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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.

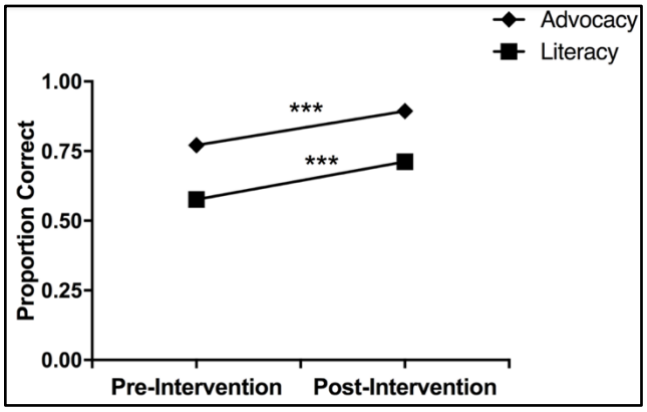
Overall, 10-15-item pre- and post-assessments measured content knowledge gained from each webinar. A summative questionnaire measured perceived confidence related to content incorporated in both webinars. These instruments are available upon request by contacting the first author.

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

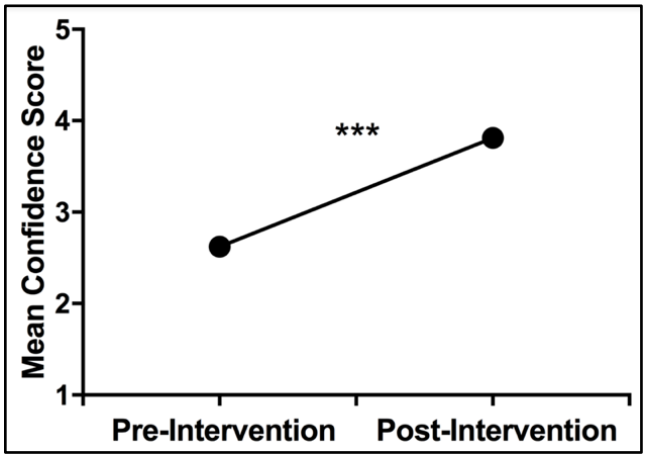


****indicates statistically significant at p < 0.001*

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

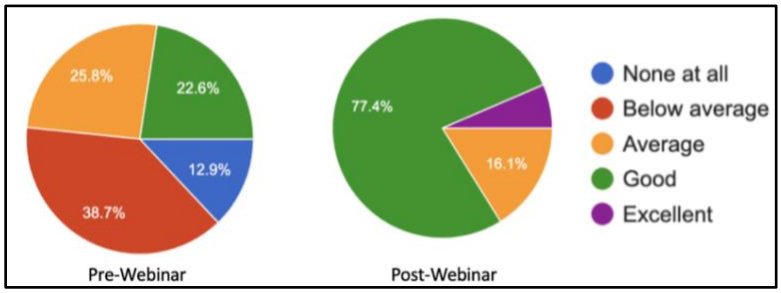


Figure 4: Parent Confidence Level in Ability to Access Resources to Prepare for Discussions of Student AT Needs in a Special Education Meeting Pre- and Post-Webinars

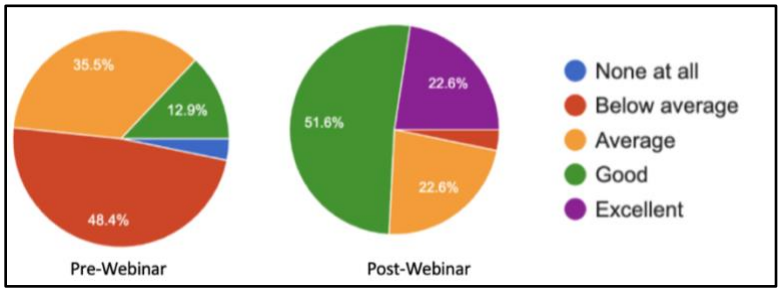


Figure 5: Parent Confidence Level Regarding Their Ability to Collaborate with the Educational Team at an IEP Meeting Pre- and Post-Webinars

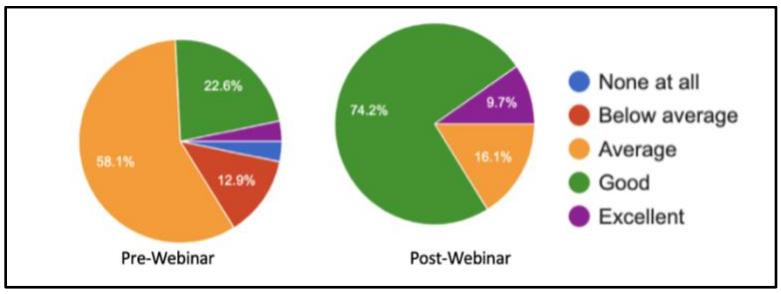
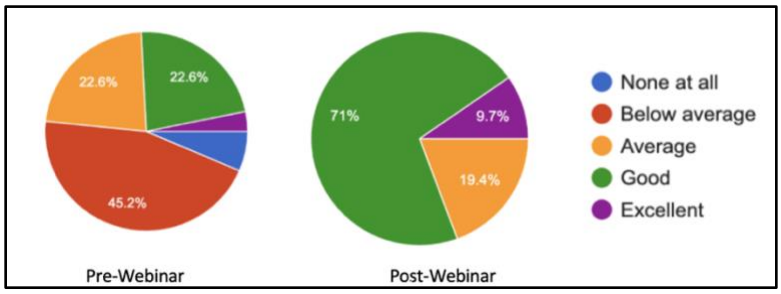


Figure 6: Parent Confidence Level Regarding Their Ability to Communicate with School Personnel at Various Levels to Problem-Solve AT Difficulties Their Child May Encounter Pre- and Post-Webinars



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

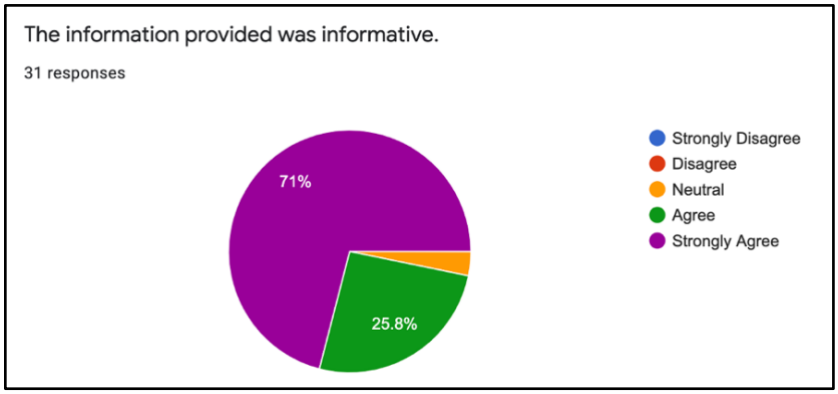


Figure 8: Parent Perception on How Helpful the Parent Education AT Literacy Module was for Transitioning to a New Educational Environment

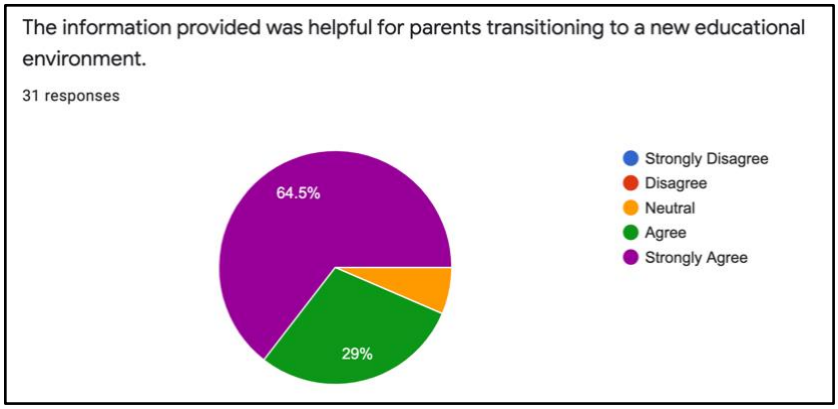


Figure 9: Parent Satisfaction with Information Provided in AT Advocacy Parent Webinar

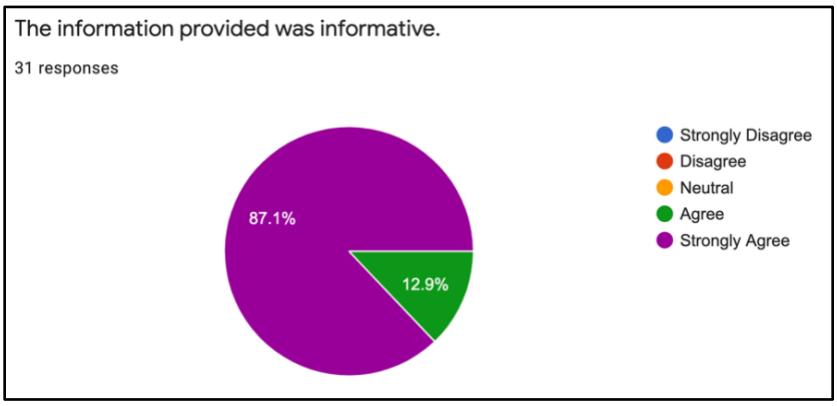
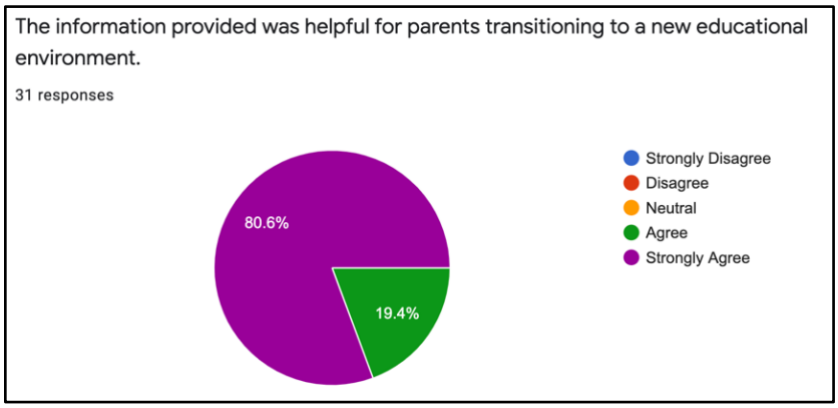


Figure 10: Parent Perception of Content Utility of Parent Education AT Advocacy Module Related to Transitioning to a New Educational Environment



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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