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Teacher Knowledge and Attitudes Towards the Utilization of Assistive Technology in Educational Settings

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Teacher Knowledge and Attitudes
Towards the Utilization of Assistive
Technology in Educational Settings

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Abstract

The purpose of this study was to determine the perceptions of special education teachers regarding the use of assistive technology in a school setting. This study also determined current information on teachers' knowledge levels of assistive technology. A survey questionnaire was sent to 120 elementary special education teachers in the Spring of 1999. The questionnaire was concerned with teacher knowledge and attitudes towards assistive technology. Data was analyzed using descriptive statistics. Results indicated teachers perceive themselves to have a good knowledge base in regards to assistive technology. However, less than half of those teachers are utilizing devices and services in their classrooms. Open-ended questions indicated several barriers to assistive technology usage including the belief that students with learning disabilities do not require assistive technology in their educational programs.

Acknowledgements

Upon my high school graduation, my mother said to me, "Teri, the world awaits you." It is only now that I am able to appreciate the depth and honesty of her words. The completion of this thesis is a huge accomplishment for me. I want to thank my parents for not losing faith in me and for their financial and emotional support. I would never have made it this far without you.

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Teacher Knowledge and Attitudes
Towards the Utilization of Assistive
Technology in Educational Settings

Technology in education has experienced a metamorphosis over the past two decades. Professionals have replaced typewriters with computers, encyclopedias with the Internet, and audiotapes with CDs. Technology within the field of special education has experienced similar advances in the utilization of assistive technology to enable students with disabilities to succeed. Assistive technology has become an integral part of the lives of some students with mild to severe disabilities with positive effects being noted in the areas of social and emotional development, academic development, and communication (Hutinger, 1994).

The use of assistive technology has been found to be an effective intervention for children with disabilities. For some, assistive technology may be the only opportunity to access people, objects, and events of their world independently. According to Thorkildsen (1994), independence is the ultimate goal of assistive technology. Behrmann and colleagues (1993) stated that the goal of assistive technology is to improve the functional capabilities of a child. Either definition promotes the idea that without assistive technology, students may be denied learning opportunities that provide a successful and appropriate education.

Assistive technology usage has been beneficial within a wide spectrum of areas in academic settings. Uses range from computers to Velcro. The usage of such assistive technology devices has become a tool for manipulation and controlling the environment

in order to enhance successful learning experiences. This, in turn, allows the child to gain a sense of autonomy and self-esteem.

History of Assistive Technology

Through mandates included in P.L. 100-407, The Technology – Related Assistance for Individuals with Disabilities Act of 1988 (Tech Act) and P.L. 101-476, The Individuals with Disabilities Act of 1990 (IDEA), assistive technology was inevitably thrust into the eyes of professionals as an issue that must be addressed within a student's Individual Education Plan (IEP) and/or a child's Individualized Family Service Plan (IFSP).

The Tech Act met assistive technology needs through awareness programs, providing accurate and more detailed information on funding issues, facilitation of assistive technology services and usage to persons of all disabilities and of all ages (Behrmann, 1993). Technological centers or specialized facilities were provided to evaluate and experiment with assistive technology devices (Parette, 1996). In addition, the Tech Act provided the beginning definitions for assistive technology services and devices that future regulations implemented.

P.L. 94-142 (Education of All Handicapped Children Act – EHA) of 1975 did not specifically address assistive technology devices or services, only provided funding flexibility. Therefore, school systems were not federally obligated to include discussions for services in regards to assistive technology (Behrmann, 1994; Parette, Hourcade, VanBiervliet, 1993). Through funding projects completed by the Office of Special Education Programs in the 1980s, assistive technology began to investigate issues in special education technology. (Behrmann, 1994). According to P.L. 99-457, the

Education of the Handicapped Amendments of 1986, an amendment to P.L. 94-142, training in assistive technology services and devices for educational personnel became the federal focus. Part H of P.L. 99-457 calls for the "identification and coordination of all available resources within the state from federal, state, local, and private sources" as well as the implementation of the individualized family service plan (Parette, Hofmann, VanBiervliet, 1994).

With the passing of IDEA 1990, a consistent federal dedication to assistive technology was evident. IDEA provides that "if a child with a disability requires assistive technology devices or services, or both, to receive a free and appropriate public education, the public agency shall ensure that the assistive technology devices or services under this program must be made on an individual basis through applicable individualized education program and placement procedures." (Federal Register 1991, as cited in Bermann, 1993). This can be either through direct special education services, related services, or as supplementary aids to enable a child with a disability to be educated within the regular education classroom (Federal Register 1991, as cited in Behrman, 1994).

An additional aspect of technology that was addressed in IDEA included transition services. Students who are fourteen and above who are preparing for the workplace may benefit from assistive technology services and devices. Once these students transition from the school to the workplace they will keep their federal safeguards under P.L. 101-336 (Americans with Disabilities Act of 1990 -ADA). ADA mandates that "assistive technology be employed as a reasonable accommodation to enable individuals to participate in employment and community activities." (Behrman,

1994). Therefore, if an assistive technology device is needed for the workplace, it should be utilized in the preparation for employment in the school setting.

Regardless of such legislation, assistive technology devices are still underutilized. Contributing to this underutilization has been inadequacies in the areas of funding, training, availability of assistive technology specialists, and a lack of collaboration among professionals and family (Dublinske, 1992; Hutinger, 1994; Behrmann, 1993).

IDEA addressed the use of assistive technology with students with disabilities in public school systems. According to the federal guidelines, an "assistive technology device" is "any item, piece of equipment, or product system, whether acquired commercially or off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of children with disabilities." (34 Code of Federal Regulations 300.5) "Assistive technology service" is "any service that directly assists the child with a disability in the selection, acquisition or use of an assistive technology device." (34 Code of Federal Regulations 300.6)

The term assistive technology service has been further defined to include:

- (a) evaluation of assistive technology needs, including a functional evaluation of the child in his or her usual environment;
- (b) purchase, lease or other acquisition of assistive technology devices;
- (c) selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or the replacing of assistive technology devices by individuals with disabilities;
- (d) coordinating the use of assistive technology devices with the child's education program, and with other intervention, therapies, and services;
- (e) training and technical assistance for the child, parents and other family members;

- (f) training and technical assistance for professionals working with the child, employers and for other individuals substantially involved in the major life functions of children with disabilities.

(34 Code of Federal Regulations 300.6)

Assistive technology devices have been divided into several categories that increase the potential of students. Blackhurst (1997) described these categories as a "continuum of solutions". The first category includes low tech devices such as non-electrical, simple, inexpensive aids. The second category includes medium tech devices which are devices that might use electricity but are not computer driven such as an electric wheelchair. The third category includes high tech devices such as microcomputers and certain augmentative communication devices (Behrmann, 1994; Huting, 1995; Thorkildsen, 1994; Blackhurst, 1997). Blackhurst added an extra category of no-tech solutions that are only the use of systematic teaching procedures or the usage of related services personnel. Often, emphasis is focused only on the high tech devices but low tech devices are used more frequently (Todis, 1993). Blackhurst (1997) recommended schools working up through the continuum starting with low tech devices to assist in finding the most appropriate device at a possible lower cost. The advantages to low tech devices are the low cost. One advantage of high tech devices is that, in the case of microcomputers, there is wide use and access in schools already. A further category identified by Todis (1993), is "adapted equipment". These are modified devices that were originally designed for the general population. Examples include curved spoons, Velcro instead of laces or buttons on clothing, and levers instead of knobs.

Professionals Involved in Technology

Ideally, every person who interacts with a child using an assistive technology device should be involved in the utilization of that device in order for the child to be

successful. The use of technology teams for the selection and implementation of assistive technology services and devices are recommended to produce positive effects on families and teachers in implementing and utilizing those devices (Parette, 1997; Todis, 1996; McGregor & Pachuski, 1996; Parette et al, 1996; Holder-Brown & Parette, 1992).

Behrmann (1993) studied assistive technology needs in Virginia. This research showed the use of "multidisciplinary teams" for service delivery of assistive technology needs. Teams consisted of occupational and physical therapists, speech and language pathologist, special educators and administrators. Duties of the team include identifying the needs of students requiring assistive technology services, eligibility, assessment, and evaluation of services. Over 80% of the respondents reported these issues as important to their development as professionals.

Blackstone (1992) also cited the use of assistive technology teams with children with disabilities. The members of the "technology team" change over time with only the child and the family member remaining constant. In addition to the child and a family member, team members may include aides/instructional assistants, audiologists, classroom teachers, occupational therapists, peers, physical therapists, physicians, psychologists, school principals, directors of special education, superintendents, special educators, speech-language pathologists, and technical resource personnel. A team facilitator, who coordinates team meetings and goals, guides the technology team under a collaborative model of service delivery, where no one person is an authority and all members are involved in planning and monitoring educational goals. The total goal of the team is to empower the child and the family to make decisions, to take control of the process, and to seek out new resources when they need them.

Team members must take several factors into consideration at different levels of delivery and/or deliberation on the selection of an assistive technology device. When choosing a specific device, teams must consider the individual needs of the user and the family (Parette, 1997; Todis, 1996; Parette et al., 1996). If an assistive technology device assists a student in meeting an academic goal, but in the process causes isolation of the child, the social needs of the child will be unmet (Todis, 1996). Consideration of “personal dignity” must be addressed. Attention by peers brought on by an assistive technology device can negatively affect the individual (Parette, 1997; Holder-Brown & Parette, 1992). In addition to user issues, the team must take into consideration the family’s needs when choosing a device.

Parette (1997, 1996) identified five “parallel domains” that team members must keep in mind when assessing an assistive technology device. Team members must consider the user characteristics. Including the fore mentioned issues, teams must investigate the current device available, past experiences with any device, and user preferences of devices. User preferences were cited as the primary consideration of purchasing an assistive technology device. The user will need to be trained on the device; therefore, time constraints need to be considered as well. The second domain of family issues includes family activities, routines, and resources. Third, cultural diversity practices need to be discussed prior to purchase to avoid device abandonment due to a family’s cultural beliefs. Technological features of a device are to be explored by the facilitation of statewide and nationwide resources. Funding is included under technological features. Often hidden expenses inflate the cost such as batteries, repair costs, and additional materials that are needed with the device. Such service system

considerations are to be explored by the team to see if a low tech solution can best meet the child's needs. Once the decision is made for a device, cost should not be a factor.

Todis (1996) and Parette (1997) both found that parents requested team members have an increased knowledge level and be more honest in regards to costs, expected growth of the student, familiarity, and comfort level with a device.

Uses of Assistive Technology Devices

Research and usage of assistive technology has shifted from students with only one area of disability such as a physical, visual, or auditory impairment, to the application of assistive technology with students with severe cognitive and multiple disabilities (Molloy & Baskin, 1994; Todis, 1993). Professionals find that integrating assistive technology devices into the classroom where there is only one impairment is easier than the child who needs several devices due to multiple disabilities. According to Todis (1993), this shift has occurred due to the focus of what type of students can use and benefit from assistive technology, the increased variety of devices available, and the practice of combining technologies to meet a wide range of disabilities.

The main purpose of assistive technology is to promote and increase independence (Thorkildsen, 1994). The most common and well-known method of promoting independence using assistive technology is the use of the computer. Okolo, Bahr and Rieth (1993) defined computer based instruction (CBI) as "the use of a computer and other associated technology with the intention of improving students' skills, knowledge, or academic performance." Computers have been attributed with positive effects in the areas of self-confidence, self-esteem, enhancement of social interactions

and cooperation, turn-taking skills, group interaction, and problem solving skills (Hutinger, 1994).

CBI has been researched, used, and radically restructured from its earlier uses in the mid-late 1970s. CBI began as a revolutionary change to the instructional process for both regular and special education classrooms. Its use was primarily as tutorial reinforcement of skills, specifically drill and practice, for special education students. Studies during the late 1980s to early 1990s focused on how CBI was being utilized, the benefits and problems with its usage. Recent studies on CBI and overall computer usage focus more on word processing, writing assistance and computer-mediated text (Okolo, et al., 1993).

One of the leading studies finding positive results with children with disabilities was Spiegel-McGill, Zippiroli, and Mistrett's study of computer use with students with language delays and social interaction deficits in 1989. The study found positive results with those students who played on the computer with non-disabled peers. In 1990, Mac Arthur and Malouf studied microcomputer use in educational programs for mildly handicapped students and found benefits such as individualized instruction, increasing attention to task, social and emotional improvements, behavior management option, and a time saving device. Concerns included access, training, locating appropriate software and scheduling computer usage, and fear of student isolation.

A similar study completed by Cosden and Abernathy (1990) observed microcomputer usage by elementary school students with and without mild handicaps to find that CBI is constrained by the limited number of computers available to teachers and the philosophy of providing equal access to computers for all students. The study

emphasized the loss of valuable instruction in the content areas while on the computer for students with disabilities who are mainstreamed in the regular environment. They also found a lack of individualized computer activities.

Computer usage has also evolved with a wide range of uses, age and developmental levels. Various disability categories can benefit from the development of computer usage such as visual impairments, physical impairments, communication impairments, and hearing impairments.

CBI has proven to be an effective strategy for students with disabilities in all stages of learning. Tutorial software has been used in the acquisition stage while drill and practice have been found effective in fluency and maintenance stages (Behrmann, 1994). CBI allows the selection of software that mimics the regular curriculum but offers an alternative method of responding. Recent studies (Raskind, Higgins, 1995; Poplin, 1995; Raskind, Herman, & Torgesen, 1995) have questioned the appropriateness and effectiveness of using computers solely for remediation and reinforcement purposes.

Young children, specifically infants and toddlers with disabilities are able to benefit from computers. Howard and colleagues (1996) conducted a study to evaluate the extent to which computer-based activities can enable young children with disabilities to exhibit changes in behavior. Toddlers and preschoolers were observed to demonstrate more positive behaviors such as active waiting, turn taking, communication, positive affect during small group activities than when they did not engage in computer activities.

Computers can be effectively used with students with visual impairments. Microcomputers with speech, Braille and large print outputs are enabling visually impaired students to write, edit, do research and access information (Mack, Koenig &

Ashcroft, 1990). Computers can be modified with adaptive keyboards, large print screen displays, Braille options and ability switches (Wilson, 1993).

Students with physical and/or severe disabilities often are using a wide-range of assistive technology devices. Proper positioning in the school environment enables successful learning opportunities. These devices include but are not limited to special wheelchairs, walkers, wedges, floor sitters, straps, standing aids, and sandbags. Environmental control is needed by students with physical disabilities in order to gain independence and access the environment around them. Examples consist of remote control switches and Velcro attached to the on and off switches ("Assistive Technology: A Student's Right", 1992).

Students with disabilities may also have specific mobility needs that can be assisted with technology. Mobility disabilities can inhibit a student access to places within the school or participation in school activities. Devices used to increase or adapt mobility include self-propelled walkers, manual and powered wheelchairs, bikes and scooters. In addition to enhancing the learning environment, students may require devices that help assist with self-care such as dressing, toileting, and electronic feeders. ("Assistive Technology: A Student's Right", 1992).

Communication is the foundation of interacting with others. An augmentative communication system is any system that aids individuals who are not independent verbal communicators. The system can include speech, gestures, sign language, symbols, synthesized speech, communication aids or microcomputers. Two forms of communication are used to augment existing speech and verbalizations. Standard forms of augmentative communication are those used generally by everyday people such as

gestures, facial expressions, eye gazing, head nod, writing and drawing. Communication aids such as the telephone, computer, typewriter and tape recorder are also standard forms of augmentative communication. Special forms of augmentative communication are those used by people with disabilities. Included are communication aids and devices, graphic symbols, specialized computer software, and manual signs (Blackstone, 1992). Due to costs involved with high tech augmentative communication, researchers are studying the effects of low tech communication alternatives. Examples include communication notebooks, folders, wallets, vests, aprons, purses and briefcases. Each of these tools implements a picture object/symbol system. Additional low tech solutions consist of E-tran or eye transfer system, scanning aides, compartmentalized communicators where choices are in the compartments (Parette, Dunn, & Hoge, 1995).

One of the learning modalities most used by children in school is listening. Students with hearing impairments must learn how to adapt their residual hearing to find other methods of gathering information. Such devices include hearing aids, an auditory trainer, telecommunication devices for the deaf, TDD, and closed captioned television. Vision is another primary modality used for learning. Vision can be adapted through increasing contrast, enlarging images and text, and using tactile materials. Some specific devices used to enhance vision include but are not limited to canes, eyeglasses, optical magnifying devices, cassette recordings, Braille materials, reading machines, and lighting modifications (Parette, 1990, "Assistive Technology: A Student's Right", 1992). Computer adaptations for the visually impaired can include screen reading programs with a speech synthesizer, large print screen displays, and Braille computer systems (Wilson, 1993).

Benefits of Assistive Technology

As stated earlier, assistive technology has been able to provide students with varying disabilities an opportunity to experience a greater amount of independence and success within their learning environment. Benefits have been found with children with disabilities in many areas.

Hutinger (1994) studied assistive technology usage in educational programs with children who have significant disabilities. This naturalistic study included observation, videotapes of children, questionnaires, and interviews with teachers and parents. Results showed that assistive technology has positive effects on children's development even when they have inconsistent experiences with that technology and have significant disabilities. Children experienced greatest improvements in social and emotional development and increased academic skills as a result of using assistive technology devices. The degree of positive effects was in direct relation to the nature of the child's placement and education experiences. Other improvements were found in the areas of communication, environmental control, and functional activities. In addition, parents reported a higher degree of improvement than the staff working with the same children. When comparing usage of assistive technology devices to traditional teaching methods without the use of assistive technology, parents and staff reported improvements and/or changes with the instruction using assistive technology devices.

Hutinger, Johanson and Stoneburner (1996) also studied the effects of assistive technology on students with multiple disabilities. Interviews and observations were conducted with 14 children, ages 2-10, with significant multiple disabilities. Parents and educators reported benefits in specific areas of development. Parents found higher levels

of improvement in social interactions, play activities, academics, and communication. Greatest gains were found in emotional outcomes, including enhanced self-concept, independence, social interaction, cooperation and exploration.

The benefits and uses of assistive technology go beyond those students with sensory and physical impairments. Students with learning disabilities can utilize technology to benefit their education. A common finding among researchers (Raskind, Higgins, 1995; Poplin, 1995; Raskind, Herman, Torgesen, 1995) is that technology with learning disabled students has a history of remediating skill deficits. This "reductionist" view is defined as breaking down a skill into logical sequenced parts of a whole (Poplin, 1995). An example of a reductionist activity in a classroom is the usage of isolated skill related drill activities on the computer. The opposite view to the reductionist view is the view of "holism". Poplin (1995) described holism as the whole of any phenomenon that cannot be broken into parts. Holism can contain elements of reductionism. Holistic views believe that assistive technology should increase independence and self-esteem for the learning disabled student. Services that are similar to those used with the student with sensory and physical impairments should be used with the LD student. For example, a student with a reading disability and good oral language skills could use an optical character recognition system (OCR) with a speech synthesizer to read a book (Raskind, Herman, Torgesen, 1995; Poplin, 1995).

Behrmann (1994) described Lahm and Morresette's holistic view of how seven areas of instruction can be enhanced by assistive technology for students with mild learning disabilities. Instructional areas include organization, note taking, writing, productivity, access to reference materials, cognitive ability, and materials modification.

All of these areas, if adapted or assisted with technology, can promote decreased learned helplessness, increased self-esteem, and an enhancement of the quality of life in education (Poplin, 1995).

Low tech and high tech assistive technology devices can provide children with solutions and organizational strategies. Low tech visual graphic organizers assist the student in organizing and planning thought processes. High tech solutions include computer word processing programs such as Word Perfect, Claris Works and ABC Flowcharter. These systems provide headings, highlighting or subcategories when organizing information.

Children, especially in regular education classrooms, are expected to take notes effectively every day. This activity may cause difficulty for the child with a learning disability due to a possible attention problem, organizational deficits, memory deficits, processing deficits, or a coexisting fine motor writing deficit. Behrmann (1994) described several high and low tech devices to assist note taking abilities such as graphic organizers which the student completes during the lesson and teacher photocopied notes with highlighters provided to accent important information. High tech solutions described include optical character readers (OCR) such as OmniPage Direct or InWords. A scanner "reads" type written text while a voice synthesizer orally reads the material while the student tracks. Microcassette recorders and videotapes provide a child with either visual or auditory processing deficits to learn in a more conducive learning modality. Computer programs such as AlphaSmart or PC-4 are portable keyboards operated on batteries. They provide a spell check, database, calculator, and a visual of

four lines of text. Word processing capabilities within a laptop provide the student editing options that would have previously caused disorganization and/or frustration.

Behrmann (1994) described word processors as "possibly being the most important application of assistive technology for students with mild disabilities." Writing can often be a deficit area for children with a learning disability due to problems in spelling, grammar, punctuation, generating ideas, organizing, drafting, editing and neatness. Therefore, word processing programs such as Bank Street Writer, ClarisWorks, or Word Perfect have been found effective within a language arts classroom.

Assistive technology devices to increase productivity can be either computer related or not. Calculators can be hand-held or can be within a computer system. Products such as databases, spreadsheets, or graphics software assist students with academic skills.

The most recent and spellbinding advances in technology are with accessing reference materials. With a computer and a modem, students can travel through the Internet to explore and learn any topic or interest. Benefits include fewer distractions compared to a library and the ability to access individuals in other communities to engage in correspondence. Teachers are cautioned with the use of the Internet due to the need to monitor the students for appropriate usage and the ability to focus on one topic. Students with disabilities may require searching instructions to eliminate wandering into different subjects. To improve cognitive abilities, manufacturers have created many tutorial, drill and practice, and problem-solving programs. CD based books are available to encourage assisted reading. Finally, tools can be created, such as authoring software, to assist children learn their individual goals.

Teachers will be able to modify materials by authoring and incorporating multimedia into instructional software.

Students and individuals with mental retardation and developmental disabilities benefit from assistive technology services and devices although many remain unserved (Parette, 1997). The Board of Directors of the Council for Exceptional Children - Mental Retardation and Developmental Disabilities (CEC-MRDD) approved a policy statement recognizing the importance of assistive technology to assist students and individuals with mental retardation to reach their full potential and lead more successful lives. The board supports IDEA in providing assistive technology services and devices in the environment of a child with mental retardation as well as provided suggestions for such implementation. Usage of both high tech and low tech devices have been found to produce benefits in intra-personal relationships, sensory abilities, cognitive abilities, communication skills, motor performance, self maintenance, leisure, and productivity (Parette, 1997).

Assistive technology can empower a student to overcome a physical or social barrier which ensures an appropriate placement within a student's least restrictive environment (Behrman, 1994; Derer, Polsgrove, Rieth, 1996; Barry & Wise, 1996; Molloy & Baskin, 1994; Kingsley & Langone, 1995). For students who are participating within inclusive classrooms currently, assistive technology can help decrease the need for source support services and foster independence within the mainstreamed environment (Behrman, 1994). Derer and colleagues (1996) found that assistive technology promotes inclusion thus allowing students to participate more effectively in school and interact with peers to a greater extent. The use of the technology needs to be conducted

in an appropriate manner. Sax, Pumpian, and Fisher (1997) stated that teachers often use assistive technology as supplementary aids and services instead of implementing it in a more holistic approach due to a lack of sufficient familiarity with devices and their effectiveness. They stated that professionals often have limited experiences with assistive technology. Therefore, when teachers go to investigate a piece of equipment, they limit themselves and the child to computers, wheelchairs and commercially available communication devices.

Carlson (1997) described four ways technology can foster both inclusion and self esteem for young children with disabilities: self-expression, communication, interaction, and education. Technology provides a means of self-expression, a support for early learning, a way to develop language skills, an appropriate social interaction among active young learners and provides a forum for them to develop life skills including academic learning.

Mc Gregor and Pachuski (1996) found in their study on assistive technology usage with students with multiple disabilities that only one child was participating in full inclusion. Sixty percent of the students who used assistive technology were served in full time special education settings. Findings showed that the majority of students who implemented assistive technology devices had multiple or physical disabilities. Researchers expressed concern with devices being utilized by only students with multiple disabilities where the Tech Law emphasizes assistive technology for all students from all disability categories.

This support of inclusion can occur with specific pieces of assistive technology such as a power wheelchair, an adaptable notebook computer with a speech card, or an

augmentative communication device. With proper implementation of assistive technology a child who has sensory, speech, and physical disabilities can be integrated into a mainstreamed regular education classroom with some degree of independence (Behrmann, 1994).

Factors Affecting Technology Use

Several studies have indicated that numerous barriers negatively affect assistive technology utilization. Bushrow and Turner (1994) cited three categories for the lack of usage of technology in special education. They identified teacher concerns, funding feasibility, and concerns about change. Results showed that teachers viewed mastering the different forms of assistive technology as difficult. The constant changes in the field of technology caused problems with mastering the latest device or piece of equipment.

A common barrier cited by a majority of the research was training inadequacies. Hutinger (1994) cited four training concerns as barriers to assistive technology usage including difficulties in program planning with adaptive equipment, lack of training and information, lack of communication between staff members, and inadequate assessments. Thorkilden (1994) found that effective training is often overlooked in research and development of assistive technology in special education.

Training difficulties are not the only cited barriers that are concerns for researchers. Behrmann (1993) surveyed 134 directors of special education in Virginia and found that only a very small percentage of eligible special education students were actually receiving services and devices. The contributing factors the researcher cited were lack of service delivery specialists, inadequate budget, lack of trained personnel, and lack of policies in relation to assistive technology on IEPs.

In Derer, Polsgrove and Rieth's (1996) study of assistive technology applications, three main categories of barriers were identified. General systems issues included concerns about equipment, management of policies, space and time, and monetary concerns about funding. Interpersonal issues included concerns about consultants, family training, negative peer reactions, stigma and unity of service delivery efforts. Individual issues included student and teacher factors such as knowledge levels, resistance and training. The barrier most cited by respondents was monetary barriers, specifically expense and funds. Mc Gregor and Pachuski (1996) also found time as a barrier to becoming a proficient user. Forty percent of their respondents cited time as a main issue.

Hutinger, Johanson and Stoneburner (1996) found similar barriers in their study of assistive technology applications with students with multiple disabilities. Barriers cited included inadequacies in the areas of support services, funding, classroom equipment, and staffing. Specific barriers included differences in program planning, lack of training and information, lack of communication between staff, inadequate assessment, and malfunctioning equipment.

Family stress may affect the quality of caregiver interactions therefore causing a barrier to assistive technology usage (Parette et al, 1996). Other barriers include inadequate information, inadequate training and a lack of experimentation prior to purchase.

Technology abandonment is the nonuse of an assistive technology device or service due to dissatisfaction or declining use over time (Parette, 1997). Abandonment is a serious factor influencing assistive technology use. Choosing an appropriate device or service initially after a needs assessment can help decrease technology abandonment.

Parette (1997) described "appropriateness" for a child with mental retardation as a device that helps achieve an individual or family goal that may otherwise be unobtainable.

Knowledge Levels of Professionals Using Assistive Technology

Few studies have been completed exclusively on the knowledge levels of teachers utilizing assistive technology. Todis (1996) found in a study on user perspectives that few preservice training programs for special education teachers included courses or class discussions on assistive technology. Instructional assistants were found to have little training or limited training such as a one-day workshop. Most districts in the study had little funding for training to increase teacher knowledge levels.

Derer and colleagues (1996) surveyed special education teachers across Indiana, Kentucky, and Tennessee in regards to assistive technology usage. Sixty-nine percent of the teachers reported that they had received some form of training in assistive technology. Only 19% felt all of their needs were met. Twenty percent received no training while a total of 41% of special educators lack adequate skills to use assistive technology effectively in the classroom.

McGregor and Pachuski (1996) found evidence in Pennsylvania to support Dere's study. These researchers surveyed special education teachers who are educationally responsible for at least one child with an assistive technology device. Their study found that even though 70% of teachers had earned a master's degree in special education, teachers overall were less satisfied with their ability to use the technology in their teaching. The study found that general background training doesn't minimize the need for specific training on devices currently used in the classroom. Hutinger (1996) found uneven training experiences with special education teachers interviewed. Teachers with

previous experiences with assistive technology can still have a lack of training and support services.

A questionnaire of teachers and staff working with deaf-blind children throughout Massachusetts reported significant barriers in usage of assistive technology. Parker, Buckley, Truesdell, Riggio, Collins, and Boardman (1990) found deficits in teachers' knowledge of assistive technology. Overall, 70% of teachers reported that they utilized some type of technology, but only 60% used electronic communication; 50% rarely used switch toys; and 48% rarely or never used the computer. Caution was advised in the generalization of the results due to the small sample size.

Often students and individuals with visual impairments have financial difficulties in purchasing the expensive technology that they require for daily living independence. Uslan (1992) surveyed direct service organizations and found that a significant number of visually impaired persons need both equipment and financial assistance. Families were often unaware of what technology was available and what it can do.

Several studies (Darrow, Darrow, & Yates, 1993; Alexander, 1993) have been completed on training modules to increase assistive technology knowledge levels. These studies showed that through training efforts, teachers and other professionals can feel more confident in their abilities to use assistive technology equipment devices.

Darrow et al. (1993) studied assistive technology training needs in rural North Carolina through a multimedia software tutorial series. They found that the teachers who participated in the project expressed a better understanding of assistive technology. Alexander (1993) conducted a study of knowledge and training on increasing awareness of training needs and knowledge levels of assistive technology. An inservice was created

from a needs assessment survey. Results of the inservice showed that a significant number of the target group improved their awareness level of assistive technology.

Attitudes Towards Assistive Technology

Teacher perceptions of assistive technology have been researched recently. Several studies found evidence of professionals overcoming their fears in regard to utilizing assistive technology. Bushrow and Turner (1994) studied barriers and change facilitators as they affect full use of assistive technology. Results revealed that the district used in the study was aware of assistive technology but that it was not a main priority. Two participants felt that "a radical restructuring of the teaching process was required for successful implementation of assistive technology" (p 452).

Dublinske, Harlan, and Bruskin (1992) studied the effectiveness of self-instructional material on the technology usage and knowledge of special education professionals and family members. A comparison of the pre- and post- scores showed a significant increase in comfort levels regarding knowledge about usage of assistive technology. Their findings also revealed that care providers felt significantly less comfortable with their knowledge of using assistive technology than did the teachers. Care providers, though, had a less desire to learn more about assistive technology than the teachers and related service personnel.

Hutinger (1995) studied reluctance of utilizing assistive technology with administrators, teachers, program assistants, and therapists. Hutinger cited several basic reasons for reluctance such as the fear of the unknown, fear of damaging or misusing equipment, time constraints to learn the device and implement into the curriculum, inadequacies with working with computers, previous unsuccessful experiences, lack of

support, frustration due to lack of funding, and a lack of belief in the benefits of technology on young students with disabilities. Results indicated that all participants, even those who were reluctant, believed that the presentations and training sessions were informative.

A two year qualitative study completed by Todis and Walker (1993) on user perspectives of assistive technology in educational settings found a conflict between what the families and the professionals viewed as the students' potential for independent use of assistive technology as well as the students' long range goals. Researchers contributed the acquisition and implementation of assistive technology with the family values and parental views.

Todis (1996) studied perspectives of parents, specialists, teachers, instructional assistant, users, and peers on assistive technology in educational settings through observation and interviews of 13 children who utilize assistive technology devices in school. The study found several characteristics of successful implementation that met educational and social needs. Successful experiences with assistive technology occurred when student and family goals and values were the basis of programming, purchase and implementation were related to student goals, a team approach with honest communication was used, replacement of old or outgrown devices and quick solutions to problems.

Parent perspectives included a cycle of emotions beginning with apprehensiveness to acceptance to funding concerns. Resistance was attributable to fear of losing or not developing certain functional or academic skills. The perspectives of specialists such as physical therapists, occupational therapists and speech/language

pathologists included a tension between school funding constrains and the needs of a student. Therapists felt a concern with obtaining a suitable match between students and equipment. Finally, therapists perceived an overall frustration that the positive outcomes expected were unobtainable due to inappropriate and inconsistent use at school and home. Special educators in this study were initially eager to implement and explore assistive technology services and devices. Eagerness led to frustration due to inadequate support systems, differences with parents, and guilt due to the child not obtaining the expected educational outcomes. Instructional assistants within special education and regular education classrooms were often responsible for implementation of the assistive technology device. Instructional assistants were less likely to be trained or felt insufficient training had been provided (Todis, 1996).

Todis (1996) emphasized the perspectives of the user and peers in the regular education classroom. Technology teams often fail to study or consider the user's perspective. Each different child acquires his or her own perspective based on previous experiences, knowledge levels and willingness. Peers were found less likely to interact with a child with an assistive technology device if the teacher artificially created the situation. Peers were more likely to interact positively with a child using a device if interactions occur naturally and were not forced.

Hutinger, Johanson, and Stoneburner (1996), in their study of students with multiple disabilities utilizing assistive technology, found that school personnel viewed assistive technology as a way to reinforce or strengthen isolated academic skills instead of integrating the device into the student's total school experience. The study reported

that usage of assistive technology devices increased if it was included in the student's IEP.

A review of literature on the perceptions of teachers regarding the usage of assistive technology showed limited studies in this area. Thus, a need exists for research of the attitudes and knowledge levels of teachers using assistive technology. Therefore, this study will address the following:

1. What percentage of teachers use assistive technology?
2. What percentage of teachers have had training in assistive technology?
3. What are the factors inhibiting assistive technology usage?
4. What are the attitudes towards assistive technology?
5. What are the uses of assistive technology?
6. What teacher support is being provided with assistive technology?
7. Who is responsible for providing assistive technology?
8. What are the knowledge levels of teachers using assistive technology?

Method

Design and Subjects

A survey research design was used to collect data for this study. The subjects were 120 elementary special education teachers, grades NK-5 and in all areas of special education. A convenience sampling method was used for the selection of counties. Counties to be chosen were predominantly rural, public school systems in Virginia. The researcher selected these counties because they have high return rates for surveys and a reputation for cooperation.

Instrument

A self-developed questionnaire was used to collect data for this study. The questionnaire (See Appendix C) was made up of several components. The first section consisted of 25 questions pertaining to teacher attitudes and knowledge towards assistive technology usage. The questions were on a Likert type scale, with four possible answers that the teachers could choose, ranging from strongly agree (1), agree (2), disagree (3), strongly disagree (4). The second section included demographic and experiential variables such as gender, years of training, education level, and usage of assistive technology devices. The questionnaire also contained a section with open-ended questions for teachers to provide additional comments.

Pilot Study

The questionnaire was field-tested on upcoming elementary school special education teacher graduates from a 4-year, predominantly Liberal Arts college in Virginia. This population was chosen due to the similar characteristics between graduate level teachers and the target population.

Procedure

The questionnaire was mailed to the subjects after receiving approval from the Human Subject Research Committee at Longwood in the spring of 1999. A letter requesting permission to perform the study was sent to each county's superintendent prior to beginning the study (see Appendix A). Questionnaires were sent with a self-addressed envelope and with a cover letter (see Appendix B). The participants were requested to return the questionnaire within two weeks of receiving the letter. Completion of the questionnaire was completely voluntary. Each questionnaire was coded with an assigned number to allow redistribution of additional surveys to those counties who had not responded. Each number was destroyed as soon as the survey was returned. Confidentiality and anonymity of the respondents was ensured.

Data Analysis

The data were analyzed using descriptive statistics in order to find the percentage of the subjects who use assistive technology, the percentage who had received training, and the percentage who received support in their utilization of assistive technology. Other factors studied included factors inhibiting usage, and views of the teacher on the usage of assistive technology. Demographic variables such as gender, position, experience, and education were analyzed. Open-ended questions were studied to identify patterns in usage of assistive technology.

Results

One hundred twenty elementary special educators were surveyed, of which seventy-one responded (51%). Ninety-four percent of respondents were female. While responses were obtained in each area of disability, the majority of subjects worked with students with learning disabilities (31%) or as a cross-categorical teacher (35%). Years of experience ranged from zero to twenty-one with fifty four percent having zero to seven years of experience. Masters degrees were held by sixty-six percent of respondents while thirty percent held bachelor's degrees. Only four percent responded as having only a provisional license.

Sixty-two percent of the respondents reported that they have received training on assistive technology. Forty-one percent reported multiple types of training. Although over half of respondents reported a combination of training experiences, only thirty-nine percent reported usage of the devices. This usage is predominately on a daily basis (30%). The main reason for non-usage by subjects (34%) was that assistive technology was not required for the children currently being served. Two lesser issues cited were a lack of funding (7%) and training inadequacies (1%) (see Table 1).

Teacher Attitudes Towards Assistive Technology

Questions 1, 6, 11, 13, 14, 15, 25, 8, and 2 dealt with teacher attitudes towards assistive technology. The respondents rated the benefits of assistive technology very highly (99%) for students with disabilities in academic settings. Ninety-two percent disagreed that few students actually benefit from assistive technology. Likewise in their responses to the items of students with severe disabilities having access to assistive technology and the belief that technology will maximize a child's ability to socialize with

others (86% and 85%). However when asked questions in regards to funding, a slight discrepancy in scores was evident. Teachers rated that the benefits of assistive technology outweighed the difficulties of obtaining the equipment (86%) and that assistive technology was not too expensive to try to use in the classroom (83%). When asked if large portions of special education funds should be spent in the purchase of assistive technology, forty-seven percent agreed (see Table 2).

Teacher Usage of Assistive Technology

Questions 3, 12, and 16 dealt with teacher usage of assistive technology. A majority of the teachers (86%) responded that assistive technology is not very complicated or difficult to use in their classrooms. When asked if assistive technology is a main priority in their classroom, forty-seven percent agreed. In addition, less than half (41%) are using low tech or high tech communication devices in their environments (see Table 3).

Teacher Support with Assistive Technology

Questions 4, 17, 22, and 23 dealt with the support received by other professionals. In regards to the support systems provided to teachers, responses varied depending on the type of support questioned (see Table 4). When asked if teachers receive assistance from related service personnel such as the physical therapist, the occupational therapist, and the speech language pathologist, and teachers rated support as fairly high (85%). Sixty-six percent of teachers also reported being confident in identifying resources to support technology in their classrooms. However, when specifically asked if teachers knew where to contact experts on assistive technology, only half (54%) of teachers agreed. In

addition, when teachers were asked if inservices were provided on assistive technology advances and needs, only thirty-one percent agreed.

Teacher Responsibility with Assistive Technology

Questions 9, 10, and 20 dealt with teacher responsibility. Teachers responded consistently with their answers in regards to who is responsible for the determination of assistive technology devices and providing those services (see Table 5). Thirty-nine percent of teachers agreed that related service personnel are not responsible for providing all of the assistive technology services and devices. Likewise, teachers (63%) felt that the determination of a student's eligibility for assistive technology was not only the teacher's responsibility. A majority of teachers (75%) felt that teachers did have the responsibility of serving as a resource to parents on assistive technology.

Teachers Knowledge of Assistive Technology

Questions 5, 7, 18, 19, 21, and 24 dealt with teacher knowledge levels. Teachers reported relatively high knowledge levels in regards to assistive technology. When determining if a device is appropriate for a child's environment, eighty-five percent felt knowledgeable. In regards to being able to match the child's individual needs with an appropriate device, teachers (66%) felt confident in their abilities. Seventy-two percent reported that they were able to determine if an assistive technology device is functional and appropriate. Teachers (66%) felt confident in assessing the effectiveness of devices in their classroom. In the event of a device needing assembly, or maintenance, sixty-one percent felt they were able to do so effectively. In regards to teaching students how to use high tech assistive technology devices to increase independence, half of the respondents (54%) agreed they were comfortable with their abilities (see Table 6).

Open-ended questions revealed insights on how technology is and is not being used in classrooms, including examples of equipment and children who are using it. Teachers reported using equipment such as Cheap Talk, Big Mack switches, battery operated toys etc. to increase communication skills. Devices such as home made creations, foam on spoons and adapted switches were used to increase independent living skills. Software such as Intellitools, spelling software and word processing programs were being used. Some students who implemented the devices were students with visual impairments, students with hearing impairments, non-verbal students, students with autism, and students with learning disabilities. Reasons for non-usage varied and were in discrepancy dependent on the individuals' experiences. The main areas of non-usage consisted of lack of funding, time constraints, lack of training, lack of consistency between environments and accessing the device within each environment.

Discussion

The purpose of this study was to determine the knowledge levels, attitudes and usage of assistive technology. The majority of teachers agreed on the positive benefits of assistive technology for students with disabilities. The concept of assistive technology in theory and the belief that it should be utilized were evident. Results collaborated the review of literature that assistive technology is underutilized within certain populations of special education.

The teachers reported that they are comfortable with their knowledge levels concerning assistive technology. Nevertheless, less than half of the teachers are currently implementing it in their classrooms. Upon examination of responses to why assistive technology is not utilized, the majority of respondents felt that assistive technology was not needed for the students they were teaching. This finding corroborates research (Poplin, 1995; Raskind & Higgins, 1995; Raskind, Herman, Togesens, 1995) that teachers may not be examining assistive technology holistically. It is unclear if teachers of students with learning disabilities are exclusively using assistive technology as a tool to remediate skill deficits or as a tool to increase independence and self-esteem in the general education classroom.

Several other factors could contribute to the lack of usage by some teachers. First, teachers reported that school systems are failing to provide inservices to update assistive technology needs. Teachers did report receiving assistance from technical centers and other sources but not typically through the school system. This finding was consistent with other studies (Hutinger, 1994; Thorkilden, 1994) that found training inadequacies as a barrier to usage. Secondly, all teachers aren't aware of where to receive

assistance on their own. Thirdly, and most importantly for educators of students with mild disabilities, the belief exists that students with mild disabilities may not use or benefit from assistive technology. Open-ended questions showed that teachers use computers for drill and practice. It is questionable if teachers are aware of the ways assistive technology can be used to benefit students with learning disabilities. Often teachers would respond that they used word processing, editing programs for their LD students, but didn't consider that as a form of assistive technology. Therefore, it is unclear if teachers understand the definition of assistive technology. In regards to schools using assistive technology teams for the determination and application of assistive technology, findings were similar to the review of literature (Blackstone, 1992; Behrmann, 1993; Parette, 1997; Todis, 1996; McGregor & Pachuski, 1996; Parette et al, 1996; Holder-Brown & Parette, 1992). Almost two-thirds of the teachers were utilizing a team approach to implementing assistive technology.

Limitations of the study

The study examined the usage of assistive technology in the elementary school setting rather than the middle school or the high school. Children with learning disabilities in elementary school may not have a need for editing and word processing software as much as those students in high school. Secondly, the results may have been skewed due to a convenience sampling used instead of a randomly selected sample.

Recommendations

Further studies are needed in regards to the usage of technology with students with learning disabilities to determine how assistive technology is being utilized. This research would be beneficial in secondary grade levels for students preparing for post-

secondary education. Research studies are becoming more available on students with multiple disabilities in post secondary settings. There was a lack of research on students with learning disabilities in high school settings. Another area poorly researched was in the area of students preparing for future employment in transition programs. It is unknown how many school aged programs are using assistive technology with the knowledge that ADA will allow the continuation of assistive technology services in the workplace.

There is a need for school systems to provide inservices for teachers on the developments in devices and services. Inservices also need to include strategies for creative funding, integrating technology into the classroom and creative solutions for smaller problems such as transporting the devices. In addition, school systems need to ensure that teachers at least have the knowledge of where resources are available. A possible suggestion is to disseminate handouts on assistive technology centers upon hiring any new staff.

More research is needed in rural counties on the usage of assistive technology and integrated issues. Many counties wanted to participate in the study but were unable to due to time constraints.

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Appendix A
Letter to Superintendent

Route 2 Box 31-D
Meherrin, Va 23954

Dear _____,

I am a graduate student in Special Education at Longwood College. I am conducting a study on teacher attitudes towards the utilization of assistive technology in educational settings as a part of my masters degree requirements. The attached survey is concerned specifically with elementary special education teachers attitudes and usage of assistive technology.

Your school district has been selected to participate in this study. The average time required for the completion of this survey is 10 minutes or less. The responses to this survey will be confidential; no schools or individuals will be identified with his/her responses.

Your cooperation is very important to the completion of this study. I will appreciate it very much if you would please give permission to conduct this research in your school system. Attached is a permission slip for you to complete. Please return the permission slip by _____.

Thank you for your cooperation and assistance.

Sincerely yours,

Theresa Ledger
Graduate Student

I, _____ grant / do not grant permission to Theresa Ledger to conduct a study on teacher knowledge and attitudes towards the usage of assistive technology in my school district, _____.

Signature _____

Date _____

Appendix B

Letter to Teacher

Route 2 Box 31-D
Meherrin, Va 23954

Dear Teacher,

I am a graduate student in Special Education at Longwood College. I am conducting a study on teacher knowledge and attitudes towards the utilization of assistive technology in educational settings as a part of my masters degree requirements. The attached survey is concerned with teacher perceptions of assistive technology and knowledge levels.

Your school district has been selected to participate in this study. The average time required for the completion of this survey is 10 minutes or less. After finishing the questionnaire/survey, please place it in the enclosed envelope and return it via mail within two weeks (by _____). Please do not indicate your name on the questionnaire nor on the envelope. Each questionnaire has been assigned a number, the purpose of this number is to help increase the response rate. The number will only be used as a way to help with follow up procedures. The number will be destroyed as soon as your survey is returned.

Your cooperation is very important to the completion of this study. Thank you for your assistance.

Sincerely,

Theresa Ledger
Graduate Student

Appendix C
Teacher Survey

Teacher Usage of Assistive Technology Questionnaire

Part I - Attitudes and Knowledge of Assistive Technology

Directions: The following statements are related to the knowledge and attitudes of teachers towards assistive technology. Each statement is rated using a Likert scale, Strongly Agree (SA) = 1; Agree (A) = 2; Disagree (D) = 3; Strongly Disagree (SD) = 4. Please circle the rating that is most appropriate.

Definitions:

Assistive technology device - Any item, piece of equipment, or product system, whether acquired commercially or off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of children with disabilities.

High tech device - Devices that are electrical or battery operated. Examples include microcomputers, augmentative communication devices, powered wheelchairs, speech synthesizers etc.

Low tech device - Devices that are non-electrical, simple, and inexpensive. Examples include teacher made communication boards, adaptive spoons, elastic shoelaces, etc.

Types of Disabilities - This survey is only pertaining to disabilities that are considered moderate to severe. Examples include moderate to severe mental retardation, autism, moderate to severe communication disorders, visual impairments, hearing impairments, and physical disabilities such as cerebral palsy and spina bifida.

| | SA | A | D | SD |
|--|----|---|---|----|
| 1. Assistive technology will benefit students with disabilities in academic settings. | 1 | 2 | 3 | 4 |
| 2. Assistive technology goals should be included in a student's Individual Education Plan when appropriate. | 1 | 2 | 3 | 4 |
| 3. The usage of assistive technology is a main priority in my classroom. | 1 | 2 | 3 | 4 |
| 4. If I feel I need help with assistive technology I can get support from the related services Personnel (Physical Therapist, Occupational Therapist, Speech - Language Pathologist) | 1 | 2 | 3 | 4 |

OVER...

| | SA | A | D | SD |
|--|----|---|---|----|
| 5. I am able to determine if an assistive technology device is functional and appropriate for a child. | 1 | 2 | 3 | 4 |
| 6. The benefits of assistive technology outweigh the difficulties of obtaining the equipment. | 1 | 2 | 3 | 4 |
| 7. I feel comfortable teaching students how to use high tech assistive technology devices to increase independence. | 1 | 2 | 3 | 4 |
| 8. Students should have access to assistive technology in educational programs. | 1 | 2 | 3 | 4 |
| 9. It is the responsibility of the related service personnel to provide all assistive technology services and devices. | 1 | 2 | 3 | 4 |
| 10. The determination of a student's eligibility for assistive technology is the teacher's responsibility. | 1 | 2 | 3 | 4 |
| 11. People with severe disabilities should have access to assistive technology. | 1 | 2 | 3 | 4 |
| 12. Assistive technology is very complicated and difficult to use. | 1 | 2 | 3 | 4 |
| 13. Assistive technology is too expensive to try to use in my classroom. | 1 | 2 | 3 | 4 |
| 14. Few students actually benefit from assistive technology. | 1 | 2 | 3 | 4 |
| 15. It is acceptable to spend large portions of special education funds to purchase assistive technology. | 1 | 2 | 3 | 4 |
| 16. I often implement low tech and high tech communication boards and augmentative communication aides when necessary. | 1 | 2 | 3 | 4 |
| 17. I feel comfortable identifying resources available to support use of technology in special education. | 1 | 2 | 3 | 4 |

NEXT PAGE.

| | SA | A | D | SD |
|---|----|---|---|----|
| 18. I feel I am able to assemble, operate and maintain the components of technology systems in a special education environment. | 1 | 2 | 3 | 4 |
| 19. I feel confident assessing the effectiveness of assistive technology systems in my classroom. | 1 | 2 | 3 | 4 |
| 20. Teachers should serve as assistive technology resources to parents of children with disabilities. | 1 | 2 | 3 | 4 |
| 21. I am able to determine if the device matches the needs of the child. | 1 | 2 | 3 | 4 |
| 22. Inservices are presented to update current assistive technology advances and needs. | 1 | 2 | 3 | 4 |
| 23. I know where to contact experts on assistive technology if needed. | 1 | 2 | 3 | 4 |
| 24. I am able to determine if a device fits into a child's environment. | 1 | 2 | 3 | 4 |
| 25. I believe technology will maximize a child's ability to socialize with others. | 1 | 2 | 3 | 4 |

OVER.....

Part II - Demographic Information

Place a check on the appropriate line.

1. Gender

a. male _____

b. female _____

2. Position

What population do you teach?

a. Mild Mental Retardation _____

b. Moderate Mental Retardation _____

c. Learning Disabled _____

d. Behavioral Disabled _____

e. Severe Mental Retardation _____

f. Cross Categorical _____

g. Early Childhood Special Education _____

h. Other (specify) _____

3. Experience

Indicate the total number of years that you have been teaching.

a. 0-3 _____

b. 4-7 _____

c. 8-10 _____

d. 11-14 _____

e. 15 + _____

f. Other (specify number of years) _____

4. Education

Indicate the highest level of education completed.

a. High school diploma _____

b. Bachelors Degree _____

c. Masters Degree _____

d. Provisional License _____

e. Other (specify) _____

NEXT PAGE.....

5. Training

Have you had any training experiences with assistive technology?

- a. yes _____ b. no _____

If yes, check type:

- a. inservice/ workshop _____
- b. technical assistance center (T/TAC) consultation _____
- c. PT, OT, SLP, or family demonstration _____
- d. assistive technology specialist _____
- e. formal collegiate training _____
- f. company manufacturer / representative demonstration _____

6. Usage

Do you use high tech assistive technology in your classroom?

- a. yes _____ b. no _____

If yes, how often?

- a. daily _____
- b. weekly _____
- c. other (specify) _____

If no, check the appropriate reasons for lack of usage.

- a. lack of funding _____
- b. lack of training _____

OVER.....

- c. fear of damaging or misusing equipment _____
- d. time constraints to learn device _____
- e. difficulty implementing assistive technology into the curriculum _____
- f. lack of support _____
- g. previous unsuccessful experiences _____
- h. other (specify) _____

Part III

Please describe any difficulties in regards to utilizing assistive technology in your classroom.

Please describe the main issues surrounding assistive technology usage in your classroom. (e.g. why do you use assistive technology, do not use assistive technology, time constraints etc.)

Thank you again for all of your time and assistance!

Table 1
Profile of Respondents

Table 1

Profile of the Respondents

| Variable | Percentage |
|-----------------------------------|------------|
| Gender | |
| Male | 5.6 |
| Female | 94.4 |
| Position | |
| Moderate Mental Retardation | 2.8 |
| Mild Mental Retardation | 7.0 |
| Learning Disabled | 31.0 |
| Behavioral Disabled | 4.2 |
| Severe Mental Retardation | 1.4 |
| Cross Categorical | 35.2 |
| Early Childhood Special Education | 7.0 |
| Other | 9.9 |
| No Response | 1.4 |
| Experience | |
| 0-3 Years | 26.8 |
| 4-7 Years | 26.8 |
| 8-10 Years | 12.7 |
| 11-14 Years | 15.5 |

| | Attitudes Towards AT | 62 |
|---|----------------------|------|
| 15+ Years | | 8.5 |
| Other | | 9.9 |
| Education | | |
| Bachelors Degree | | 29.6 |
| Masters Degree | | 66.2 |
| Provisional License | | 4.2 |
| Training | | |
| Yes | | 62.0 |
| No | | 36.6 |
| Type of Training | | |
| Inservice / Workshop | | 7.0 |
| Technical Assistance Center (T/TAC) Consultation | | 2.8 |
| PT, OT, SLP, or Family Demonstration | | 2.8 |
| Assistive Technology Specialist | | 1.4 |
| Formal Collegiate Training | | 7.0 |
| Company Manufacturer / Representative Demonstration | | 1.4 |
| Combination | | 40.8 |
| No Response | | 36.6 |
| Usage | | |
| Yes | | 39.4 |
| No | | 59.2 |
| Frequency | | |
| Daily | | 29.6 |

| | | |
|--|----------------------|------|
| | Attitudes Towards AT | 63 |
| Weekly | | 8.5 |
| Other | | 1.4 |
| No Response | | 60.6 |
| Reasons for Non-Usage | | |
| Lack of Funding | | 7.0 |
| Lack of Training | | 1.4 |
| Fear of Damaging or Misusing Equipment | | 0.0 |
| Time Constraints to Learn Device | | 0.0 |
| Difficulty Implementing Assistive Technology into the Curriculum | | 0.0 |
| Lack of Support | | 0.0 |
| Previous Unsuccessful Experiences | | 0.0 |
| Other | | 33.8 |
| Combination | | 12.7 |
| No Response | | 45.1 |

Table 2

Teacher Attitudes Towards Assistive Technology

Table 2

Teacher Attitudes Towards Assistive Technology

| Item | Percentage |
|---|------------|
| 1. Assistive technology will benefit students with disabilities in academic settings. | |
| Agree – Strongly agree | 98.6 |
| Disagree – Strongly disagree | 0.0 |
| No response | 1.4 |
| 2. The benefits of assistive technology outweigh difficulties of obtaining the equipment. | |
| Agree – Strongly agree | 85.9 |
| Disagree – Strongly disagree | 9.9 |
| No response | 4.2 |
| 3. People with severe disabilities should have access to assistive technology. | |
| Agree – Strongly agree | 94.4 |
| Disagree – Strongly disagree | 2.8 |
| No response | 2.8 |
| 4. Assistive technology is too expensive to try to use in my classroom. | |
| Agree – Strongly agree | 8.5 |

| | |
|--|------|
| Disagree – Strongly disagree | 83.1 |
| No response | 8.5 |
| 5. Few students actually benefit from assistive technology. | |
| Agree – Strongly agree | 4.2 |
| Disagree – Strongly disagree | 91.6 |
| No response | 4.2 |
| 6. It is acceptable to spend large portions of special education funds to purchase assistive technology. | |
| Agree – Strongly agree | 46.5 |
| Disagree – Strongly disagree | 49.3 |
| No response | 4.2 |
| 9. I believe technology will maximize a child's ability to socialize with others. | |
| Agree – Strongly agree | 84.5 |
| Disagree – Strongly disagree | 12.7 |
| No response | 2.8 |
| 10. Students should have access to assistive technology in educational programs. | |
| Agree – Strongly agree | 97.2 |
| Disagree – Strongly disagree | 0.0 |
| No response | 2.8 |
| 11. Assistive technology should be included in a student's IEP when appropriate. | |

| | |
|------------------------------|------|
| Agree – Strongly disagree | 94.4 |
| Disagree – Strongly disagree | 4.2 |
| No response | 1.4 |

Table 3
Teacher Usage of Assistive Technology

Table 3

Teacher Usage of Assistive Technology

| Item | Percentage |
|--|------------|
| 1. Usage of assistive technology is a main priority in my classroom. | |
| Agree – Strongly agree | 46.5 |
| Disagree – Strongly disagree | 49.3 |
| No response | 4.2 |
| 2. Assistive technology is very complicated and difficult to use. | |
| Agree – Strongly agree | 9.9 |
| Disagree – Strongly disagree | 85.9 |
| No response | 4.2 |
| 4. I often implement low tech and high tech communication boards And augmentative communication aides when necessary. | |
| Agree – Strongly agree | 40.9 |
| Disagree – Strongly disagree | 49.3 |
| No response | 9.9 |

Table 4

Teacher Support with Assistive Technology

Table 4

Teacher Support with Assistive Technology

| Item | Percentage |
|--|------------|
| 1. If I feel I need help with an assistive technology device, I can get support from the related services personnel (Physical Therapist, Occupational Therapist, Speech – Language Therapist) | |
| Agree – Strongly agree | 84.5 |
| Disagree – Strongly disagree | 14.0 |
| No response | 1.4 |
| 2. I feel confident identifying resources available to support the use of technology in special education. | |
| Agree – Strongly agree | 66.2 |
| Disagree – Strongly disagree | 32.4 |
| No response | 2.8 |
| 3. Inservices are provided to update current assistive technology advances and needs. | |
| Agree – Strongly agree | 31.0 |
| Disagree – Strongly disagree | 66.2 |
| No response | 2.8 |
| 4. I know where to contact experts on assistive technology | |

if needed.

| | |
|------------------------------|------|
| Agree – Strongly agree | 53.5 |
| Disagree – Strongly disagree | 45.1 |
| No response | 1.4 |

Table 5

Teacher Responsibility with Assistive Technology

Table 5

Teacher Responsibility with Assistive Technology

| Item | Percentage |
|--|------------|
| 1. It is the responsibility of the related service personnel to provide all assistive technology services and devices. | |
| Agree – Strongly agree | 39.4 |
| Disagree – Strongly disagree | 56.4 |
| No response | 4.2 |
| 2. The determination of a students eligibility for assistive technology is the teacher's responsibility. | |
| Agree – Strongly agree | 33.8 |
| Disagree – Strongly disagree | 63.4 |
| No response | 2.8 |
| 3. Teachers should serve as assistive technology resources to parents of children with disabilities. | |
| Agree – Strongly agree | 74.6 |
| Disagree – Strongly disagree | 19.7 |
| No response | 5.6 |

Table 6

Teacher Knowledge of Assistive Technology

Table 6

Teacher Knowledge of Assistive Technology

| Item | Percentage |
|---|------------|
| 1. I am able to determine if an assistive technology device is functional and appropriate for a child. | |
| Agree – Strongly agree | 71.8 |
| Disagree – Strongly disagree | 26.7 |
| No response | 1.4 |
| 2. I feel comfortable teaching students how to use high tech assistive technology devices to increase independence. | |
| Agree – Strongly agree | 53.5 |
| Disagree – Strongly disagree | 43.6 |
| No response | 2.8 |
| 3. I feel I am able to assemble, operate, and maintain components of technology systems in a special education environment. | |
| Agree – Strongly agree | 60.6 |
| Disagree – Strongly disagree | 36.7 |
| No response | 2.8 |
| 4. I feel confident assessing the effectiveness of assistive technology systems in my classroom. | |
| Agree – Strongly agree | 66.2 |

| | |
|--|------|
| Disagree – Strongly disagree | 28.2 |
| No response | 5.6 |
| 5. I am able to determine if the device matches the need of the child. | |
| Agree – Strongly agree | 66.2 |
| Disagree – Strongly disagree | 32.4 |
| No response | 1.4 |
| 6. I am able to determine if a device fits into a child's environment. | |
| Agree – Strongly agree | 84.5 |
| Disagree – Strongly disagree | 12.7 |
| No response | 2.8 |
