughout the pandemic in unexpected ways. When schools were first closed in March 2020, extreme caution was exhibited in handling any types of materials, and deep-cleaning of physical surfaces was required. Minimal interactions took place at building locations. With slower handling of equipment, and slower, methodical deliveries, technology tools were slowed in getting into the homes of students. And of course, that depended on whether or not technology tools were even available. With increased widespread online ordering of supplies and materials globally, patterns in the supply chain had changed to the point where backorders were common. The difficulties experienced in purchasing toilet paper in March 2020 were not limited to just paper products. All sorts of items, including assistive devices and peripherals, became more difficult to obtain, which slowed delivery of tools into the students' hands.

OUTCOMES AND BENEFITS

There are several outcomes to the abrupt change in school settings that will be lasting once schools reopen in live settings again. In most cases, consequences of closures may be considered more of an extension of procedures and practices already in place. We had previously described our experience in opening Assistive Technology Services' support and training resources through our public website and social media. Feedback from families, schools, and students continues to remain positive and ATS will prioritize communication through this avenue. A family's role in supporting assistive technology placements will continue in any future setting. ATS communication within publicly accessed platforms will continue to grow and become more substantive and impactful.

Another instance of lasting change is consideration for device cleaning as they are exchanged and transported to students. It is not that devices were not cleaned prior to the pandemic. Detailed protocols for preventing COVID-19 exposure pushed our group to consider a more intricate approach to cleaning practices and products used with technology devices. Further details were explored for transport of the

devices themselves and the hands that handled them along the way. The physical delivery aspects of our job were reviewed in significant detail. Since ATS staff might not have been the only handlers of our student technology tools, we partnered with other central technology staff as well as school staff to maintain the safest contact protocols. The current priority is to prevent any spread of COVID-19. The continued outcome will be that we can also prevent the spread of other bacteria and viruses in the future with more detailed standardized cleaning protocols.

A more detailed examination of our student interactions also occurred. When ATS was forced to minimize direct student contact, we reviewed our assessment procedures, the types of technology tools we were using, and how training took place for students and staff. This, again, is reflected in our contact pyramid illustration provided in our description of assessing students remotely. Before we could change any details of our procedures, we had to account for live interaction that might have been taken for granted. We had to identify critical components of our operating procedures and eliminate those that included risk. An analogy of rearranging procedures and protocols may be that of serving food in the manner of Chipotle. If you have ever dined there, you may have ordered a burrito, tacos, a burrito bowl, or a salad. The food components of all those items are built by the request of a customer as he or she may choose, and the same ingredients are used to make either a burrito, tacos, a burrito bowl, or salad with varied procedures. ATS identified critical components of its daily job procedures and rearranged daily protocols to ensure the safest and most efficient practices to assess students, place appropriate technology tools, and provide training. A better understanding of our own standard operating procedures will continue to benefit our regular practice as schools reopen.

As the 2020–2021 school year began, assistive technology student assessment and training occurred with students attending classes in their own homes. Itinerant AT coaches collaborated with classroom teachers to perform these tasks. With many parents and other family members also available in the same home environments, we found they were in a better physical location to witness AT assessment and training. Some displayed a strong degree of interest and were invited to participate. Others were curious and would simply witness the experience. An unintended and positive result of this interaction is the immediate communication of assistive technology tools and strategies used by students. Instant communication with AT Coaches in virtual classroom environments may initially be lost when students return to live settings and family members will no longer be in the room with their child while attending live classes. A long-term, positive change will emerge from virtual classroom interactions during school closures. School staff, students and families will retain a greater proficiency with computer teleconferencing and this can be a continued, convenient channel to directly communicate with ATS staff.

Expanded use of computer teleconferencing tools also led to unexpected internal collaboration and outreach between ATS and school staff. In analyzing and reviewing daily procedures after the 2020–2021 school year began, we came to realize that AT coaches were providing overlapping training at individual school locations. As an example of this, AT coach “A” might hold a Read&Write training for a few teachers at one elementary school early in the week, while AT Coach “B” might also have held a Read&Write training a few days later at a different elementary school. The training was provided through the same teleconferencing medium over the same topic. Why not consolidate our efforts to centralize

training? This would allow AT coaches to focus on training areas of expertise, allow diverse groups of teachers to attend and collaborate during training sessions, and also document the training for purposes of attendee license recertification. Prior to school closures, both AT coaches and staff attending training through a teleconference platform might have been apprehensive and reluctant to do so. The lack of expertise with teleconferencing created concerns from the trainers that they might not be able to effectively deliver their message. Conversely, attendees unfamiliar with teleconferencing could have reduced their ability to focus on the training topic. This disappeared with the blitz of virtual training required by school closures and overall comfort with using electronic communication platforms. Familiarity with a virtual training environment will continue as the crash course in using teleconferencing tools not only happened with school professionals but with student teachers and others entering the field.

A final outcome unique to Fairfax County Public Schools is that the FCPSON initiative went from a gradual, yearly rollout, to happening over several months in 2020. Computers landed in every student's household by late April 2020. As the initiative promised, the focus was on instructional change rather than simply establishing a 1:1 computer ratio. Assistive Technology Services had been an active voice within the FCPSON rollout prior to the pandemic and are continuing with it through the 2020–2021 school year. With students having a computing device in hand, they have access to more and more inclusive technology tools for customized learning. We will continue to promote the use of these tools within the context of Universal Design for Learning and increase awareness for students with diverse learning needs.

CONCLUSION

When Assistive Technology Services adapted to the March 2020 school closures, it was our intention to continue with long term district change regarding classroom technology integration. Student participation in virtual learning environments increased proficiency with technology tools for all staff and students. Assistive Technology teachers had always worked for improved implementation of technology accommodations and were excited for the rollout of the FCPSON initiative in both live and virtual classroom settings. Technology vendors were also expanding more accessibility tools within their products. A more inclusive and diverse instructional landscape was being built prior to school closures and is continuing to grow. Assistive Technology Services immediately responded to the environmental changes of March 2020 by deeply examining its logistical and standard operating procedures. We made initial adjustments to ensure that we promoted safe interactions with schools and students. The progress of our change was strategized so that lasting improvements would extend into live classroom settings as school began to reopen in January 2021. In this way, the “new normal” of the 2020 COVID-19 pandemic did not have to be a different normal, but possibly an accelerated “normal” of gradual change already occurring. Assistive Technology Services is always excited for any change that will positively impact student success.

DECLARATIONS

This content is solely the responsibility of the author(s) and does not necessarily represent the official views of ATIA. No financial disclosures and no non-financial disclosures were reported by the author(s) of this paper.

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<https://www.fcps.edu/academics/academic-overview/special-education-instruction/assistive-technology-services-ats>

Fairfax County Public Schools Assistive Technology Services Technology Tools for All Learners
<https://www.fcps.edu/academics/academic-overview/special-education-instruction/assistive-technology-services-ats-6>

Fairfax County Public Schools FCPSOn <https://www.fcps.edu/resources/technology/fcpson>

Fairfax County Public Schools General Information <https://www.fcps.edu/about-fcps>

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