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THE EFFECTS OF A TRAINING SESSION ON TEACHER KNOWLEDGE,  
PERCEPTIONS, AND IMPLEMENTATION OF ASSISTIVE  
TECHNOLOGY IN SECONDARY SCHOOLS

by

Robert T. Woodbury Jr.

A creative project submitted in partial fulfillment  
of the requirements for the degree

of

MASTER OF EDUCATION

in

Special Education

Approved:

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Logan, Utah

2015

## ABSTRACT

The Effects of a Training Session on Teacher Knowledge, Perceptions, and  
Implementation of Assistive Technology in Secondary Schools.

by

Robert Woodbury, Master of Education

Utah State University 2015

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Department: Special Education and Rehabilitation

Despite the prevalence of students with mild disabilities in special education and the legal mandate to consider assistive technology to support their needs, research suggests low rates of assistive technology use by this population (Bouck, Maeda, & Flanagan, 2012; Derer, Polsgrove, & Rieth, 1996; Quinn, Behrmann, Mastropieri, & Chung, 2009). One major barrier to assistive technology consideration and implementation cited by teachers is a lack of training. This study examined changes in teachers' knowledge, perceptions, and implementation of assistive technology as a result of a hands-on teacher training session. Participants included 61 regular and special education teachers and administrators in secondary public schools in one Western state. Participants completed a pre-training survey measuring their knowledge and experience with assistive technology, as well as their attitudes about using assistive technology. They then participated in a hands-on training session about assistive technology held at their school. After the training session, participants completed a post-training survey, as well as a follow-up survey given 30 days after the training session. The follow-up survey

measured changes in participant implementation of assistive technology following the training session. Results of this study show that a teacher training session improved regular and special education teachers' and administrators' knowledge and perceptions of assistive technology. The findings also show that 49% of respondents to the follow up survey reported using assistive technology in their classrooms following the training session. Implications for future research are discussed.

(69 pages)

## The Effects of a Training Session on Teacher Knowledge, Perceptions, and Implementation of Assistive Technology in Secondary Schools.

Assistive technology has the potential to help students with mild disabilities in many academic areas, including reading, writing, spelling, and organization (Edyburn, 2000; Edyburn, Higgins, & Boone, 2005). Assistive technology is formally defined in federal legislation as “any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities” (The Assistive Technology Act, P.L. 108-364, H.R. 4278, 108<sup>th</sup> Congress (2004)). Mild disabilities are typically classified as (a) specific learning disabilities, (b) speech or language impairment, (c) emotional/behavioral disorders, and (d) mild cognitive impairment (Edyburn, 2000; U. S. Department of Education, 2013). When technology was first introduced into special education over 40 years ago, it was considered primarily to help students with physical and sensory impairments and more severe needs (Blackhurst, 1997; Edyburn, 2000). However, the majority of students served today in special education have mild disabilities (U. S. Department of Education, 2013). Starting in 1997, and continuing in the 2004 re-authorization, the Individuals with Disabilities Education Act (IDEA) has included the requirement that assistive technology be considered for all students who qualify for special education, including students with mild disabilities (Individuals with Disabilities Education Improvement Act, P.L. 108-446, H.R. 1350, 108<sup>th</sup> Congress (2004)). Despite the prevalence of students with mild disabilities in special education and the legal mandate to consider assistive technology to support their needs, research suggests low

rates of assistive technology use by this population (Bouck, Maeda, & Flanagan, 2012; Derer, Polsgrove, & Rieth, 1996; Quinn, Behrmann, Mastropieri, & Chung, 2009).

Several researchers have attempted to identify barriers to assistive technology implementation for students with disabilities (Derer et al., 1996; Flanagan, Bouck, & Richardson, 2013; Lee & Vega, 2005; Wahl, 2004). In the regular education technology literature, Ertmer (1999) discussed first and second order barriers to technology integration in schools. First order barriers (extrinsic to educators) usually include a lack of resources (e.g. funding, training, infrastructure, etc.), while second order barriers are intrinsic to educators and generally consist of negative or incorrect attitudes and perceptions. According to the researchers, second order barriers were harder to recognize, and were influenced by first order barriers. For example, a teacher's beliefs that assistive technology is too time consuming and costly could be reinforced by the general lack of assistive technology devices, training, and resources available to them in their school. Researchers have identified several first and second order barriers to implementation of assistive technology, including teacher perceptions, lack of knowledge and training, cost of assistive technology, and the difficulty in using assistive technology (Derer et al., 1996; Flanagan et al., 2013; Lee & Vega, 2005).

One barrier to teacher understanding of assistive technology may be the broad federal definition of assistive technology, which comprises any device, whether low or high tech, off the shelf or highly customized, to support students with disabilities. This definition broadens the concept of assistive technology to the point of blurring the limits, especially in relation to students with mild disabilities (Edyburn, 2006). Another barrier may be the evidence that many special education teachers have little or no training in

assistive technology to support students with disabilities (Derer et al., 1996; Flanagan et al., 2013; Wahl, 2004). This lack of training and knowledge of assistive technology by special educators can result in what has been called the “consideration paradox” (Edyburn, 2006, p. 62), where IEP teams are legally mandated to consider assistive technology for all students with disabilities, but often lack the necessary knowledge to do so effectively.

Many of the above-mentioned as well as other first- and second-order barriers to technology implementation could be addressed through adequate teacher training, yet many researchers have pointed out a lack of adequate pre-service and in-service training for regular and special educators (Gronseth, 2011; Ludlow, 2001; Michaels & McDermott, 2003; Wahl 2004). In the absence of adequate pre-service teacher training in the area of assistive technology, the burden falls on schools to provide training to teachers. While lack of teacher training and understanding has been clearly identified in the research literature as a barrier to assistive technology integration in schools, more research needs to be conducted to identify the effects of teacher training on the knowledge and perceptions of regular and special educators in secondary schools. This will provide critical information and guidance to administrators and policy makers on the best way to adequately inform and train educators about assistive technology.

## **Literature Reviews**

I conducted two separate literature reviews: one on teacher knowledge and perspectives regarding assistive technology with students who have mild disabilities, and a separate one on the current status of literature on training teachers regarding assistive technology. These reviews are described below.

**Teacher knowledge and perspectives regarding assistive technology and students with mild disabilities.** I searched the EBSCO Host database (ERIC, Education Source, and PsychINFO) using the following search terms: *assistive technology, student, teacher, attitudes, and perceptions*. My database searches yielded 42 articles. I also reviewed the citations within the research articles I read to identify more resources. From that pool of articles, I focused on research studies utilizing a survey method, and from those surveys, I focused on those measuring public school teacher perceptions of assistive technology use. I found four studies surveying teacher attitudes regarding assistive technology in schools (Derer et al., 1996; Flanagan et al., 2013; Lee & Vega, 2005; Wahl, 2004).

In 1996, Derer et al. surveyed 405 teachers in three states (Indiana, Kentucky, and Tennessee) in school districts where assistive technology was known to be used. Information about which districts were using assistive technology was obtained from assistive technology centers in each state. The survey collected information on settings in which assistive technology was being used, characteristics of children using assistive technology, devices most commonly used, the purposes for which the devices were used, and perceived barriers and benefits of using assistive technology. The respondents in the study reported using assistive technology with 34% of their students. Most students receiving assistive technology services were diagnosed with specific learning disabilities, communication disorders, and intellectual disability. Students with visual impairment and physical disabilities were also served. The respondents identified the following perceived barriers to using assistive technology: (a) obtaining equipment, (b) time, (c) cost, and (d) teacher knowledge and training. Among those reported barriers, cost was



the most prevalent concern. The respondents also identified perceived benefits of assistive technology use, including improved: (a) instructional refinement (individualization to unique student needs), (b) communication, (c) independence, (d) self-concept, and (e) skill improvement. The most prevalent reported benefits of assistive technology use were student independence and self-determination. The researchers also identified a lack of understanding among some teachers of what assistive technology is. For example, 40% of the responding teachers reported no assistive technology use in their classrooms in the demographic section of the survey, but then identified several representative devices from a later list in the survey as devices they used in their classrooms. Because the field of assistive technology was still relatively young in 1996, this study provides a good historical backdrop upon which to measure more recent research findings.

Nine years after Derer et al. (1996) conducted their survey of teachers in Midwestern states, Lee and Vega (2005) surveyed 154 special education personnel in a large, mostly rural county in California, comprised of 48 school districts. The survey collected information on student demographics and backgrounds, perceived challenges and barriers to assistive technology use, types of assistive technology devices used, and teacher perceptions about their assistive technology knowledge, skills and resources. The survey respondents reported that the largest barrier to assistive technology use was a lack of teacher knowledge regarding assistive technology. Only 24.7% of respondents agreed that they had adequate assistive technology training from their teacher preparation programs, and 87.7% said their teacher preparation programs did not emphasize assistive technology. The researchers found a wide range of reported knowledge concerning

assistive technology from 22% of teachers reporting over 40 hrs of assistive technology training to 18.2% of teachers reporting no assistive technology training. Of the teachers reporting over 40 hrs of training, 71.9% agreed that assistive technology was an important part of their daily routine, 85% of them agreed they feel comfortable using it, and 67.6% agreed they could identify and use it to ensure student success. Of the teachers reporting no assistive technology training, 73.9% said assistive technology was not an important part of their daily routine, and only 8% said they could identify and use it to ensure student success. While the exact amount of training for the remainder of the teachers was not reported in the study, 48.7% of respondents reported receiving zero or very limited training (1-5 hrs). This highlights a distinct lack of assistive technology training and knowledge for almost half of the survey sample.

In a similar study of teacher knowledge and attitudes towards assistive technology, Wahl (2004) surveyed 173 special education teachers, speech language pathologists, and occupational therapists in a large suburban school district located in Northern California. Rather than ask general questions about assistive technology use, the survey asked about specific items and also about assistive technology training. Wahl found that low tech assistive technology was more well-known and available than high tech assistive technology, which is consistent with other survey findings (Flanagan et al., 2013; Gronseth, 2011). Wahl also found that 80% of respondents indicated an interest in continued assistive technology education. This finding, in addition to the low rates of teacher training found by Lee and Vega (2005), suggest a strong need for more assistive technology training for special education personnel.

A more recent survey was conducted by Flanagan et al. in 2013 focusing on teacher perceptions of assistive technology in literacy instruction for students with mild disabilities. They surveyed 51 special education teachers who taught literacy to 7<sup>th</sup>-grade students in one Midwestern state. The survey was administered to one teacher from each targeted school. Participating teachers were identified by their school principal. The 20-item survey focused on use and effectiveness of low-tech assistive technology, use and effectiveness of high-tech assistive technology, and general assistive technology use. The reported mode for use of high and low tech assistive technology by teachers was less than once per week. Low tech assistive technology use ranged from daily to never, and the reported mode for high tech assistive technology was that it was never used. The researchers found the use of high tech assistive technology correlated positively with teacher degree level. They also found teachers with high levels of confidence in using assistive technology had positive previous experiences along with effective training and knowledge. Researchers found teachers with low levels of confidence using assistive technology (over a third of the sample) reported needing additional training and knowledge about how to use it during instruction. The most frequently perceived barriers to assistive technology use were: (a) cost, (b) a need for training/lack of training, (c) difficulty in using it during instruction. The most frequently perceived factors encouraging assistive technology use were that it: (a) increased student learning, (b) provided individualized student supports, and (c) could be used by more than one student or several students at once. The authors also pointed out a gap between research and practice, in that text to speech and word prediction technologies are promoted in the

research literature as effective tools to support literacy, but these tools had the highest report of never being used by the teachers in the study.

The studies reviewed above all indicated a lack of teacher knowledge and training as a major barrier to using assistive technology with students with disabilities. They also indicated a high degree of teacher interest in more assistive technology training and a higher level of perceived confidence and use with teachers who received more training.

**Current status of literature on training teachers regarding assistive technology.** I again searched the EBSCO Host database (ERIC, Education Source, and PsychINFO), this time using the following search terms: *assistive technology, teacher training, and secondary education*. This search yielded 303 results. I excluded studies that focused on students with visual and hearing impairments, those that did not deal directly with training teachers, and those that did not employ an experimental design. I was left with two articles (Van Laarhoven et al., 2008; Wojcik, Peterson-Karlan, Watts, & Parette, 2004).

Wojcik et al. (2004) described a comprehensive assistive technology teacher preparation model designed to meet the needs of general education, special education, and early childhood education pre-service teacher candidates at one Midwestern university. The model consisted of two main components. One was a traditional component consisting of coursework and experiential activities aimed towards preparing special education and early childhood education teacher candidates to understand and use assistive technology. The other was an alternative system consisting of a series of web-based modules and hands-on experiences in the university assistive technology center designed to give regular education teacher candidates a basic understanding of assistive

technology. The regular education teachers were required to complete six on-line modules and pass an exam related to the content of the modules. They were then required to visit the university assistive technology center where they completed hands-on activities with a variety of assistive technology tools and demonstrate competence in (a) adapting text to create accessibility for persons with disabilities, (b) operate various equipment (close captioning, FM/IR listening systems, etc.) to enhance access for persons with sensory impairments, (c) use visual strategies to aid in instruction, and (d) use accessibility options in current computer operating systems. A pre- and post-survey of students completing the alternative system revealed an increase in the percentage of students rating themselves as having functionally adequate assistive technology knowledge and skills. Pre- and post- data were not collected for the traditional approach.

Van Laarhoven et al. (2008) also investigated ways to train pre-service teacher candidates about assistive technology in a university setting. They evaluated the perceived effectiveness of video based assistive technology tutorials with 188 pre-service special and elementary education teacher candidates in their junior and senior years who were enrolled in one of four targeted courses at a Midwestern university. The researchers developed a DVD with a series of video based tutorials for using various assistive software and devices, called the Encyclopedia of Assistive Technology (EAT). The EAT was given to faculty members to use in the classes they taught, including the four classes in which participants were enrolled. The participants complete pre- and post-test surveys designed to measure the effect of the EAT on (a) familiarity with specific assistive technologies, (b) comfort with using specific assistive technologies, (c) perceived effectiveness and comfort in integrating assistive technology into instruction, and (d)

attitude toward the importance of assistive technology in education. The overall results indicate that the EAT video tutorials were effective at increasing participants' familiarity, comfort level, and perceived effectiveness with using assistive technology. While the results are based on self-reports and should be interpreted with caution, they suggest that video based tutorials are an effective medium for teaching assistive technology skills. The results of this supplemental literature review highlight the need to develop basic assistive technology awareness and skills in regular education teachers and teacher candidates in addition to special education teachers and teacher candidates. They also suggest that on-line training modules, hands-on experiences, and video based tutorials are effective mediums to increase assistive technology skills in pre-service teacher candidates in university settings. These studies also highlight the fact that the limited amount of research that has been conducted concerning assistive technology training for teachers has been conducted with pre-service teacher candidates. I could find no research dealing with regular and special educators currently teaching in the public schools. Therefore further research is needed to evaluate the effects of assistive technology training with this population.

The purpose of this study is to examine the effects of an assistive technology in-service training on the knowledge and perceptions of regular and special education teachers (measured by a pre- and post-test) in secondary public schools regarding assistive technology. This study will address the following research questions:

1. Given 61 regular and special education teachers and administrators in secondary public schools, to what extent will a teacher training session affect scores on pre- and post-tests of knowledge and perceptions regarding assistive technology?

2. How do those levels of teacher knowledge and perceptions compare across various demographics (e.g. content area, grade level, experience, etc.)?
3. What impact will a teacher training session have on teacher and administrator behavior regarding assistive technology as measured by a 30 day follow up probe?

## **Method**

### **Participants**

Sixty-one licensed regular and special education teachers and administrators participated in this study. They were employed in three different secondary public schools in one mostly suburban and rural school district in one western state. Two of the schools served students in grades 6-7, and the third served students in grades 8-9. Participant ages ranged from 21 to 64 years, with a mean age of 40.6 years. Fifty-four percent of participants reported 16 or more years of teaching experience, while 25% reported teaching less than 5 years. Sixty-two percent of participants reported having a bachelor's degree, with 36% reporting a graduate degree and one participant reporting a post-graduate degree. Participants taught a variety of subjects, including English, Language Arts, Social Studies, Math, Science, Special Education, Career and Technical Education (CTE), Foreign Language, Physical Education (PE), English as a Second Language (ESL), and Music. Several participants taught more than one subject. Eighty-seven percent of participants taught regular education, with 10% teaching special education and 3% acting as school administrators. The majority of participants (97%) reported being Caucasian. Sixty-six percent of participants were female. All participants reported using instructional technology in their classrooms, but there was a wide range of

reported frequency of instructional technology use in the classroom. Most participants reported having at least some confidence in using instructional technology in the classroom. Fifty-seven percent of participants reported having less than 5 hours of assistive technology training prior to the training conducted in this study. Most participants, however, reported having at least a little experience with assistive technology prior to the training session. Table 1 shows all participant demographic data.

I recruited participants for this study by contacting school principals to explain the nature and purpose of the study and ask for permission to conduct a portion of the study at his/her school, including a training of his/her school faculty during a regularly scheduled faculty meeting or a special professional development meeting. Three principals consented to allow their faculty to participate in the study. Each licensed teacher in the participating schools was given a consent form that explained the nature and purpose of the study. The consent form defined participation in the study as (a) participation in the faculty training, (b) completion of the pre- and post-test surveys, and (c) participation in a 30-day follow-up probe to assess implementation changes in assistive technology use after the training. The consent form also explained that (a) participation in the study was purely voluntary and non-participation would not negatively affect their job, (b) a subject could decide to decline participation at any time with no negative effects to their job, (c) all data from the study would be displayed in aggregate form with all personal identifiable information removed. My contact information was also included on the consent form so that prospective participants could contact me with any additional questions.



Principals who consented to their school's participation in the study were also asked to participate in the surveys and the training session. Additionally, they were asked to help explain the nature of the study to their teachers and to endorse and encourage participation in all aspects of it. They were asked to help facilitate the logistical aspects of the training and to be present at the training as participants. One of the principals could not participate in the training session due to a last minute administrative issue that arose on the day of the training. Additionally, principals were asked to encourage completion of all surveys before and after the training session through direct communication with their teachers as needed.

### **Setting**

Staff trainings were conducted at the three participating schools on different days. Two trainings were held during a regularly scheduled faculty meeting and another was conducted on a designated professional development day. All participants attended trainings at the school where they regularly teach. The trainings were held either in a computer lab or library. Each participant had access to a computer with internet access and the Google Chrome browser during the trainings. I acted as presenter during the trainings and had access to a computer with internet access and the Google Chrome browser as well. My computer screen was displayed via a projector so as to be visible at all times to all participants.

### **Dependent Variables**

This study measured the changes in participant responses to rating-scale and open-ended questions on a pre- and post-test instrument given before and after a staff training on assistive technology. Data were aggregated and analyzed to see how

responses changed from the pre-to the post- test across participants and the group. I also analyzed how responses compared across various demographic variables, including years of experience, content area(s), grade level, etc. This study also measured how participants used and talked about assistive technology with students, colleagues, and parents approximately 30 days after the training session as well as how many participants sought out additional information about assistive technology following the training. The follow up probes utilized Yes/No questions and asked for open-ended explanations of each “yes” response.

### **Experimental Design**

This study utilized a one group pre- and post-test design (Martella, Nelson, Morgan, & Marchand-Martella, 2013) with an additional implementation probe. This design allowed comparison of participant scores before and after training. Because all teachers needed training, no control group was established.

### **Procedures**

**Instrument design and development.** The pre- and post-test instruments and follow up probes consisted of rating-scale questions, Yes/No, and brief open-ended questions. All rating scale questions used a 1-5 scale where a score of 1 represented “strongly disagree” and a 5 represented “strongly agree”. The pre- and post-tests were nearly identical (with randomized order of questions on the post-test) and were designed to assess a participant’s knowledge of and perceptions regarding assistive technology. The instruments asked questions such as, “I feel confident using assistive technology to meet individual student needs” (requiring a rating-scale response), and “What are the benefits of using assistive technology with students and during instruction?” (requiring an

open-ended response). The post-test differed slightly from the pre-test in that it included a brief section where participants were asked to rate the perceived effectiveness and social validity of the training presentation. The follow-up probe was designed to assess implementation of assistive technology in a participant's practice as a result of the training. Questions included, "Have you used assistive technology with students in the last 30 days?" (requiring a Yes/No response) and, "If yes, please explain." (eliciting an open-ended explanation of how participants used assistive technology with students). All instruments were pilot-tested by at least three teachers in the state who had special expertise in assistive technology in public schools. Their feedback was gathered and used to refine the instruments prior to actual use in the study.

**Administration of testing instruments.** Testing instruments consisted of pre- and post-training surveys and follow-up probes as described below.

***Pre- and post-training surveys.*** Pre-training surveys were administered in an online digital format using Google forms. The surveys were emailed to participants within two weeks of the scheduled training. School principals were asked to give their faculty time to complete the surveys and to remind and encourage their teachers to complete the pre-training surveys prior to the scheduled training. Participants completed the post-test surveys as the last part of the staff training to ensure completion of the survey, and to ensure that responses were made while the training was still recent in participants' memories.

***Follow up probes.*** Participants received a brief follow up probe approximately 30 days after the staff training. They were administered via email using a Google form, similar to the pre- and post-training surveys. Follow up emails were sent to those who

had not yet completed the follow up probes one and two weeks after sending it out to encourage probe completion. The response rate for the follow up probe was 61%.

**Teacher training sessions.** One training session was held at each participating school. Each training session lasted approximately 50 min. Participants were required to complete the pre-training survey before the training started. I acted as trainer for all sessions. I created a slideshow presentation using Microsoft PowerPoint to assist fidelity of presentation across different groups of participants. Copies of the presentation slides were also made available online using Google slides, and participants were provided with a link to follow along with the slides during the training or to review later. Each teacher was provided with a training packet that included a copy of the presentation slides with room to take notes, along with tutorials for downloading, accessing, and using the assistive technology tools presented in the training. Each training session consisted of four main parts:

1. An introduction to the training session and overview the history and definitions of assistive technology.
2. A demonstration of three free assistive technology tools that participants could use in instruction and to support students with disabilities.
3. A “hands-on” learning experience where participants could interact with the tools that had been demonstrated.
4. Concluding statements, questions and answers, and post-test administration.

***Introduction and overview.*** I began by briefly explaining who I was and stating the purpose of the training session. I then briefly explained the practical and legal history of assistive technology in special education. This included the federal definition of

assistive technology as first described in the Assistive Technology Act of 1998 and the inclusion of assistive technology in the Individuals with Disabilities Education Act of 1997 and 2004, including the legal mandate to consider assistive technology for all students with disabilities. I also briefly explained some representative applications of assistive technology for different disability populations, including assistive technology for those with hearing and visual impairments, physical disabilities, communication disorders, and cognitive impairments (including learning disabilities).

***Demonstration of assistive technology.*** After the introduction and overview, I briefly demonstrated three internet-based assistive technology tools: (a) Bookshare®, (b) Read&Write for Google®, and (c) SpeakIt!®. Bookshare is an organization that provides free accessible downloads of popular novels and textbooks for students with qualifying print disabilities. The downloaded books can then be read by an application on a computer or mobile device. The Read&Write for Google®, and SpeakIt!® tools are extensions for the Google Chrome internet browser that provide text to speech services on webpages and in Google Docs. Before demonstrating how to use the tools, I briefly explained the Google Chrome Web Store and the concept of installing apps and extensions to the Google Chrome internet browser. I then demonstrated all three tools from the perspective of increasing student success and independence. After that, I also demonstrate how to integrate the Read&Write for Google®, and SpeakIt!® tools into classroom instruction from a Universal Design for Learning (UDL) approach.

***Hands-on experience with assistive technology.*** I then instructed each participant to open up the Google Chrome internet browser on the computer in front of them and instruct them to sign into their Google account provided them by their school

district that they regularly used for accessing Gmail, Google drive, and other Google apps. I then guided participants through the process of accessing the Google Chrome Web Store and finding and installing the Read&Write for Google®, and SpeakIt!® extensions with the help of the step by step tutorials provided in the training packet. I modeled each step of the process using a computer and projector in conjunction with verbal instructions and the provided paper tutorials. Participants were then instructed to open up a pre-made Google document containing expository text. They could access the document through an online link provided on the training slides or sent to them in a previous email. I encouraged them to practice using the Read&Write for Google® tool to read text from the document aloud via text to speech. I again provided a model along with verbal instructions and a printed tutorial in the training packet. After allowing participants to practicing with the Read&Write for Google® tool for 3-5 min, I then instructed participants to click on a link in the Google Doc that sent them to a pre-selected webpage. I again guided participants using the above-mentioned techniques to practice reading the webpage aloud using the SpeakIt! ® tool. After using the SpeakIt! ® tool for 3-5 min, participants were directed to another Google document with a lesson plan template. They were first shown how to make and save a copy of the document into their own Google drive, and were then were instructed to take approximately 5-10 min and complete the template to create a lesson plan on how they could integrate assistive technology into a lesson they would be teaching in the next 2 to 3 weeks.

***Conclusion, questions and post-test.*** The training concluded with a brief summary of the important points from the training, including important definitions and examples of assistive technology. I explained the 30-day follow-up probe and allowed

participants to ask questions or make final comments. After that, participants were directed to my contact information in the training packet and encouraged to contact me at any time with further questions. Lastly, participants were then instructed to click on the last link in the Google Doc still open in front of them, which directed them to complete the post-test instrument.

**Training presentation fidelity.** Each school principal was asked to complete a training fidelity checklist during the training session, or to ask one of their faculty members to do it. The checklist contained all of the important points of the training in the order they were presented, along with blank check boxes at the end of the form. The checklist was organized in an outline format to help the faculty member stay organized. The designated faculty member was directed to mark an x in the corresponding checkbox for each item covered by the presenter during the training session. Items not covered by the presenter were to be left blank. Additional items that were covered by the presenter, but were not in the original presentation outline were to be recorded by checking a blank checkbox at the bottom of the form and noting the nature of the additional material. Training fidelity checklists were only completed for two of the three participating schools. For two schools of the three participating schools, the principal or assistant principal completed the checklist. The administrator at the third school was unable to attend himself due to an unforeseen administrative issue, and did not designate somebody else to complete it. I gathered the checklists after the training sessions. In both cases where the checklist was completed, no additional items were marked as being added to the training and one item was omitted from each training session. In both cases, the

omitted item was a demonstration of the Bookshare® book reading software due to problems with the presentation computers used during the training.

### **Data Analysis**

Demographic information are displayed in a table. Participant responses to rating-scale questions are displayed in a table showing the mean responses to each question, as well as standard deviation and the difference between mean responses on each question. Answers to open ended questions were analyzed and categorized according to common themes. Those common themes are displayed in a table and excerpts of open-ended questions that represent the most commonly represented themes will be included in the written results. Follow up probe data are displayed in a table showing responses to Yes/No questions.

## **Results**

### **Pre- and Post-Training Ratings**

Table 2 shows findings from participant responses to rating scale questions for the total sample. Participant self-rating scores ranged from 1 to 5, with mean scores ranging from 2.3 to 4.4 on pre- and post-training surveys. Participant self-ratings increased from the pre-training survey to the post-training survey on all questions except for two dealing with participants' perceived need and desire for more training, which either decreased slightly or did not change significantly. The mean score on participants' perceived knowledge of assistive technology improved modestly from a score of 2.8 before the training session to 3.2 afterwards. Likewise, participant ratings of their perception of the value of assistive technology improved from mean scores of 4.0 and 4.1 to scores of 4.3



and 4.4. These two questions showed the least amount of increase from pre to post training responses. Participant ratings of their confidence in using assistive technology with students ranged from mean scores of 2.3 to 2.8 before the training session. After the training session, participant mean scores on the same questions increased to a range of 3.3 to 3.6. The largest increases in participant scores from pre to post training surveys were on questions dealing with confidence in finding and evaluating assistive technology resources (from 2.3 to 3.4) and using assistive technology to support reading (from 2.6 to 3.6). Both of these aspects were areas of heavy focus during the training sessions. As mentioned previously, two questions dealing with participants' perceived need and want for more training regarding assistive technology either decreased or did not change significantly, moving from pre-training scores of 4.0 and 4.2 to post-training scores of 4.0 and 3.8, respectively. The standard deviation of pre-training rating-scale scores ranged from 1.0 to 1.3. The standard deviation of post-training rating-scale scores ranged from 0.7 to 1.2.

### **Responses to Open-Ended Questions**

As shown in Table 3, participant responses to open-ended questions regarding perceived barriers to and benefits of assistive technology implementation yielded several common themes. The most common responses to the pre-training survey were, first, a lack of knowledge/training, and second, a lack of resources/cost of obtaining sufficient technology. Other common responses included a lack of time to use technology, unreliable and changing technology, lack of student motivation, class size/hard to individualize, and other various factors, including responses by several PE teachers stating difficulties in integrating technology into PE classes. After the training session,

participants reported a lack of resources as being the largest perceived barrier, with lack of knowledge/training and time being commonly perceived barriers as well. One participant commented about the lack of resources, stating, “Even though the app is free, the student may or may not have access to a computer.” Another said, “I don’t have access to a Chromebook for every student very frequently.” Other perceived barriers reported on the post-training survey include class size/difficult to individualize, unreliable technology, lack of student motivation, and other various factors, including comments by PE teachers and a Music teacher about difficulty using technology with those subjects. Interestingly, six participants specifically mentioned on the post-training survey that they needed more time to practice using assistive technology before being able to use it effectively with students. One participant, for example, stated, “I just need to learn how to use it myself REALLY WELL before I try to use it with students.” Another stated that she needed “to get comfortable through usage.”

Before the training session, participants reported the ability of assistive technology to remove barriers to learning as the most common benefit to assistive technology implementation. Before the training, one participant stated that assistive technology, “would help them [the students] access the information more easily and produce evidence of their learning. It would make learning more accessible and less frustrating for them.” Participants also included general statements about increasing student success, increasing student engagement, and the ability to support diverse learners. They also reported the ability of technology to improve classroom instruction, student interest in technology, and other factors. The most commonly reported benefits of assistive technology on the post-training survey were increasing student success,

removing barriers to learning, and supporting diverse learners/individualizing instruction. For example, one participant stated, "It could help struggling students be more successful in a regular classroom setting." Some previously mentioned benefits, such as increasing student engagement was also reported to a lesser degree after the training than before. Participants also included the fact that students enjoy technology and technology can improve instruction. Interestingly, eight respondents specifically reported that assistive technology could increase student reading on the post-training survey, while reading was not specifically mentioned at all prior to the training session. One participant, for example, stated that assistive technology could "Help [students] become involved and [be] able to overcome personal inhibitors to reading." Another participant stated, "I think this will help them read more quickly and with less distraction."

To sum up the overall trends in open-ended response data, a lack of resources/cost was the second most frequently reported barrier to assistive technology implementation before the training session and the most frequent reported barrier after the training session. The number of respondents reporting lack of knowledge and training dropped from 26 (42.6%) before the training to 14 (23%) after the training. The most frequently reported benefit to AT implementation before the training session was its ability to remove barriers to learning. The most frequently reported benefit after the training session was its ability to increase student success. The number of participants reporting that assistive technology can improve student success in general increased from 14 (23%) before the training to 23 (37.7%) after the training. The ability of assistive technology to support diverse learners and improve individualization of instruction increased slightly

from 12 (19.7%) before the training to 15 (24.6%) afterwards. Table 3 shows responses to open-ended questions regarding perceived benefits and barriers.

### **Response Data Analyzed By Demographic Categories**

Participant response data were also sub-divided and analyzed according to various demographic categories. While the total sample of participants was distributed fairly evenly between certain demographic categories such as age, and education level, some caution must be used when analyzing response data according to other categories. The total sample included nearly twice as many female participants as male participants, and nearly twice as many participants with a bachelor's degree versus a graduate or post-graduate degree. The distribution of participants according to years of teaching experience was much greater on the ends of the spectrum, with 38% reporting 21 or more years and 25% reporting less than 5 years. Thirty percent of the total sample reported teaching English, while only 3% of the total sample reported teaching either Art/Music/Drama, a Foreign Language, English as a Second Language (ESL), or being school administrators. Several participants also reported teaching more than one subject. Notably, almost half of the History/Social Studies teachers also taught English. Participants who reported being 20-29 years old had the highest pre-training mean scores on Likert scale questions. Those respondents who reported teaching Special Education, Foreign Language, ESL, and being school administrators also tended to have higher pre-training mean scores. Pre-training means scores did not significantly differ when subdivided by gender, education level, or years of teaching experience. In general, younger participants and those with less teaching experience reported higher post-training mean scores. Female participants reported higher post-training mean scores than male

participants. Participants who taught Special Education, History/Social Studies, Foreign Language, ESL, and school administrators reported the highest post-training scores. When looking at the amount of change from pre to post-training scores, it should be noted that, in general, demographic groups that reported higher pre-training scores showed less dramatic differences from pre-to post-training. The groups that showed the greatest differences between pre and post-training scores were those in the 30-39 age range, those with 5-10 years teaching experience, and those who taught History/Social Studies, and Foreign Language. Female participants showed greater differences in scores than male participants. Table 4 shows participant responses to Likert scale questions analyzed by demographic categories.

### **Follow Up Survey Responses**

Table 5 shows participant responses to the 30-day follow up survey. Thirty-seven participants responded to the 30-day follow up survey, which is a 61% response rate. Forty-nine percent of respondents reported using assistive technology in their classroom in one capacity or another within 30 days after the training session. They reported using a wide variety of assistive technology, with text to speech and iPads being the most commonly reported tools. Thirty-two percent reported providing alternative access to instructional materials, using a variety of tools from books on CD to emailed notes and use of Skype video-conferencing technology to share classroom content with a homebound student with disabilities. Twenty-seven percent reported using assistive technology to support reading, with the majority using text to speech tools. Also, 22% of respondents reported using assistive technology to support writing using a variety of low and high-tech tools. Thirty-five percent of respondents reported talking to colleagues

about assistive technology. They reported talking about text to speech tools, Bookshare®, portable keyboards, and other tools. Thirty-two percent of respondents reported talking to students. They primarily shared the Read&Write for Google®, and (c) SpeakIt!® tools discussed in the training sessions. Lastly, 14% reported talking to parents about various assistive technology tools and strategies. Also, 11% of respondents reported seeking additional information about assistive technology. It is possible that the 30 day follow up survey data reflect an over-estimation of the actual amount of increase in assistive technology implementation for the total sample size as a result of the training session. This may be because participants who had not implemented assistive technology in their classrooms were probably less likely to respond to the follow up survey.

### **Social Validity**

The post-training surveys also included questions addressing participant perceptions of the effectiveness of the training session and the applicability of the training session to each participant's professional situation. These questions utilized the same 1-5 rating scale as all other rating scale questions used in the pre- and post-training surveys. Scores on post-training questions regarding the perceived effectiveness and social validity of the trainings ranged from 2 to 5, with mean scores ranging from 4.1 to 4.7 depending on the question. When asked what could have been done to improve the trainings, many participants responded that more time and more training would be helpful, and several participants commented that more specific examples of how to use assistive technology in the classroom, particularly with other subjects would be helpful. For example, one participant asked for, "More examples from teachers who have used

AT in the classroom.” Another participant asked to “think of math related ideas.” Social validity scores are included in Table 2.

### **Discussion**

The findings of this study show that a teacher training session can modestly improve regular and special education teachers’ and administrators’ knowledge and perceptions of assistive technology. Participants generally responded that the training material was relevant and important to their situations as educators, and many participants commented that they needed more training and time to practice with assistive technology tools. Teacher perceptions of the importance and effectiveness of assistive technology improved the most for those in the 30-39 age range and for those who had taught for 5-10 years. This might possibly reflect a point in a teaching career where educators feel more comfortable with the basics of teaching (e.g. classroom management, grading, curriculum, etc.) and are ready to expand their knowledge and effectiveness by looking for technology interventions to target struggling students and differentiate instruction. Teachers who taught content areas relating to History/Social Studies, Foreign Language, ESL, Special Education, Career/Technical Education, and English reported the most positive rankings of their perceptions and knowledge. This could be because these teachers work more closely with at-risk students, such as English language learners and students with disabilities, or also because the tools demonstrated in the training focused heavily on reading, which are a large focus of these subjects. It should also be noted that almost half of the History/Social Studies teachers also taught English, so there could have been some cross-over between the two groups. Several math teachers asked about the possibility of using these tools to help struggling students access story

problems in math, but we found that the tools that were demonstrated during the training were not compatible with the online math curriculum used in their schools, which could have negatively biased their responses in this study.

Participation rates at each individual school were less than 100% due to several factors, such as refusal to participate and scheduling conflicts. This non-participation bias will have to be considered when interpreting results from each school and from the larger sample in general.

The findings of 30-day follow-up probe data show that 49% of participants reported using assistive technology in their classrooms following the training session. Several participants also reported sharing information about assistive technology and seeking out additional information regarding assistive technology following the training session. These data should be interpreted with caution, as not all respondents completed 30-day follow-up surveys and those that completed the follow-up surveys were probably more likely to indicate increased assistive technology use than non-responders. There is also no way to definitively conclude that reported teacher behavior on the follow up survey is a direct result of the training sessions, as several teachers could have already been using assistive technology before the training session or obtained information about assistive technology from other sources. Social validity data show that teachers generally favored the training sessions as an effective way to learn about assistive technology. Several participants indicated an interest in receiving more assistive technology training and in having more time to practice using the technology before using it in a classroom situation.



One issue that became apparent during the course of this study was that many regular education teachers do not clearly understand the difference between instructional technology and assistive technology. This problem was further compounded by the line between the two becoming increasingly blurred in recent years as technology tools that were once considered only for persons with disabilities, such as speech recognition, word prediction, and text to speech have become readily available on many mainstream technology platforms and devices and are therefore no longer related solely with persons with disabilities. With that in mind, it is possible that some participants may have responded to survey questions about assistive technology from a broader instructional technology viewpoint.

The existing research on teacher perceptions of assistive technology indicate a strong perceived need by in-service teachers for more training on the topic (Flanagan et al., 2013; Lee & Vega, 2005; Wahl 2004). The findings from the current study add to the existing research by examining how a brief teacher training session affected teacher perceptions of assistive technology. The findings of this study also expand the research literature on assistive technology training (which has focused almost exclusively on pre-service teacher training) to training in-service teachers. This study also examined the effects of training on not only special education teachers, but also regular education teachers and administrators. In contrast, most existing assistive technology research has focused solely on special educators.

Several limitations of this study should be noted and discussed. One limitation of this study was the small size and relative homogeneity of the sample, as all participants resided in one western state and worked in one rural/suburban school district. Future

research could be conducted with teachers from other geographic regions and include teachers from urban school districts. Another limitation of this study was the quantity and duration of the training provided. Each participant only received one training session that lasted for less than 1 hr. Future research could examine the effects of multiple trainings or one single training of longer duration. A third limitation of this study was the lack of support, coaching, and follow up provided to participants after the initial training. Follow up probes of assistive technology implementation rates were only conducted 30 days after the training session. Future research could examine the more lasting effects of implementation rates as a result of training by conducting follow up probes 3-6 months after the initial training. Joyce and Showers (2002) indicate that “one shot” teacher trainings do not produce implementation results to the same level as trainings combined with coaching. Future research could examine the effects of a teacher training on assistive technology combined with expert or peer coaching on the implantation of assistive technology in the classroom. As mentioned previously, future research should also take into account the increasingly blurred lines between instructional technology and assistive technology and possible misunderstandings participants may have about the difference between the two.

A few limitations should also be noted regarding participant behavior regarding assistive technology implementation as reported on the 30 day follow up probe. First, it is impossible to determine from this study that teacher reported behaviors on the follow up probe were a result of the training session, because no assistive technology implementation data were collected prior to the training session to use for pre- post-comparisons. Also, respondent demographic data were not collected as part of the 30 day

follow up probes, which prevents making comparisons between various demographic categories. It should also be noted that 30 day follow up probes data were based on self-reported information rather than direct observation of behavior. Further research should address some of these issues through collecting better assistive technology implementation data prior to participant training. Future researchers could also collect respondent demographic information to allow for comparisons of the rates of assistive technology implementation among different demographic categories, particularly between regular education and special education teachers. Also, follow up data in future research could be based on direct observation of participant behavior in the classroom rather than relying on a self-reporting mechanism for data collection.

In conclusion, this research study shows that providing training to in-service teachers and administrators can positively impact their perceptions and knowledge of assistive technology. In order to better serve students with disabilities, as well as other at-risk students who may or may not qualify for special education, further efforts should be made to train and support the regular education and special education teachers who work daily with students who could benefit from using assistive technology on a more frequent and consistent basis.

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## Tables

Table 1

### *Participant Demographic Information*

**N Respondents = 61                      59 teachers      2 administrators**

<u>Mean Age</u>	<u>Range</u>				
40.6	21-64				
<u>Male</u>	<u>Female</u>				
21=34.4%	40=65.6%				
<u>Race/Ethnic Background</u>					
Caucasian	African-American	Hispanic/Latino	Asian-American	Native-American	Other
59=96.7%	0%	0%	1=1.6%	0%	1=1.6%
<u>Education Level</u>					
Bachelors	Graduate	Post-Graduate			
38=62.3%	22=36%	1=1.6%			
<u>Teaching Experience</u>					
<5 years	5-10 years	11-15 years	16-20 years	21+ years	
15=24.6%	8=13.1%	5=8.2%	10=16.4%	23=37.7%	
<u>Content Areas Taught</u>					
English/ Language Arts	Math	Science	Special Education	CTE	Social Studies
18=29.5%	9=14.8%	9=14.8%	6=9.8%	5=8.2%	5=8.2%
Physical Education	Art/ Music/ Drama	Foreign Language	ESL	Administration	
5=8.2%	2=3.3%	2=3.3%	2=3.3%	2=3.3%	
<u>Previous Assistive Technology Training</u>					
None	<5 hrs	5-10 hrs	11-20 hrs	20+ hrs	
0%	35=57.4%	12=19.7%	9=14.8%	5=8.2%	

**Previous experience with assistive technology**

No Experience	Little Experience	Some Experience	Lot of Experience
6=9.8%	19=31.1%	22=36%	14=23%

**Frequency of Instructional Technology Use in the Classroom**

Once per week or less	2-3 times per week	Once per day	Multiple times per day	Once per class period	Multiple times per period
9=15.3%	9=15.3%	6=10.2%	14=23.7%	10=16.9%	11=18.6%

**Confidence Level of Using Instructional Technology in the Classroom**

No Confidence	Some Confidence	Confidence	Great Confidence
2=3.4%	23=39%	24=40.7%	10=16.9%



Table 2

*Participant Responses to Rating Scale Questions-Total Sample  
(1=Strongly Disagree, 5=Strongly Agree)*

<b>Rating Scale Questions</b>	<b>Pre-training Mean Scores</b>	<b>Standard Deviation</b>	<b>Post-training Mean Scores</b>	<b>Standard Deviation</b>	<b>Difference Between Pre and Post Mean Scores</b>
I consider myself knowledgeable about assistive technology. (E.g. portable keyboards, special computer programs, etc.)	2.836	1.065	3.246	1.173	0.410
I believe assistive technology can improve student performance.	4.098	1.106	4.377	0.687	0.279
I believe assistive technology can improve classroom instruction.	4.000	1.000	4.262	0.751	0.262
I want to learn more about assistive technology.	4.000	1.080	3.951	0.884	-0.049
I need more training about assistive technology.	4.213	0.951	3.770	1.023	-0.443
I feel confident in using assistive technology to meet individual student needs.	2.770	1.203	3.410	1.070	0.639
I feel confident in providing alternative access to instructional materials for students with disabilities.	2.836	1.280	3.393	1.130	0.557
I feel confident in using assistive technology to support reading in my class.	2.644	1.110	3.576	1.054	0.932

I feel confident in using assistive technology to support writing in my class.	2.780	1.247	3.271	1.112	0.492
I feel confident in integrating assistive technology into classroom instruction.	2.814	1.121	3.407	1.205	0.593
I feel confident in finding and evaluating assistive technology resources to use with students.	2.328	1.121	3.377	1.067	1.049
The information presented in this training is important to me.			4.230	0.804	
The information presented in this training pertains to my personal situation as an educator.			4.115	0.896	
The presenter and the training material were engaging and informative.			4.656	0.544	

Table 3

*Perceived Barriers and Benefits to Assistive Technology Implementation***Perceived Barriers to Assistive Technology Implementation**

	Responses	Percentage of Total Respondents
<i>Pre-Training</i>		
Lack of knowledge/Training	26	42.6%
Lack Resources/Cost	20	32.8%
Time	8	13.1%
Technology unreliable	7	11.5%
Changing technology	4	6.6%
Lack of student motivation	4	6.6%
Class size/difficult to individualize	4	6.6%
Other	7	11.5%
<i>Post-training</i>		
Lack of resources	23	37.7%
Lack of knowledge/training	14	30.0%
Time	12	19.7%
Class size/difficult to individualize	6	9.8%
Need time to practice with the technology	6	9.8%
Technology unreliable	4	6.6%
Lack of student motivation	2	3.3%
Other	7	11.5%

**Perceived Benefits of Assistive Technology Implementation**

<i>Pre-training</i>		
Remove barriers to learning	18	29.5%
Increase student success	14	30.0%
Increase student engagement	12	19.7%
Support diverse learners/individualize	12	19.7%
Improve classroom instruction	7	11.5%
Students enjoy technology	4	6.6%
Other	7	11.5%

*Post-training*


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Increase student success	23	37.7%
Remove barriers to learning	20	32.8%
Support diverse learners/individualize	15	24.6%
Increase student engagement	8	13.1%
Improve reading	8	31.1%
Students enjoy technology	3	4.9%
Improve instruction	2	3.3%

Table 4  
*Mean Responses to Rating Scale Questions by Demographic Category*

<b>Category (N=61)</b>	<b>n=</b>	<b>Pre-Training Mean Score</b>	<b>Pre-Training Standard Deviation</b>	<b>Post-Training Mean Score</b>	<b>Post-Training Standard Deviation</b>	<b>Difference Between Pre- and Post- Training Mean Score</b>
<b>Age</b>						
<b>60+</b>	<b>10</b>	<b>3.008</b>	1.277	<b>3.348</b>	1.146	<b>0.340</b>
<b>50-59</b>	<b>12</b>	<b>2.910</b>	0.893	<b>3.269</b>	0.966	<b>0.359</b>
<b>40-49</b>	<b>15</b>	<b>3.190</b>	1.232	<b>3.595</b>	1.09	<b>0.405</b>
<b>30-39</b>	<b>10</b>	<b>3.131</b>	1.143	<b>3.769</b>	0.778	<b>0.638</b>
<b>20-29</b>	<b>10</b>	<b>3.523</b>	0.812	<b>3.777</b>	0.754	<b>0.254</b>
<b>Gender</b>						
<b>Male</b>	<b>21</b>	<b>3.005</b>	1.016	<b>3.24</b>	1.014	<b>0.235</b>
<b>Female</b>	<b>40</b>	<b>3.200</b>	1.146	<b>3.712</b>	0.999	<b>0.512</b>
<b>Education</b>						
<b>Masters</b>	<b>22</b>	<b>3.191</b>	1.181	<b>3.512</b>	1.092	<b>0.321</b>
<b>Bachelors</b>	<b>38</b>	<b>3.134</b>	1.042	<b>3.609</b>	0.954	<b>0.475</b>
<b>Teaching Experience</b>						
<b>21+ years</b>	<b>23</b>	<b>2.948</b>	1.128	<b>3.15</b>	1.054	<b>0.202</b>
<b>16-20 years</b>	<b>10</b>	<b>3.292</b>	1.160	<b>3.515</b>	1.083	<b>0.223</b>
<b>11-15 years</b>	<b>5</b>	<b>3.385</b>	1.218	<b>3.785</b>	0.947	<b>0.400</b>
<b>5-10 years</b>	<b>8</b>	<b>2.894</b>	0.989	<b>3.923</b>	0.972	<b>1.029</b>
<b>&lt;5 years</b>	<b>15</b>	<b>3.349</b>	0.936	<b>3.795</b>	0.804	<b>0.446</b>

<b>Subject(s) Taught</b>						
<b>Science</b>	<b>9</b>	<b>3.000</b>	1.150	<b>3.222</b>	0.923	<b>0.222</b>
<b>PE</b>	<b>6</b>	<b>2.769</b>	1.006	<b>3.338</b>	1.09	<b>0.569</b>
<b>Math</b>	<b>10</b>	<b>2.838</b>	1.115	<b>3.239</b>	1.05	<b>0.401</b>
<b>Special Education</b>	<b>6</b>	<b>3.654</b>	0.900	<b>3.833</b>	0.845	<b>0.179</b>
<b>History/Social Studies</b>	<b>9</b>	<b>3.154</b>	0.914	<b>3.877</b>	0.498	<b>0.723</b>
<b>English</b>	<b>18</b>	<b>3.256</b>	1.152	<b>3.761</b>	1.058	<b>0.505</b>
<b>CTE</b>	<b>5</b>	<b>3.154</b>	0.830	<b>3.738</b>	1.07	<b>0.584</b>
<b>Art/Music/Drama</b>	<b>2</b>	<b>2.423</b>	1.033	<b>2.462</b>	1.197	<b>0.039</b>
<b>Administrator</b>	<b>2</b>	<b>3.950</b>	0.919	<b>4.25</b>	0.636	<b>0.300</b>
<b>Foreign Language</b>	<b>2</b>	<b>3.538</b>	0.653	<b>4.346</b>	0.381	<b>0.808</b>
<b>ESL</b>	<b>2</b>	<b>3.462</b>	0.544	<b>4.115</b>	0.272	<b>0.653</b>

Table 5  
*Participant Responses to 30 Day Follow Up Survey*

	Yes	No	Percent of Yes Responses
Have you used assistive technology with students in the last 30 days?	18	19	49%
Have you provided alternative access to instructional materials for students in the last 30 days?	12	25	32%
Have you used assistive technology to support student reading in the last 30 days?	10	27	27%
Have you used assistive technology to support student writing in the last 30 days?	8	29	22%
Have you integrated assistive technology into classroom instruction in the last 30 days?	11	26	30%
Have you talked to another teacher about assistive technology in the last 30 days?	13	24	35%
Have you talked to a parent about assistive technology in the last 30 days?	5	32	14%
Have you talked to students about assistive technology in the last 30 days?	12	25	32%
Have you sought more information about assistive technology in the last 30 days?	4	33	11%

## Appendix

## Assistive Technology Survey

This brief survey will ask you questions about your current knowledge and perceptions about assistive technology. Assistive technology is a term to describe any technology that is used to help students with disabilities in school, at home and in the community and may include tools such as special computer applications (e.g. text to speech, word prediction, speech recognition), portable keyboarding devices, wheelchairs, talking calculators, etc.. Note: Some survey questions may ask about instructional technology, which is a broader term than assistive technology and encompasses any technology used in a classroom to help all students.

\* Required

1. How confident do you feel using instructional technology in your classroom? (E.g. smartboards, document cameras, tablets, etc.) \*

Mark only one oval.

- ☐ Not confident at all
- ☐ Somewhat Confident
- ☐ Confident
- ☐ Really Confident

2. How frequently, on average, do you use instructional technology in your classroom?

Mark only one oval.

- ☐ Once per week or less
- ☐ 2-3 times per week
- ☐ Once per day
- ☐ Multiple times per day
- ☐ Once per every class period
- ☐ Multiple times in every class period

3. I consider myself knowledgeable about assistive technology. (E.g. portable keyboards, special computer programs, etc.) \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree



4. How much assistive technology training have you received (including college)? \*

Mark only one oval.

- ☐ <5 hours
- ☐ 6-10 hours
- ☐ 11-20 hours
- ☐ 21+ hours

5. I have experience using assistive technology with individual students. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

6. I have experience integrating assistive technology into classroom instruction. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

7. I believe assistive technology can improve student performance. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

8. I believe assistive technology can improve classroom instruction. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

9. I feel confident in finding and evaluating assistive technology resources to use with students. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

10. I feel confident in using assistive technology to meet individual student needs. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree Strongly Agree

11. I feel confident in providing alternative access to instructional materials for students with disabilities. \*

Mark only one oval.

1 2 3 4 5

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Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

12. I feel confident in using assistive technology to support reading in my class. \*

Mark only one oval.

1 2 3 4 5

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Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

13. I feel confident in using assistive technology to support writing in my class. \*

Mark only one oval.

1 2 3 4 5

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Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

14. I feel confident in integrating assistive technology into classroom instruction. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

15. I need more training about assistive technology. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

16. I want to learn more about assistive technology. \*

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

17. What makes it difficult for you to use assistive technology with students? \*

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18. What are some of the benefits of using assistive technology with students? \*

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19. Age \*

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20. Gender \*

Mark only one oval.

- ☐ Male
- ☐ Female

21. Ethnicity \*

Mark only one oval.

- ☐ White
- ☐ Black or African-American
- ☐ Hispanic or Latino
- ☐ Asian / Pacific Islander
- ☐ Native-American or American Indian
- ☐ Other

22. Choose the highest level of educational degree you have completed. \*

Mark only one oval.

- ☐ Bachelors
- ☐ Masters
- ☐ Doctorate

23. How many years of teaching have you completed? \*

Mark only one oval.

- ☐ <5 years
- ☐ 5-10 years
- ☐ 11-15 years
- ☐ 16-20 years
- ☐ 21+ years

24. Which subject(s) you currently teach? \*

Check all that apply

Check all that apply.

- ☐ English/Language Arts
- ☐ Math
- ☐ Science
- ☐ History/Social Studies
- ☐ CETS
- ☐ Art/Music/Drama
- ☐ Physical Education
- ☐ Foreign Language
- ☐ Special Education
- ☐ Speech-Language Pathology
- ☐ School Administrator
- ☐ Other:

25. \*Post-Test Only: The information presented in this training is important to me.

Mark only one oval.

	1	2	3	4	5	
Disagree Strongly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree Strongly

26. **\*Post-Test Only:** The information presented in this training pertains to my personal situation as an educator.

*Mark only one oval.*

	1	2	3	4	5	
Disagree Strongly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree Strongly

27. **\*Post-Test Only:** The presenter and the training material were engaging and informative.

*Mark only one oval.*

	1	2	3	4	5	
Disagree Strongly	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Agree Strongly

28. **\*Post-Test Only:** What would you change to make this training better?

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Administrator Version:

## Assistive Technology Survey

This brief survey will ask you questions about your current knowledge and perceptions about assistive technology. Assistive technology is a term to describe any technology that is used to help students with disabilities in school, at home and in the community and may include tools such as special computer applications (e.g. text to speech, word prediction, speech recognition), portable keyboarding devices, wheelchairs, talking calculators, etc..

\* Required

1. I consider myself knowledgeable about assistive technology. (E.g. portable keyboards, special computer programs, etc.) \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree Strongly Agree

2. How much assistive technology training have you received (including college)? \*

Mark only one oval.

☐ <5 hours

☐ 6-10 hours

☐ 11-20 hours

☐ 21+ hours

3. I have experience using assistive technology with individual students. \*

Mark only one oval.

1 2 3 4 5

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Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

4. I have experience integrating assistive technology into classroom instruction. \*

Mark only one oval.

1 2 3 4 5

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Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

5. I believe assistive technology can improve student performance. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

6. I believe assistive technology can improve classroom instruction. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree Strongly Agree

7. I feel confident in finding and evaluating assistive technology resources to use with students. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree Strongly Agree

8. I feel confident in using assistive technology to meet individual student needs. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree Strongly Agree

9. I feel confident in providing alternative access to instructional materials for students with disabilities. \*

Mark only one oval.

1 2 3 4 5

Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

10. I need more training about assistive technology. \*

Mark only one oval.

1 2 3 4 5

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Strongly Disagree ☐ ☐ ☐ ☐ ☐ Strongly Agree

11. I want to learn more about assistive technology. \*

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

12. What makes it difficult for teachers in your school to use assistive technology with students? \*

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13. What are some of the benefits of using assistive technology with students in your school? \*

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14. Age \*

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15. Gender \*

Mark only one oval.

☐ Male

☐ Female

16. Ethnicity \*

Mark only one oval.

☐ White

☐ Black or African-American

☐ Hispanic or Latino

☐ Asian / Pacific Islander

☐ Native-American or American Indian

☐ Other



17. Choose the highest level of educational degree you have completed. \*

Mark only one oval.

- ☐ Bachelors
- ☐ Masters
- ☐ Doctorate

18. How many years of teaching have you completed? \*

Mark only one oval.

- ☐ <5 years
- ☐ 5-10 years
- ☐ 11-15 years
- ☐ 16-20 years
- ☐ 21+ years

19. \*Post-Test Only: The information presented in this training is important to me.

Mark only one oval.

1 2 3 4 5

Disagree Strongly ☐ ☐ ☐ ☐ ☐ Agree Strongly

20. \*Post-Test Only: The information presented in this training pertains to my personal situation as an administrator.

Mark only one oval.

1 2 3 4 5

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Disagree Strongly ☐ ☐ ☐ ☐ ☐ Agree Strongly

21. \*Post-Test Only: The presenter and the training material were engaging and informative.

Mark only one oval.

1 2 3 4 5

Disagree Strongly ☐ ☐ ☐ ☐ ☐ Agree Strongly

22. \*Post-Test Only: What would you change to make this training better?

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23. \*Post-Test Only: What additional information and/or training does your faculty need to better understand and use assistive technology? \*

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## Follow-up survey

This brief survey is a follow-up to the assistive technology training session you attended at your school approximately 30 days ago. Your participation is greatly appreciated.

**\* Required**

1. Have you used assistive technology with students in the last 30 days? \*

*Mark only one oval.*

- ☐ Yes  
☐ No

2. If you marked "Yes", please explain.

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3. Have you provided alternative access to instructional materials for students in the last 30 days? \*

*Mark only one oval.*

- ☐ Yes  
☐ No

4. If you marked "Yes", please explain.

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5. Have you used assistive technology to support student reading in the last 30 days? \*

*Mark only one oval.*

- ☐ Yes  
☐ No

6. If you marked "Yes", please explain.

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7. Have you used assistive technology to support student writing in the last 30 days? \*

*Mark only one oval.*

☐ Yes

☐ No

8. If you marked "Yes", please explain.

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9. Have you integrated assistive technology into classroom instruction in the last 30 days? \*

*Mark only one oval.*

☐ Yes

☐ No

10. If you marked "Yes", please explain.

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11. Have you talked to another teacher about assistive technology in the last 30 days? \*

*Mark only one oval.*

☐ Yes

☐ No

12. If you marked "Yes", please explain.

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13. Have you talked to a parent about assistive technology in the last 30 days? \*

*Mark only one oval.*

- ☐ Yes  
☐ No

14. If you marked "Yes", please explain.

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15. Have you talked to students about assistive technology in the last 30 days? \*

*Mark only one oval.*

- ☐ Yes  
☐ No

16. If you marked "Yes", please explain.

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17. Have you sought more information about assistive technology in the last 30 days? \*

*Mark only one oval.*

- ☐ Yes  
☐ No

18. If you marked "Yes", please explain.

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## Follow-up Survey-Administrator Version

**Follow-up survey**

This brief survey is a follow-up to the assistive technology training session you attended at your school approximately 30 days ago. Your participation is greatly appreciated.

\* Required

1. Have you observed members of your faculty using assistive technology with students in the last 30 days? \*

Mark only one oval.

☐ Yes

☐ No

2. If you marked "Yes", please explain.

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3. Have you observed members of your faculty providing alternative access to instructional materials for students in the last 30 days? \*

Mark only one oval.

☐ Yes

☐ No

4. If you marked "Yes", please explain.

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5. Have you observed members of your faculty using assistive technology to support student reading in the last 30 days? \*

Mark only one oval.

☐ Yes

☐ No

6. If you marked "Yes", please explain.

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7. Have you observed members of your faculty using assistive technology to support student writing in the last 30 days? \*

*Mark only one oval.*

☐ Yes

☐ No

8. If you marked "Yes", please explain.

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9. Have you observed members of your faculty integrating assistive technology into classroom instruction in the last 30 days? \*

*Mark only one oval.*

☐ Yes

☐ No

10. If you marked "Yes", please explain.

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11. Have you talked to another teacher or administrator about assistive technology in the last 30 days? \*

*Mark only one oval.*

☐ Yes

☐ No



12. If you marked "Yes", please explain.

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13. Have you talked to a parent about assistive technology in the last 30 days? \*

*Mark only one oval.*

☐ Yes

☐ No

14. If you marked "Yes", please explain.

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15. Have you talked to students about assistive technology in the last 30 days? \*

*Mark only one oval.*

☐ Yes

☐ No

16. If you marked "Yes", please explain.

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17. Have you sought more information about assistive technology in the last 30 days? \*

*Mark only one oval.*

☐ Yes

☐ No

18. If you marked "Yes", please explain.

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19. Have you noticed any other changes in your faculty with regard to assistive technology in the past 30 days? Please explain. \*

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### Training Fidelity Checklist

Rater Initials: \_\_\_\_\_

Date: \_\_\_\_\_

Directions: Check the box next to each component that is mentioned during the training session.

#### **Introduction**

- ☐ Trainer self-introduction
- ☐ Explain purpose of study and training
- ☐ Briefly review federal definition of AT
- ☐ AT considerations in IDEA
  - ☐ AT consideration for all students mandate
  - ☐ AT consideration paradox for IEP teams
- ☐ Representative examples of AT
  - ☐ Hearing Aids, Amplification systems
  - ☐ Magnification systems, screen readers
  - ☐ Wheelchairs, pencil grips
  - ☐ AAC systems
  - ☐ Text to speech, word prediction, speech to text

#### **Demonstration**

- ☐ Explain what Bookshare is
  - ☐ Explain different methods for reading text
    - ☐ Downloadable Computer program
    - ☐ Mobile devices via app
    - ☐ Read straight from internet browser (Chrome or Safari)
  - ☐ Briefly demonstrate Bookshare website -Search and download books
  - ☐ Demonstrate Computer program with Student example: struggling reader read a grade level novel
  - ☐ Verbally mention instruction example: students read textbook chapter independently
  - ☐ More info in training packet

- ☐ Chrome web store
  - ☐ Apps and extensions
  - ☐ More information in training packet
- ☐ Demo Read&Write for Google in Google docs
  - ☐ Student and instruction example: read worksheet shared from teacher on Chromebook in class
- ☐ Demo SpeakIt!
  - ☐ Student example: use while researching on the web
  - ☐ Instruction example: use w/web content while using smart board in class
- ☐ Ask for comments or questions

### **Hands-on experience**

- ☐ Demo and instruction : Open up Google Chrome and log into teacher Google account (or dummy account)
- ☐ Demo and instruction: access Chrome web store
- ☐ Demo and instruction: search for SpeakIt! and install it
- ☐ Demo and instruction: search for Read&Write and install it
- ☐ Demo and instruction : authorize Read&Write
- ☐ Demo and instruction: open up Google doc
- ☐ Demo And instruction : use Read&Write to read first few paragraphs
- ☐ Instruction: Picture a struggling reader in your class using Read&Write
- ☐ Demo and instruction: open web link
- ☐ Demo and instruction: use SpeakIt! via right mouse click to read first few paragraphs
- ☐ Instruction: again picture struggling reader while using SpeakIt!
- ☐ Ask for comments or questions
- ☐ Instruction: complete AT integration worksheet
- ☐ Instruction: give time limit for worksheet completion
- ☐ Give 1 minute left warning
- ☐ Instruction: time up
- ☐ Encourage to follow through with worksheet plans

**Conclusion**

- ☐ Review AT definition
- ☐ Review three examples shown
  - ☐ Bookshare
  - ☐ Read&Write
  - ☐ SpeakIt!
- ☐ Explain 30 day follow up probe
- ☐ Point out further information in training packet
- ☐ Point out my contact information in training packet
- ☐ Ask for questions/ comments
- ☐ Direction: click last link in Google doc
- ☐ Explain post survey
- ☐ Ask for questions
- ☐ Thank you
- ☐ Leave room

Plan for integrating assistive technology into classroom instruction.

Date: \_\_\_\_\_

Student outcome I want to **increase** or **improve** with the help of assistive technology:

Assistive technology tool I want to use:

How I will integrate the assistive technology tool into a lesson I plan to teach in the next 1-2 weeks:

What do I still need to know in order to make this work? How will I find out?

How will I know if the assistive technology tool has been effective?