Preservice Teachers' Attitudes and Knowledge towards Assistive Technology: Exploring and In-Class Workshop Approach

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Abstract

The Individuals with Disabilities Education Improvement Act (2004) mandates that all students receiving special education services should be considered for assistive technology; therefore, it is imperative that teacher preparation programs prepare preservice teachers to select, implement, and evaluate assistive technology for their future students. This mixed-methods study explored the influence an in-class workshop had on preservice teachers' feelings of preparedness to use assistive technology in their future classrooms. The participants were all enrolled in a 400-level special education methods course, and their perceptions were assessed by administering a pre- and post- survey. The workshop consisted of an independent online training module, instructor lecture, and peer presentations on high and low technology options. The results of the study found that participating in a workshop that focused on AT did positively and significantly influence preservice teachers' knowledge and perceptions of AT usage. Suggestions for future implementation of a workshop model and future research are discussed.

Keywords

Abstract

The Individuals with Disabilities Education Improvement Act (2004) mandates that all students receiving special education services should be considered for assistive technology; therefore, teacher preparation programs must prepare pre-service teachers to select, implement, and evaluate assistive technology for their future students. This mixed-methods study explored the influence an in-class workshop had on pre-service teachers' feelings of preparedness to use assistive technology in their future classrooms. The participants were all enrolled in a 400-level special education methods course, and their perceptions were assessed by administering a pre- and post-survey. The workshop consisted of an independent online training module, instructor lecture, and peer presentations on high and low technology options. The study results found that participating in a workshop that focused on AT did positively and significantly influence pre-service teachers' knowledge and perceptions of AT usage. Suggestions for future implementation of a workshop model and future research are discussed.

Keywords: teacher education, pre-service teachers, assistive technology, special education

Introduction

In today's schools, assistive technology (AT) plays a vital role for students with disabilities to access the general education classroom and curriculum. To prepare pre-service teachers to employ AT in their future classroom effectively, it is critical that teacher preparation programs (TPP) explore beliefs, knowledge, and usage of AT.

Some students with exceptionalities require the use of AT to be successful in schools. Teacher preparation programs that emphasize special education are more likely to prepare their special education pre-service teachers in using AT to support students. Still, this preparation is typically not found in other TPPs (i.e., elementary education, secondary education, early childhood education). Yet, students with exceptionalities that require AT will frequently be placed in classroom settings besides the special education classroom. The purpose of this study is to explore the influence an in-class workshop has on pre-service teachers' feelings of preparedness to use AT in their future classrooms. The research questions that guided this study are as follows: 1) Is there a relationship between completing an AT workshop and pre-service teachers' perceptions of using AT? 2) Which aspects of AT do pre-service teachers feel like they need more instruction?

Review of Literature

Assistive Technology

Under the Individuals with Disabilities Education Improvement Act (2004), individualized education plan (IEP) teams are required to discuss AT's inclusion during the development of every student's IEP. Although AT should be considered for all students during

the IEP process, AT is not required or appropriate for all students with a disability. According to IDEA (2004), assistive devices and services are required to be available for students with disabilities. Originally, The Technology-Related Assistance to Individuals with Disabilities Act of 1988 first described an AT device. The law was reauthorized in 2004 and is now known as The Assistive Technology Reauthorization Act of 2004 (P.L. 108-364). A significant change brought about from the reauthorization now requires States to provide direct assistance to individuals with disabilities to ensure they have direct access to the AT devices and services they need. Most States choose to focus their efforts on reutilization programs, demonstration programs, device loan programs, and financial programs. The Assistive Technology Reauthorization Act of 2004 defines AT as any item, piece of equipment, or system an individual with a disability may use to increase, maintain, or improve functional capabilities. IDEA (2004) defined AT services as any service that directly assists a child with a disability in selecting, adopting, or using an AT device. This law requires that AT devices and services be available for students with disabilities to assist them in accessing their environment at school and home preparing them for postsecondary academics and occupations. Morrison (2007) suggested that using a variety of AT, such as screen readers, voice recognition software, and word prediction technology allows students better access to the general education curriculum.

Bodine (2003) described AT as a tool utilized by someone with a disability to perform everyday tasks such as getting dressed, moving around, controlling their environment, learning, working, or engaging in recreational activities. Each student should be assessed to evaluate the appropriate device or service to ensure progress towards their personal and academic goals. (Edyburn, 2000). As the student makes progress towards their goals, the AT will also need to be re-evaluated to maintain effectiveness. For example, a student who uses word prediction

software that includes access to a dictionary with limited words may find that this AT writing tool supports written composition. As the student advances through grades and personal vocabulary knowledge increases, he or she will need to access a more advanced dictionary if the AT tool is to continue to be effective in supporting the growing needs of the student (Bowser & Reed, 1995). Ongoing assessment of AT effectiveness is needed to maximize benefit from its use, particularly as technology advances (Bowser & Reed, 1995).

In-Service Teachers' Perceptions and Use of AT

Even though researchers have stated for many years that certain technological advancements can make the general education curriculum content more accessible and help to improve student achievement, the full potential of technology continues to remain unfulfilled within the realm of special education (Burgos, 2015; Smith & Kelley, 2007). Leech (2011) found that teachers perceive technology as an advantage for students' learning, but they often did not use it to its full capacity. Students who require special education services typically have difficulties developing cognitive abilities and acquiring new knowledge; however, AT could bridge the gap between their needs and skill acquisition (Leech, 2011). This could be accomplished through the utilization of AT that has been individualized to the student's specific needs. These tools could provide many benefits as they help to mold the learning process to various cognitive, sensory, or mobility impairments.

Misconceptions Surrounding AT Usage

Many potential misconceptions are surrounding AT usage. According to Lamond and Cunningham (2018), three significant misconceptions could halt AT's use within the classroom or home. The first misconception is that students who use AT are getting an unfair advantage

over their peers. Assistive technology is prescribed to mediate specific challenges and level the playing field in the classroom but should not be considered a privilege. Explicit instruction should continue to the entire classroom while incorporating AT. Assistive technology should not be used as a replacement for the skill. Providing AT to students is aligned with the equity model, ensuring that every student gets what is needed to be successful, rather than ensuring that every student receives the same resources (Meng, 2018; Lee & Templeton, 2008).

The second misconception is that AT will "fix" the student's challenges or deficits (Lamond & Cunningham, 2018). Teachers and parents sometimes believe that AT will get rid of the student's need or disability. The use of AT devices allows the student to access the curriculum like their peers without a disability. With appropriate support, better access enables students with disabilities to experience more success within the general curriculum.

The third misconception is that students or teachers do not need to be trained on the AT to achieve success (Lamond & Cunningham, 2018). In reality, the lack of training for the student and teacher could hinder their success. The predominance of online learning during the pandemic has made AT even more relevant. The diminished teacher access has increased the need for technology through online learning and AT for those students in need. Extant literature suggests that AT training's focus should predominantly be for teachers rather than students since students learn how to use AT quickly, and they may not need to access every component (Morrison, 2007). Identifying the specific skill deficits, providing AT tools to overcome those specific deficits, and planning effective ways to implement those tools in the classroom, or through virtual means, is critical for student success with AT. According to McMurray and Pierson (2016), technology has become a significant component in developing and delivering curriculum in all educational settings, especially in special education. Assistive technology promotes greater

independence by enabling students with disabilities (especially males) to perform tasks they were formerly unable to accomplish or had great difficulty achieving.

Barriers to AT Implementation

Teachers need access to professionals that possess expertise in technology and pedagogy (Morrison, 2007). Since AT can directly impact learning for students with disabilities, the process for the integration of AT into the curriculum is more complex (Morrison, 2007). Nikolopoulou and Gialamas (2015) found that four primary barriers impact teachers' usage of AT. Those barriers are lack of technical support, lack of confidence, lack of equipment, and class conditions. Teachers' confidence with technology also significantly affected two factors: lack of support and class conditions (i.e., number of devices and number of children in need of that device). When teachers' confidence using technology is higher, their perceived barriers, such as support and class conditions, are minimized.

A significant gap exists within the literature between the potential positive impact of AT and the realities of its usage in the typical classroom. The lack of teacher time, access to support services, limited leadership, lack of a shared vision or rationale for AT use, classroom budget limitations, attitudes about technology, limited computer literacy, as well as limited training are commonly cited problems (Edyburn, 2000; Parette & Blum, 2013; Mundy, Kupczynski, & Kee, 2012; Abtahi & Motallebzadeh, 2016). AT's potential benefits are embraced if teachers and those supporting AT services receive training in instructional methodologies that allow AT to be integrated in a meaningful manner (Edyburn, 2000). Teachers' degree of involvement using computer technologies enhances young children's thinking processes and work habits. Essentially, the more teachers use technology, the more they learn about it and integrate it into

their classrooms (Nir-Gal & Klein, 2004). Research also demonstrates that teachers who are more efficacious in using AT in a special education context value its use in instruction to a greater extent than those who consider themselves novice technology users (Seevers, Martin, & Crawford, 2001).

Research indicates that when training has been made available to teachers, it tends to focus on the technology's basic functionality with limited modeling of instructional methods (Morrison, 2007). raining typically occurs during the initial stages of implementation. Yet, there is little attention to ongoing support for teachers and an inadequate understanding of how AT can enhance learning and competence (Morrison, 2007). Few teachers have sufficient knowledge of possible tools, and most do not have access to the necessary hardware and software resources for practical use (Puckett, 2004). eacher familiarity, confidence, and skill in choosing AT and integrating technology into the curriculum are dependent on teacher training (Lesar, 1998).

Pre-service Teachers' Perceptions and Use of AT

To effectively prepare pre-service teachers to implement AT in their future classrooms, it is imperative to review the literature regarding how TPP's include AT content. Abner and Lahm (2002) found few pre-service training programs for special education teachers that included courses or even class sessions on AT applications and issues. However, one study found that only half of the special education pre-service teachers had AT training in their coursework, and for those that did, a large part was general AT information provided in courses other than specific AT related courses (Abner & Lahm, 2002; Bausch & Hasselbring, 2004).

A study conducted at Nipissing University suggests that pre-service teachers not only need to be introduced to AT during their TPP, but their exposure to AT should be integrated

throughout all aspects of their coursework (Corkett, Kariuki, Brackenreed, & Waller, 2015). By providing pre-service teachers with a variety of opportunities to observe AT usage within their courses of study, as well as to have an opportunity to use AT personally, this may increase the likelihood that the pre-service teachers will integrate AT into their future classrooms (Corkett et al., 2015).

Lei (2009) examined pre-service teachers' beliefs, attitudes, confidence, and interest in technology and evaluated their strengths and weaknesses in technology. Lei (2009) found that pre-service teachers who have grown up with technology (e.g., computers, internet, cell phones, iPods) had (a) strong positive beliefs toward technology but had reserved attitudes toward integrating technology in classrooms, (b) were proficient in the use of technology but only within a limited scope, (c) were proficient with basic technologies but lacked experience with advanced technologies; and, (d) lacked experience and expertise in classroom technologies. Lei's (2009) findings suggest that even though pre-service teachers recognize the importance of incorporating technology into the classroom to help their students learn, they lack the knowledge, skills, and experiences.

Ropp (1999) conducted a study which focused on how the personal characteristics of pre-service teachers (i.e., attitudes toward computers and technology, computer anxiety, computer self-efficacy, technology proficiency, and computer coping strategies) change as a result of the experience and instruction they receive through their education career. Pre-service teachers who had strong beliefs about their computer capabilities were less anxious about using computers, held more positive attitudes towards technology and computers, were more confident in their ability to perform tasks relating to teaching with technology, and they used more computer

coping strategies (Ropp, 1999). Furthermore, direct instruction on the use of AT could drastically change pre-service teachers' perceptions and usage.

Preparing Preservice Teachers through Workshops

The extant literature on how to teach pre-service teachers about AT's use within their TPP and courses is not abundant or highly prescribed. However, the workshop model can deliver meaningful instruction on AT to pre-service teachers. The workshop model can be utilized across various settings, such as in the classroom, at a conference, or for professional development. A workshop is characterized by a set of activities designed to foster learning, discussion, and feedback on a specific topic. Workshops also emphasize open dialogue about the demonstration or development of practical skills in a setting that allows everyone a chance to be heard. Workshops are particularly valuable because they offer an intensive, interactive educational experience delivered efficiently and effectively, especially if time is limited (Center for Community Health and Development, 2017; Spagnoletti, Spencer, Bonnema, McNamara, & McNeil, 2013). Workshops are a particularly wise pedagogical choice when new content is introduced, during training or staff development, or when a new concept is demonstrated (Center for Community Health and Development, 2017). Due to overloaded curriculum and finite classroom time, workshops are a feasible and effective tool in many classrooms, including those in higher education. Workshops often range from forty-five minutes to two or more days and vary in number of participants.

Methods

Participants

A convenience sample was used to identify participants for this study. Participants in this study were pre-service teachers enrolled in a 400 level instructional strategies course designed for elementary and special education majors and minors during the 2018-2019 school year. The course examined teaching methods for students with special needs in elementary grades. Topics covered included characteristics of high incidence disabilities, evidence-based and high leverage practices, differentiated instruction, response to intervention, and specific content area teaching strategies (i.e., literacy, mathematics, science, and social studies). There were two sections of this class offered during the fall and spring semesters. A pre and post-survey design was used spring semester 2019. A total of 56 pre-service teachers were asked to complete a pre- and post-test and attend a workshop on AT. Of those 56 pre-service teachers, only 43 pre-service teachers completed the pre-survey, and 41 completed the post-survey. In total, 41 pre-service teachers completed both the pre-and post-test, and those participants were represented in the data analysis. Completion of the pre and post survey was not a mandatory class assignment. Pre-service teachers voluntarily completed the survey which accounts for the difference in the survey participants. Table 1 describes the academic major of the pre-service teachers that participated in the pre-workshop survey. Participants self-reported their classification as juniors (48.8%) and seniors (51.2%).

Table 1

Majors of Preservice Teachers

Majors	Frequency	Percent
Special Education	6	7.1
Elementary Education	24	28.6
Dual Elementary/Special Education	7	8.3
Dual Early Childhood/Special Education	2	2.4
Dual Elementary/Early Childhood Education	4	4.8
Total	43	100.0

In-class Workshop Model

The workshop was taught alongside content that included a brief introduction of universal design for learning (UDL). UDL is defined as a framework supported by decades of neuroscience research that teachers can use to implement high-quality flexible materials, techniques, and strategies during their instructional delivery so students can demonstrate their learning in various ways (CAST, 2018). UDL is an educational framework that aims to improve and optimize teaching and learning for all people and is based on scientific research about how humans learn (CAST, 2008). UDL is based on a set of guidelines that focus on the why, what,

and how of learning. The guidelines consist of providing multiple means of engagement, multiple means of representation, and multiple means of action and expression (CAST, 2008). While AT and UDL constructs are different, they were presented at the same time because the goal of each is to ensure quality access to general education curricula. Rose, Hasselbring, Stahl, and Zabala (2005) posit that "AT and UDL, while different, are completely complementary-much like two sides of the same coin" (p. 507). Since the concepts were taught in a special education methods course, all the material was taught through a special education and exceptionalities lens. The pre-service teachers were asked to complete the pre-survey before engaging with the academic content and completing the post survey after they had completed all required assignments. Assistive technology was the only construct assessed because it received the bulk of the time in class and was the primary focus of the course objectives.

The pre-service teachers were required to complete an online instructional module produced by The IRIS Center (https://iris.peabody.vanderbilt.edu/module/at/). The IRIS Center's STAR Legacy modules are through Vanderbilt University's Peabody College with support from the U.S. Department of Education's Office of Special Education Programs (OSEP). The center provides free online resources about evidence-based practices to bridge the research to practice gap. The resources are primarily created to be used as professional development tools and in TPPs. The IRIS Center provides free online resources such as the STAR Legacy modules, case studies, and informational briefs on topics related to improving outcomes for students with disabilities. These available tools have the potential to increase teachers' knowledge and skills related to evidence-based practices (Sayeski, Hamilton-Jones, & Oh, 2015). The module was completed outside of class time, so the pre-service teachers would be prepared to engage with the

in-class content on a deeper level. The objectives of the required IRIS module (Assistive

Technology: An Overview) were that learners would be able to:

- define AT

- differentiate between AT devices and services

- understand how AT helps students with disabilities gain access to the curriculum

- understand that the IEP team is responsible for considering AT for students with
   disabilities

- access resources that support the use of AT for students with disabilities

The module includes multiple informational pages, video clips, education exercises, and

interviews with AT experts. The module explains the need for AT in the classroom and then

discusses the definition AT services and devices. It then explains the considerations,

implementation, and evaluation of AT usage with students. Lastly, there is a page of tips for

teachers, followed by reference and resources that provide additional content.

To ensure that the candidates engaged with the module's content, they were required to

complete the module's assessment question portion and submit it as an assignment. The

assessment questions included items such as naming and describing three items that could be

used as AT, listing reasons why AT is necessary, discussing assistive devices and services, and

applying their knowledge in scenario-based questions as they pertain to implementation of AT in

the classroom and an IEP team context. The module assessment questions were submitted and

graded ($n = 41$ with an overall average of 93.78% correct on the assignment). The instructor

provided corrective feedback as needed.

During class time pre-service teachers participated in a lecture that focused on the IDEA definition of AT, the connection between AT and UDL framework, AT usage within a student's IEP, role of IEP team members when selecting, implementing, and evaluating a student's AT needs and usage, examples of AT for specific needs (i.e., fine motor, attention, reading difficulties, math difficulties, speech and language disorders, and emotional/ behavioral disorders). Pre-service teachers were encouraged to ask questions of the instructor. Pre-service teachers were also given guided questions to discuss in peer small group discussions such as "Discuss the relationship and purpose of assistive technology with the UDL framework?"

Lastly, pre-service teachers were asked to use Padlet, which is an online tool that allows individuals to create and collaborate by sharing their ideas in a digital bulletin board fashion by displaying information that users contribute (https://padlet.com/). Each participant was asked to contribute two posts to the Padlet site, one high tech, and one low tech device or idea that they could see themselves using in their future classrooms. Each post had to contain the product name, brief usage information, general cost, and a picture of the technology. The goal of the assignment was to share ideas and explore the wide variety of AT.

Procedures

Data Collection

The participants were all enrolled in a 400 level instructional strategies course. This was a required course for elementary and special education majors and minors. Before taking this course, most elementary education majors would have had one introductory special education course. Special education majors and double majors, which include a combination of elementary

and special education, early childhood education, and special education, would have had more than one special education course.

Pre-service teachers self-reported the pre- and post-test responses. Pre-service teachers were given the survey before the instructor completed any instruction or discussion. After the completion of the pre-survey and demographic questions, pre-service teachers participated in a workshop on AT. After the workshop, pre-service teachers responded to the same survey that was taken before the workshop. The survey was delivered via Qualtrics, which is an online survey tool. The university's internal review board approved the study.

Instrumentation

For this study, we used a survey developed by Lee and Vega (2005) to measure pre-service teachers' perceived knowledge and attitude towards AT use in the classroom. Permission to use the survey was obtained from the authors. The survey consisted of 24 Likert-scale items (Strongly Agree= 1, Strongly Disagree= 5, Not Applicable= 6). The Likert-scale items asked participants questions regarding their perceptions about special education related to AT knowledge and skills, AT resources, and their TPPs (Lee & Vega, 2005). One open-ended qualitative question was included to inform future pedagogical practices regarding participants' need for further AT related knowledge. Additional demographic information was collected, including academic major, academic minor, classification (i.e., freshman, sophomore, junior, and senior), number of education field placements, and an ideal future teaching placement. The survey represented negative scoring, and the scale ran in the opposite direction, meaning the Strongly Agree = 1, Strongly Disagree = 5, and Not Applicable = 6. To leave the original scoring would confuse the results since we were looking at the overall mean scores because the lower

mean number would represent a higher mean comparing two numbers. To eliminate any confusion when looking at the mean scores, we reverse scored the Likert Scale scores into new variables. We transformed the Likert-scale items to represent strong agreement with a higher score and not applicable with the lowest score (Strongly Agree = 6, Strongly Disagree = 2, Not Applicable = 1). By doing this, when the mean scores are examined, the larger number represents a higher score.

Results

A mixed methods research design was employed in this study. Quantitative data were analyzed using a paired-samples t test. For the paired-samples t test, a matched-subjects design with the intervention was used. When using a matched-subjects design, participants scored on two variables, meaning that one score was obtained before the intervention and the next score after the intervention. Green and Salkind (2017) suggest using this type of design to determine if the mean differences in scores between the interventions differ from zero. A mean score of all 21 Likert-scale questions was determined for each participants' pre-survey and post-survey. Then a comparison in mean scores using a paired samples t test was conducted to detect the differences between pre- and post- test mean scores to determine if there is a significant difference in pre-service teachers' perceptions of using AT after completing an AT workshop?

Research question 1. Is there a relationship between completing an AT workshop and pre-service teachers' perceptions of using AT? A paired-samples t test was conducted to determine if there was a significant difference in pre-service teachers' (N= 41) perceptions of using AT after completing an AT workshop. The results indicated that the mean for the pre-workshop survey (M = 4.01, SD = .79) was significantly lower than the mean of the post-workshop survey (M = 4.88,

$SD = .74$); t(40) = 9.45, $p = .00$. The standard effect size index using Cohen's d was 1.14, which indicates a considerable and consistent difference on the 6-point Likert ratings on the pre- and post-test. The 95% confidence interval for the mean difference between the two surveys was .68 to 1.06.

Research question 2. What aspect of assistive technology do you feel like you need more instruction? After determining that the workshop was successful at influencing participant perceptions and knowledge about AT, the researchers felt that it would be beneficial to analyze the qualitative question to understand how the content and delivery could be improved for the future. The most frequent recommendation was for future training or workshops to include more examples and interaction with AT. One of the key findings of Maushak, Kelley, and Blodgett's (2000) study was that interaction and engagement with AT devices played an important role in building knowledge and confidence in using AT. While the present workshop did have participants post examples of high- and low-tech AT, they did not physically interact. Another common request was to provide more content about the process a teacher must engage in to refer a student for an AT evaluation and how to evaluate the students' ongoing use of the AT device or service. To meet this need, it is recommended that more time be allotted for a workshop than the workshop time allotted, which was two class sessions (approximately 2.5 hours in class), to further delve into the local school system's policies and procedures for AT referrals. Additionally, the IRIS module on AT provided special strategies about monitoring and assessing AT usage, so more time could have been spent discussing these components.

Discussion and Implications

The present study supports Maushak, Kelley, and Blodgett's (2001) findings that using a workshop effectively changes knowledge about AT usage, which is often best delivered through intensive AT interventions. Similar results were supported in Lamond and Cunningham's (2018) study which found that teachers need many opportunities to increase their AT knowledge. However, there were contradictory findings between the present study and Maushak, Kelley, and Blodgett's (2001) study. They determined the short, one-time exposure to AT content was not enough to make a difference in attitudes. While this is not surprising since attitudes tend to be firmly entrenched and difficult to change even with multiple exposures, this study's findings indicate that attitudes towards using AT did improve because of the workshop (Bandura, 1997).

While it is not specifically related to AT, Sayeski, Hamilton-Jones, and Oh (2015) posit that the use of IRIS Star Legacy modules have the potential to increase teachers' and pre-service teachers' knowledge and skills which is represented within the present study. We suggest that this module's use contributed to participants' perceptions of AT knowledge and use, and other teacher teachers should consider including the module in their curriculum as well.

Given the significant positive change in perception towards using AT in their future classrooms, it is recommended that TPPs continue to offer AT training and experience with the workshop model. While the workshop model showed positive results in this study and others (Lamond & Cunningham, 2018; Maushak, Kelley, & Blodgett, 2000), there may be other formats that deliver equal or more effective results. For instance, creating and delivering a solely online module or workshop on AT may be a better fit for some TPPs. Providing ongoing AT content is particularly important if ongoing and updated training is provided for teachers since

technology is constantly changing (Lee & Vega, 2005). Exploring various workshop training models is one method that could make relevant AT content more accessible to pre-service and inservice teachers, which would promote ongoing learning about devices, services, and the use of AT in their future or current classrooms.

Additionally, using a hands-on approach could enrich the participants' learning experience and impact their beliefs (Maushak, Kelley, & Blodgett, 2001). Support for a hands-on approach was also documented within the qualitative findings of the present study. It is recommended that future workshops include opportunities for participants to interact with a variety of low- and high-tech devices. The AT workshops should not be categorized as one-and-done. With the ever-changing technology advances, it is recommended that future workshops are preplanned and scheduled. The National Assistive Technology Act Technical Assistance and Training (AT3) Center is an organization that provides training and technical assistance to support quality implementation at the state and national level for AT. A primary goal of theirs is to make general AT information available to the general public and connect stakeholders with state resources (https://www.at3center.net/). One especially valuable service is to provide state by state contact information on topics such as AT programs, device loans, device demonstrations, device reutilization, and financial loans. This resource has the potential to connect teacher educators with AT professionals that could provide valuable, interactive resources for their classrooms to foster a hands-on approach to learning.

Limitations

Since participants were included from two sections of the same course which utilized the workshop, a convenience sample was used to determine the participants. However, it would have

been preferred to have had a random sample, but the study still provides valuable knowledge into the research questions and informs pedagogical practices within TPPs. Also, since a control group design was not used, a comparative study was not possible.

The participants were asked to complete the pre-test before they engaged in any content and were supposed to take the post-test after all the workshop components had been completed. Since they completed the surveys on their own and it was all self-report, if the participants did not adhere to data collection guidelines, then their answers could have potentially skewed the results. Additionally, one instructor was responsible for the delivery of the content in the workshop. Therefore, different instructor's delivery style could influence the results of the workshop.

The survey instrument used was well suited for the aims of the study, however, the reliability and validity of the instrument have not been published so further research could measure the reliability and validity of the instrument. It could also measure the study's reliability and validity with one or more open-ended questions included to determine if the addition of those questions changes the reliability or validity.

Implications for Future Research

As previously discussed, many variations could be made to the workshop model (i.e., delivery, content, time), so one possible avenue for future research is to offer the workshop based on the participants' explicit needs, which may differ from the workshop in the present study. It would also be helpful to collect data before and after the workshop with inservice teachers as participants. Additionally, it would be valuable to receive feedback from inservice teachers and use that to inform the content and delivery to pre-service teachers. Also, the workshop could be

modified to include equal time and instruction on UDL and AT which would justify assessing perceptions of both constructs.

The purpose of this study was to explore the influence an in-class workshop had on pre-service teachers' feelings of preparedness to use AT in their future classrooms. The results determined that an AT workshop significantly influences pre-service teachers' perceptions and knowledge towards using AT in their future classrooms. While this study yielded beneficial findings for teacher educators and TPPs, future research should continue to explore pedagogical practices that effectively equip the next generation of teachers to meet all students' needs in inclusive education settings through the use of AT.

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