Assistive Technology Service Delivery in Rural School Districts

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Abstract

Little is known about the implementation of assistive technology (AT) services for students in rural areas. This study investigated the AT service delivery in 10 rural districts across six states. The results indicated that students use AT across functional areas, but considerably fewer number of devices than do those not living in rural areas. AT experts attended a low percentage of IEP meetings, and the AT expertise of related service personnel is rated highly. Teachers reported that rural students have access to the technology they need; however, they also indicated they needed more training on available technology for their students.

Keywords: assistive technology, rural special education, technical service delivery

The Individuals with Disabilities Education Improvement Act (IDEA, 2004a) requires that assistive technology (AT) be considered for all students with an Individualized Education Program who need technology to receive a free appropriate public education. Assistive technology as defined by IDEA includes both AT devices and services. AT devices are defined as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability" (IDEA, 2004b, § 602 (1) (A)). AT services are defined as "any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device" (IDEA, 2004c, § 602 (2)). These services are comprehensive and involve evaluating the student's AT needs in customary environments; acquiring AT devices; customizing, applying, and maintaining AT devices; coordinating other therapies with AT devices; training for the student and family; and training for professionals involved with the student.

Despite the consideration of AT being mandated since 1997, AT policies being in place in many school districts (Bausch, Ault, Quinn, Behrmann, & Chung, 2009; Bell, 2001), and the proliferation of new technologies into school systems, relatively little remains known about the students who receive AT devices and services and how well districts implement these services for their students. The National Assistive Technology Research Institute (NATRI; Lahm, Bausch, Hasselbring, & Blackhurst, 2001) in a cooperative effort with the U.S. Department of Education, Office of Special Education Programs, conducted a nationwide effort to determine the current state of the practice of AT service delivery in schools. In a study named the "Status of AT Use Survey," NATRI found (based on a nationwide nonprobability sample of 699 AT users ages 3-21 years) that (a) the largest percentage of students received AT services in self-contained settings (40.47%); (b) AT was the third most frequently provided service for students receiving related services; and (c) the most students receiving AT services were identified with a multiple disability (27.71%), a learning disability (16.72%), an orthopedic impairment (14.66%), autism (13.93%), or an intellectual disability (12.17%; Quinn et al., 2009). In addition, Bausch, Ault, Evmenova and Behrmann (2008) reported data from the same NATRI survey. They asked professionals serving students who were AT users, to report about who delivered the AT services in their districts and what services they delivered to their students. The most frequently mentioned professionals delivering AT services were speech and language specialists (18.6%), AT specialists (16.1%), other providers (i.e., those who were grouped together because they provided less than 4% of the services individually, 13.0%), teachers (12.5%), occupational therapists (7.2%), and paraprofessionals (5.0%). The AT services that the professionals indicated they performed most often included training or technical assistance for the student, coordinating other therapies with AT devices, and training or technical assistance for other professionals. Very infrequently they reported that they were involved in designing or customizing AT devices, purchasing or leasing devices, or evaluating the AT needs of a student in their customary environment. Most disturbing was that, for a group of students (15.7%), the professionals reported that the students were not receiving any AT services. In addition, many of the AT services

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that the professionals reported they delivered to their students were not actually AT services. The authors reported that teachers and other professionals who work with AT users need more training and increased awareness of AT services in order to better implement the AT used by their students.

While these data provide some indication of AT practices occurring nationwide, even less data are available regarding AT implementation in rural areas of the country. In a review of the literature, only a handful of articles were located that involved AT and rural issues. Jeffs and Morrison (2005) conducted a review of the literature to determine how dimensions of diversity had been examined in AT research, including the dimension of rural. They reviewed articles related to assistive technology from 2000-2004 found in 12 journals and located only three articles relating to a study of AT and a rural dimension. The authors noted that the literature focused on the challenges of rural service delivery, including "scarcity of resources, services, devices, and AT professionals" (p. 23). A limited number of studies found in the literature involved AT and rural participants; however, their findings supported the conclusions of Jeffs and Morrison. Three studies, all of which involved surveys or interviews, were conducted with rural participants. First, Kent and Barnes (2000) distributed a questionnaire and interviewed individuals with disabilities living in a rural area of the United Kingdom. All participants received services from the same medical practice. They interviewed a total of 198 individuals about the health services, aids and adaptations, and personal assistance they received. Seventy-four participants were 16-65 years of age, 69 were 66-75 years old, and 55 were 75 years or older. The results indicated that 53% of the group used domestic adaptations, and 75% used disability aids. The authors indicated that participants in the younger group had the greatest unmet needs and that the individuals with the highest degree of disability required more interlinked and organized services than they currently received. Second, Gitlow and Sanford (2003) mailed questionnaires to allied health professionals asking them about their current skills, knowledge, and competence related to AT; the competencies they would like to develop; and how they would like to have AT education provided. The results indicated a clear need for more information in the area of AT as two-thirds of the respondents indicated they had nonexistent or only basic knowledge in AT, and more than half indicated they had a moderate or significant need for additional AT information. Finally, the respondents did not have a preference on how they would like to receive the education other than they did not want to travel more than 1 hr from their home to obtain training. Third, Keramidas and Collins (2009) interviewed eight practitioners serving children aged birth to 3 years working in rural West Virginia. They asked questions about AT, including their experiences with AT, training they had received, family involvement, obtaining devices, and issues related to rural service delivery. One respondent indicated that it was more difficult to obtain AT in rural areas when compared to metropolitan areas but felt that excellent services could still be delivered in rural areas. Three respondents indicated that a lack of practitioners was a challenge in rural areas, and one practitioner noted it was difficult to obtain training due to the distance that needed to be traveled.

With common themes emerging from the limited rural data available in the literature, clearly, there is need for additional research on AT in rural areas to respond to the unique needs and challenges of the area. Data are needed to determine the current issues in rural areas and to develop solutions to respond to the challenges of rural AT service delivery. The purpose of this study was to investigate the current state of the practice of AT services delivered in rural school districts in the United States. The specific research questions included the following: (a) What and how many AT devices are used by students in rural school districts and how does that compare to all students nationwide? (b) Who attends and participates in IEP meetings in rural districts? and (c) What are the strengths and barriers of AT service delivery identified by teachers in rural school districts?

Method

Data presented in this study were drawn from two larger studies conducted by NATRI called the "State Case Study" and the "Status of AT Use Survey."

State Case Study

The purpose of the State Case Study was to determine the current state of implementation of AT services in schools for students with disabilities, aged 3-21 years, across the nation. Ten states (i.e., California, Florida, Kansas, Kentucky, Massachusetts, Montana, Oregon, Texas, Virginia, and Wisconsin) and multiple school districts within each state were identified for the study. The states and districts represented diversity in terms of geographic location, size, and model of AT service delivery. A total of 43 school districts participated in the study, and multiple pieces of data were collected. First, the researchers asked district level administrators from each state to respond to an online survey about AT policies and practices in their state. Second, the researchers identified multiple professionals (n = 219) in each school district who were involved in AT service delivery to collect data in their districts. Each professional targeted up to 10 students (n = 322) who were AT users in their district and were diverse in disability area, age, and type of technology used. For each student, they collected field notes in the students' classrooms (n = 305) during a time in which they would use their AT; they attended IEP meetings (n = 274), and they conducted interviews of the students' teachers (n = 260) families (n = 268), and the students themselves (n = 145; when appropriate) about issues related to their AT. The interview protocols are available from the first author upon request. For purposes of this study, the authors disaggregated data from rural school districts from the overall survey responses. The specific data from the State Case Study used for this study included those collected during IEP meetings and interviews conducted with the teachers.

Each data collector interviewed the students' special education teachers in a face-to-face format and asked questions and subquestions from a set of prescribed questions supplied by the researchers, although they had the flexibility to ask probe and follow-up questions, as needed, to gain understanding and clarity. The interviews were audiotaped, transcribed, and then imported into qualitative data analysis software.

Table 1.

Rural-Urban Continuum Codes, Location of Districts, and Number of Participants

Rural-Urban Continuum Code Definition[a]		Location of District	Number of Students
6	Urban population of 2,500 to 19, 999 and adjacent to a metropolitan area	Western Kentucky Central Oregon	8
7	Urban population of 2,500 to 19,999 and not adjacent to a metropolitan area	Northern California Southeast Kentucky Eastern Oregon	26
8	Completely rural or less than 2,500 urban population and adjacent to a metropolitan area	Northwestern Kentucky	9
9	Completely rural or less than 2,500 urban population and not adjacent to a metropolitan area	Northwest Kansas Southwest Montana Northwest Wisconsin North central Wisconsin	13

[a] U.S. Department of Agriculture Rural-Urban Continuum Codes and Definitions (2003)

Definition of rural districts. To define rural districts, the researchers used the U.S. Department of Agriculture's (2003) rural-urban continuum codes. These nine codes are a classification scheme used by the U.S. government that differentiates metropolitan counties from nonmetropolitan counties based on the degree of urbanization and if they are adjacent to a metropolitan area. The Office of Management and Budget (OMB) groups all U.S. counties according to their metropolitan or nonmetropolitan status based on the U.S. census. A code of nine indicates the most rural counties. We defined counties as rural if they had a continuum code of six through nine. The definition of these codes, the areas of the states, and the number of students in each of these rural areas included in this study are shown in Table 1. There were a total of 56 students living in rural areas included in the original data set, and the authors used these data for this study.

Status of AT Use Survey

Simultaneously with the State Case Study, the Status of AT Use Survey data were collected. The data collectors participating in the State Case Study completed a paper or online survey (i.e., AT Use Survey) on each of the students they identified. First, for each student, they gathered demographic data on (a) age, (b) grade level, (c) ethnicity, (d) gender, (e) type of education plan, (f) special transportation needs, (g) hours per week receiving special education, (h) and economic status. Second, they collected data on the AT devices that students used that were divided into seven functional areas (Blackhurst & Lahm, 2000), including existence; communication; body support, alignment, and positioning; travel and mobility; environmental interaction; education and transition; and sports, fitness, and recreation. Third, data collectors reported the AT services, related services, and AT documentation that was in place for each student. The complete survey is available from the first author upon request.

In addition to the data reported on the specific students identified by the data collectors, the researchers collected State Case Study data from one large urban school district in which school district employees entered data on individual students. They entered a total of 253 students in the survey database from this district, which represented approximately 0.3% of all the students receiving special education services in that district. Further, the researchers used convenience sampling in which they solicited data from other school districts at professional conferences. This accounted for an additional 167 surveys. After deleting surveys with incomplete or unusable data, the researchers entered information from 699 students in 14 states and 60 districts into the database (Quinn et al., 2009).

Rural districts. The same 56 students whose data contributed to this study from the State Case Study were the same students whose data were used for this study from the larger Status of AT Use Survey data set. The specific data used for this study from the State Case Study was the number and type of AT devices used by all students in the data set and for the rural students.

Data Analysis

To summarize the quantitative data, the authors entered the data into a database using Filemaker Pro 5.0 by Filemaker Incorporated. They then exported the data into a Microsoft Excel file so they could figure descriptive statistics in terms of frequency counts and percentages.

To analyze the qualitative interview data, the authors focused on coding the data and identifying the categories of barriers and strengths of AT implementation identified by the teachers. They used qualitative data analysis software (NVivo 2.0 by QSR International) to assist in management of the data.

The analysis proceeded in several steps. First, the second author read all teacher responses to the specific interview questions related to barriers and strengths. Using a constant comparison method (Lincoln & Guba, 1985), in which pieces of data were compared against one another and categorized together if they were similar or forming a new category if the piece of data was unique, she coded the responses as either a barrier or strength to AT implementation. Second, she coded the barriers and strengths into separate categories as to the particular barrier or strength the teacher described. Third, two additional project personnel reviewed the codes assigned by the second author and noted agreements and disagreements. Finally, the three personnel met to discuss the codes and discussed any discrepancies, redefining the codes as needed until they reached a consensus on all responses.

Results

In this section, the authors report both quantitative and qualitative results. Quantitatively, they report data from the AT devices used by students in rural districts and from the IEP meetings attended in rural districts. Qualitatively, they report interview data in terms of teacher perspectives of barriers and strengths to AT implementation.

AT Devices Used

To determine the number of students that were using AT devices in rural areas, the authors totaled the percentage of students using AT devices by functional area. The survey listed devices that were categorized by the functional area for which the students were using the device. The definitions of the seven functional areas used to categorize the devices were as follows (Blackhurst & Lahm, 2000):

1. Problems in Existence or daily living activities were associated with the functions needed to maintain oneself in eating, grooming, dressing and bathroom skills.
2. Problems in Communication were associated with the functions needed to understand spoken language, process and express information, and to interact socially.
3. Problems in Body Support, Protection, and Positioning were associated with the functions needed to stabilize, support, or protect a portion of the body.
4. Problems in Travel and Mobility were associated with the functions needed to move within environments.
5. Problems in Environmental Interaction were associated with the functions needed to perform activities across environments.
6. Problems in Education and Transition were associated with the functions needed to participate in learning activities and to prepare for new school settings or post-school environments.
7. Problems in Sports, Fitness, and Recreation were associated with the functions needed to participate in individual and group sports, play, hobby, and craft activities.

Table 2 shows the devices used by all students whose data were reported in the Status of AT Use and the devices used by students in rural areas by functional area. These data indicate that students in the rural areas are receiving access to AT devices and that they are using them across all functional areas. Although some slight variability exists between all students and rural students, both groups were using devices in all functional areas.

To determine the number of AT devices used by rural students, the authors totaled the number of devices used by the rural students and averaged the number of devices used per student. They also recorded the number of devices used by all students in the Status of AT Use Survey and compared

Table 2.

Percent of Devices Used by Rural and All Students by Functional Area

Functional Area	Percent of All Students $n = 699$	Percent of Rural Students $n = 54$
Existence	8	4
Communication	30	30
Body Support, Protection, & Positioning	7	8
Travel and Mobility	6	16
Environmental Interaction	15	14
Education and Transition	26	24
Sports, Fitness, and Recreation	6	3

Table 3.

Number of Devices Used by Rural and All Students in the Survey of AT Use Survey

Measure	All Students	Rural Students
Number of Students	699	54
Total Number of Devices Used	5058	173
Number of Devices Used per Student	7.2	3.2

with the rural students. These data are shown in Table 3. The data indicated that rural students used considerably fewer number of devices per student when compared to all of the students in the Status of AT Use Survey.

IEP Meetings

Data collectors attended and collected data in 56 IEP meetings in rural areas in which AT was discussed. First, they collected data on the persons attending the meetings. Data collectors were given a checklist to use that contained the roles of several persons that likely may attend an IEP meeting including the student, parent, special educator, general educator, instructional assistant, personal attendant, speech-language pathologist, occupational therapist, physical therapist, rehabilitation engineer, adapted physical education instructor, school psychologist, school nurse, medical specialist, volunteer, peer, administrator, AT specialist, professional from an outside agency, and an advocate. If others attended who were not listed on the checklist, the data collectors selected an "other" category. Next, for each person attending the meeting, the data collectors scored the persons that initiated AT discussions and the persons who actively discussed AT during the IEP meetings. Finally, the data collectors ranked the participants in terms of their level of AT expertise.

Persons attending the IEP meetings. In the IEP meetings of students living in rural areas, the individuals who were present in most of the meetings included the parents (present in 100% of meetings), administrators (86%), special educators (84%), speech language pathologists (83%), and general educators (71%). The individuals who were present in the least meetings included the psychologists (present in 18% of the meetings), AT specialists (18%), outside agency professionals (14%), vision specialists (11%), and nurses (10%).

Persons initiating AT topics. In each meeting, the data collectors recorded the individuals who initiated AT topics. They summarized the data in terms of the percentage of meetings in which those attending the meetings initiated AT topics. Although the AT specialists did not attend a large percentage of the IEP meetings, when they did, they were the initiator of the AT topics in all of the meetings they attended (100% of the meetings), followed by "other" specialists (83%), special educators (56%), speech language pathologists (49%), physical therapists (46%), occupational therapists (38%), parents (37%), instructional assistant (19%), general educators (7%), and students (6%).

Persons actively discussing AT topics. Data collectors also recorded the percentage of meetings in which those attending the meetings played an active role in discussing AT topics once they were initiated. Again, despite attending a small percentage of the meetings, when AT specialists were present in meetings, they actively discussed AT in 100% of the meetings, followed by special educators (81%), occupational therapists (75%), speech language pathologists (74%), other professionals (67%), physical therapists (62%), parents (61%), instructional assistants (50%), general educators (47%), administrators (28%), and the students (18%).

AT expertise of IEP participants. The data collectors gathered data on the level of AT expertise possessed by each of the participants. Based on their own judgment, they provided a gross ranking on the level of AT expertise of the participants on a scale of 1 to 5 with 1 defined as *knows little or nothing about AT*, and 5 defined as *has high level of AT knowledge and expertise*. AT specialists were ranked as having the highest level of expertise (4.8) followed by physical therapists (4.4), occupational therapists (4.3), speech language pathologists (3.9), special educators and instructional assistants (3.6), other professionals (3.1), parents (2.9), and the general educators (2.5).

Strengths and Barriers of AT Services

In addition to the quantitative data, data collectors asked teachers open-ended questions about the strengths and the barriers they noticed in their districts. The focus was on understanding and contextualizing what was working well, as well as the challenges of implementing AT in rural districts. Specifically in regards to the strengths of their districts, the authors analyzed responses from 45 rural special education teachers to the following questions and subquestions.

1. What does your district do well in terms of getting AT devices and services for your students?
2. How are AT practices supported by your school or district?
   a. What exemplary practices can you name?
   b. What makes them exemplary?
   c. How does the school or district support you in being able to obtain and use the AT devices and services for your students?

The authors categorized the teachers' responses into those that most teachers mentioned including (a) access to technology, (b) AT expertise, (c) promptness, (d) training, and (e) administrative support.

Access to technology. Most teachers (53%) reported having access to technology as a strength of their district. Teachers described how their districts obtained the AT equipment the students needed, that teachers served as an advocate for their students in obtaining devices, and that equipment was available through a lending library.

Several teachers indicated that the district obtained any equipment they requested for their students, including devices that were of high cost. For example, a Kentucky teacher of an 18-year-old student with multiple disabilities said,

> I have never asked for any assistive technology device that I have been turned down for. They never have even hesitated, and I have asked for some really high tech equipment before . . . I have always gotten what I needed for my students without even blinking an eye.

Teachers mentioned that they obtained AT equipment for their students through the use of lending libraries operated by their cooperating educational service agency. For example, one Wisconsin teacher of an 8-year-old student remarked, "I don't know what other districts have, but I know [our district] has a pretty good library of materials and, if we need things, lots of times they are there."

One teacher of a 10-year-old student with intellectual disabilities mentioned the importance of the professionals serving as advocates for their students in order to obtain AT equipment. She said,

> I think being a rural district and so far away from everything, I think we really are strong advocates for our kids . . . Our [speech and hearing person] does it in a very quiet way, but if he feels like a student needs something you know he will go to bat for it and find a way to get it for us.

AT expertise. Teachers mentioned that the access to AT expertise was a strength of the AT programs in their districts. Multiple teachers mentioned the benefits of having access to "AT specialists" that had a "very good background in their specific area of equipment and devices, strategies and techniques" and access to related service professionals that were knowledgeable about AT. For example, a California teacher of a 19-year-old student with significant disabilities said,

> I think having my own OT that knows all of this stuff it helps a lot to be able to give her and my speech therapist ideas on what I'd like to do and then, them helping me figure out how to get my students there. I'd probably be at a big loss if I didn't have them do that for me because I wouldn't know what I am looking for at this point and they do.

In addition, for those districts without an AT department, they indicated that, if they had an AT need that was beyond their knowledge, the district would seek support from experts from an outside agency.

Promptness. Thirteen percent of the teachers indicated that the promptness by which they received AT equipment and answers to their questions were strengths. Two teachers both serving different 12-year-old students in Kentucky indicated that the technology coordinator was "quick to answer questions and quick to solve problems," and another teacher said that the "speed and focus" that the AT department used made them "exemplary." Others indicated that access to devices moved "pretty quickly," was obtained in a "timely way," and was "purchased without question and quickly."

Training. Nine percent of the teachers described the opportunities they had to receive AT training while honing their own AT skills as a strength. To exemplify, teachers said that an AT specialist would come to the classroom and provide "one-on-one instructions," that their AT specialists gave "general workshops to groups of teachers," or that the district was supportive and would send teachers to "trainings and professional development activities."

Administrative support. Administrative support was mentioned as a support by 9% of the teachers during their interviews. A California teacher was encouraged that administrators provided her with the release time she needed to learn a new specific AT device. A Kentucky teacher said that administrators scheduled extra time for teachers to learn a new technology that was to be available school wide.

Barriers of AT Services

In addition to strengths, the data collectors asked the teachers about the barriers they experienced in their districts. Specifically, they analyzed the same 45 teachers' responses to the following questions and subquestions.

1. What could your school or district do better in terms of getting AT devices and services to students who need them?
2. What are the barriers to the delivery of AT practices in your district or school?
   a. What prevents you from being able to use AT with your students in the ways that you want to use them?

The authors categorized the teachers' responses into those that most teachers mentioned, which included the need for (a) training, (b) funding of technology, (c) personnel, (d) time, and (e) prompt services. Interestingly, similar themes appeared as barriers that also emerged from the data as strengths.

Need for training. The need for training was mentioned by 31% of the teachers as something the school system could do better to improve AT service delivery. This compares to the 9% of teachers who indicated training as a strength of their district. Teachers made general comments about the need for training as a barrier, such as "just the lack of education and training," but they also indicated that more training was needed on "what's available" and "what could be used and what they are used for." One California teacher of a kindergarten student with a cochlear implant described the need for training:

> First, they'd need to provide a lot more education to the resource specialists and teachers and everybody out there in the field as to what's even available. Have access to the technology fairs and the AT fairs and trainings and workshops and manuals and information. That's sorely lacking and training first of all for the people out there, then training on procedures for how to access those things should they be desired once a person even knows about them.

More funding of technology needed. The teachers (20%) thought that a lack of funds and technology prevented them from delivering the quality of services that was possible if unlimited funds were available so they could update the computers they considered "dinosaurs" and to have "unlimited funds to be able to purchase [equipment] for my students that I'd like to see [used] in the classroom." A California teacher said, "It would be nice to have a larger number of items available. We're rural and to get factory representatives or trial pieces in can take a lot of time."

More time. Teachers (11%) mentioned that they needed more time to be able to explore, discover, and work with AT so they could provide improved services. They indicated they could do more if they had the time to devote to working on AT. A California teacher said, "There is a weakness in providing me time to go find out about such things myself if they haven't been recommended by someone."

Need for prompt services. Finally, 7% of the teachers felt that AT services were not prompt enough for quality implementation of services. This is in contrast to 13% who indicated this as a strength in their district. Teachers noted that they wanted delivery of the devices and services to be "more timely," and a barrier was "not being able to get them when I really need them—taking so long after ordering."

Discussion

This study adds to the literature as it provides much needed data on the state of the practice of AT service delivery in rural school districts in the nation, thereby assisting researchers and practitioners in responding to the unique needs and challenges of the area.

Several findings require further reflection. First, it is encouraging to see that students in rural districts had access to AT devices across functional areas; however, when compared to all students across the nation, the rural students used considerably fewer number of devices per student. While the data from this study did not reveal why this is the case, the authors speculate that a lack of awareness of devices or a lack of AT specialists actively present in the schools could have contributed to this finding. While their data did not indicate how many of the districts employed AT specialists, the fact that they attended few IEP meetings in which AT was being discussed suggests that either they were not hired by the schools or that their area of service was so large geographically that was is not possible to attend the meetings and be as actively involved as would have been desirable. One solution for rural districts is to work together in collaboratives or regional services centers to obtain an AT lending library that several districts can access to become more aware of available technologies and to have be able to conduct trials of technologies with students prior to purchase. Sharing of resources also may allow rural districts to fund AT specialists who could work across districts in a consultative role.

Second, it is interesting that AT specialists attended a small percentage of the IEP meetings of the rural students, but, when they attended the meetings, they initiated and discussed AT topics in all of the meetings they attended. This has several implications for practice. As a solution, AT specialists may need to explore innovative ways to attend meetings, including the use of technology so that they could attend meetings virtually. AT specialists were ranked with high degrees of AT knowledge and expertise, and their input in as many IEP meetings as possible would be needed for students that require AT services. For rural districts that did not have AT specialists at all, empowering teachers, parents, and other professionals to build their own AT expertise would help improve the quality of AT decisions and discussions made at IEP meetings where AT experts could not be present. The literature has supported this notion as Puckett (2004) found that many special education teachers have limited AT knowledge, and, in order for teachers to guide teams in AT decision, they need to thoroughly understand AT resources (Marino, Marino, & Shaw, 2006). This could be done by increased professional development opportunities or by using an AT specialist in a consultative role.

Third, the data revealed that related service personnel were highly involved in AT service delivery and were highly ranked in terms of their AT knowledge and expertise. The results indicated that speech-language pathologists, occupational therapists, and physical therapists were consistent initiators and discussants of AT topics in IEP meetings and were ranked higher than special education teachers in terms of their AT knowledge. Although highly rated, related service personnel do not perceive themselves as experts in AT and reported themselves as less than adequately trained in a national survey of occupational therapists (Long, Woolverton, Perry, & Thomas, 2007). Teachers in rural districts should be able to depend upon these specialists to assist them in consideration and implementation of AT across functional areas. This finding has implications for pre-service preparation programs that should include coursework in AT competencies since it appears that related service personnel working in schools are being depended upon for their AT knowledge (Bausch & Ault, 2012).

Fourth, the interview data indicated that most teachers indicated that the technology their student needed was available to them. This is in contrast to a lack of technology and resources in rural areas reported in the literature (Jeffs & Morrison, 2004; Kent & Barnes, 2000). Participants however, also mentioned that they needed more training on what technology was available for their students and how to use it properly. It is possible that the teachers *thought* they had access to all the technology their students needed because they were not aware of the possible options that were available. This also could contribute to why students in rural districts had many less devices than students in other areas of the country. Solutions for rural districts would be to employ technology to provide professional development in ways that is accessible for professionals that do not require them to travel long distances while obtaining the training they need (Gitlow & Sanford, 2003), perhaps taking advantage of quality online training opportunities.

Limitations and Future Research

Although the data were collected from a relatively small nonprobability sample and generalizations to the greater population cannot be made, the researchers collected information from rural areas across five states that were geographically diverse and that represented different service delivery

models. Future research in rural areas continues to be needed as little exists in the literature. Research is needed on describing quality model programs of AT service delivery, finding practical solutions to the challenges of AT service delivery in rural districts, and identifying the factors that contribute to quality AT programs in rural areas.

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