

A STUDY OF THE FACTORS  
WHICH IMPACT  
ASSISTIVE TECHNOLOGY IMPLEMENTATION

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Doctor of Education

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by

Sheila Bradby Bailey

May 2000

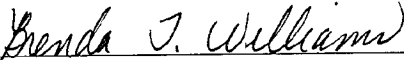
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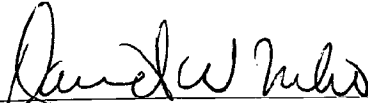
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## DEDICATION

It is with gratitude that I acknowledge the collective support of the most important people in my life: my husband and children. Their patience, prayers, and love never wavered. A special thank-you to all others who remained supportive and encouraging throughout this process.

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## A STUDY OF FACTORS WHICH IMPACT ASSISTIVE TECHNOLOGY IMPLEMENTATION

### ABSTRACT

The primary purpose of this study was to explore the extent to which barriers and facilitators to assistive technology implementation, as identified in the literature, exist in Virginia. This study offered special education administrators an opportunity to provide perspectives on the status of assistive technology implementation and the overall role of educational leaders. Each of the (133) local special education administrators was afforded an opportunity to participate in this study.

The results revealed that, while some factors identified in the literature did impede assistive technology services in Virginia, there also exist facilitators to implementation. These were indicated on a rating scale that ranged from "small extent" to "great extent". Some of the facilitators have been developed through assistive technology teams, regional programs, and examples of collaborative efforts in localities.

The primary barrier was Equipment Complexity and the main facilitator was Division Administrative Support. Administrators revealed that their roles are evolving and at times overwhelming. They expressed the need for assistance with a very complex issue. This research illuminates information that could be examined by the stakeholders in this process who seek to improve services and provide appropriate assistive technology to individuals with disabilities.

**A STUDY OF THE FACTORS WHICH IMPACT  
ASSISTIVE TECHNOLOGY IMPLEMENTATION**

## Chapter 1: The Problem

### Introduction

In 1983 there were approximately 125 students for each computer in America's public schools (Plotnick, 1996; Quality Education Data, 1995). By 1988 the student computer ratio was 22 students for every computer (Plotnick, 1996). As we enter the 21<sup>st</sup> century, new and more useful technologies are making their way into the American classroom (U.S. Department of Education, 1996). According to an article in Education Week (1998), three out of four U. S. public school classrooms have at least one computer designed for instructional use. The number of U. S. students for every instructional multimedia computer decreased from 21 in 1997 to 13 in 1998 (Jerald, 1998). Computers, therefore, have become widely accepted and are utilized daily in schools throughout the country (Hawkins, 1996; U.S. Department of Education, 1996).

In addition to the presence of computers in schools, there have been numerous other advances in technology that continue to impact upon education. Such advances vary from simple, very inexpensive devices to those that require extensive training to implement and can be quite expensive. Both the devices and methods of appropriate utilization lead to a body of confusing and misleading information. Consequently, educators, parents, students, legislators, and the community all expect that schools are implementing policies and procedures that will allow students access to technology which will enable them to function in a technologically advanced society.

The need to appropriately address these advances continues to be fueled by the dramatic evolution of technology in education which includes: microcomputer technology, research on instructional procedures, and numerous new assistive devices and equipment (Blackhurst, 1997; Blackhurst & Cross, 1993). Depending upon the student's abilities and needs, the opportunities to incorporate assistive devices into the learning environment broaden with each technological advancement (Virginia Assistive Technology System [VATS], 1999).

Special education has certainly felt the impact of educational technology. Computer technologies have the potential to help students with disabilities become more fully participatory and contributing members of society. These technological advancements, moreover, have helped to ensure equal opportunities in education for individuals with disabilities and have facilitated transition from school to work and community living. Assistive technology has major implications regarding lifespan issues and environmental and curricular accessibility. Such devices are used to facilitate acquisition of academic, vocational, and daily living skills (Bryant, Erin, Lock, Allan, & Resta, 1998).

More specifically, these devices are employed by individuals with disabilities who are experiencing difficulty with reading materials. Scanning text or utilizing a voice synthesizer, for example, allows students to focus on comprehending rather than decoding material (Bryant et al., 1998). For students experiencing difficulty with math calculation, a device as simple as the calculator provides the needed support to access the general education curriculum (Bowser & Reed, 1995). Communication skills can be

enhanced through the use of an augmentative communication system which may include dedicated communication aids or microcomputers (Kentucky Assistive Technology Service Network, 1996). This accessibility to assistive technology has not found its place in the classroom or daily lives of individuals with disabilities without federal legislation and resulting state and local policy.

Assistive technology is broadly conceptualized by Lewis (1998) as any technology with the potential to enhance the performance of individuals with disabilities. Over the past several years there has been increased use of assistive technology by individuals with disabilities in educational settings. Today, federal legislation mandates the provision of assistive technology in special education through the Individuals with Disabilities Education Act (IDEA) of 1997 (P.L. 105-17) and the Technology-Related Assistance Act Amendments of 1994 (P.L. 103-218). Public Law 103-218 is also known as the Tech Act.

The field of assistive technology expanded in the mid-eighties following the revision of federal special education law by Congress (Viadero, 1997). With the passing of the amendments contained within Public Law 103-218, the Technology-Related Assistance Act Amendments of 1994, came a refocusing of the educational system on advocacy and change (Bryant & Seay, 1998). The Tech Act required the identification and elimination of systematic barriers that obstruct the timely acquisition and use of assistive technology devices and services through state technology related projects (Bryant & Seay, 1998). Hosmer (1995) stated that such barriers to assistive technology use, consequently,

interfere with individuals with disabilities having greater control over their own lives. Appropriate implementation is dependent upon all individuals involved ensuring that the barriers to use do not become insurmountable, precluding all opportunities for assess by the population who would benefit the most. General and special educators are responsible for applying the laws related to assistive technology and eliminating factors in the educational setting that result in inappropriate services for individuals with disabilities.

An important key to appropriate access in educational settings is determining how the needed device or service will be incorporated into the student's educational program, or identifying the instructional purposes it will serve (Goodman, 1999). It is not enough for schools to simply fill classrooms with computers, tape recorders, word processors, or brailled material for students. In a frequently referenced policy letter, issued on August 10, 1990 by the Office of Special Education Programs (OSEP), the provision by schools of assistive technology devices and services was addressed. The position of the Department of Education regarding assistive technology devices and services for students with disabilities was made clear in this letter from Judy Schrag, Former Director, OSEP, to Susan Goodman, Lawyer/Consultant, (Goodman, 1999; see also VATS, 1999). It is interesting to note that this correspondence predates the actual reference to assistive technology in special education statute or regulations.

The letter addressed two points of interest:



1. Can a school district presumptively deny assistive technology to a student with disabilities?
2. Should the need for assistive technology be considered on an individual case-by-case basis in the development of the student's Individualized Education Plan?

The response from J. A. Schrag, in summary, stated that under Part B of the Education of the Handicapped Act, to deny assistive technology prior to a determination of whether it is an element of a free appropriate public education (FAPE) is not permitted. Hence, the need for the consideration of assistive technology on a case-by-case basis as part of the IEP process has been established (VATS, 1999). The research that has been conducted thus far addresses the factors that impact the provision of assistive technology since its early introduction as a part of FAPE.

#### Background of the Study

What follows is a study of the barriers and facilitators to the use of assistive technology by individuals with disabilities in the state of Virginia that is based on a review of current literature and relevant legislation. The purpose of this research was to examine the body of knowledge that identifies barriers to the use of assistive technology and to identify the facilitators which enhance implementation. Additionally, the study was designed to reveal the extent to which such barriers and facilitators exist in the state of Virginia. The role of the special education administrator in the provision of assistive

technology services and emerging practices related to assistive technology implementation were also examined.

### Statement of the Problem

The literature relating to general education indicates both general and special educators share common concerns related to the effective implementation of technology in educational programs. Among the shared concerns is the issue of accessibility for all students. Students with disabilities must have an equal opportunity to participate in and benefit from school programs and activities (Assistive Technology Funding and Systems Change Project, [ATFSCP] 1999). Yet, Scherer (1999) wrote that several obstacles to effective use of technology in the classroom exist. The obstacles included a lack of resources, training, and time. While most teachers agree that technology is crucial, the dilemma related to which kind and what level of usage are most effective remains unsolved (Scherer, 1999; ATFSCP, 1999). Tapscott (1999) concluded that we have yet to learn how to best utilize technology as a tool for moving schools to new heights of effectiveness. To that end, the problems that this study investigated are as follows:

What are the barriers and facilitators that have had an effect on the utilization of assistive technology in special education settings in Virginia? Secondly, what practices are effective in facilitating the use of assistive technology? Thirdly, what are the perceived roles of special education administrators in the implementation of assistive technology?

### Research Questions

1. What factors impact the implementation of assistive technology?
2. To what extent do these factors impede the implementation of assistive technology in Virginia schools?
3. To what extent do these factors facilitate the implementation of assistive technology in Virginia schools?
4. What are the perceived roles of the special education administrator in the implementation of assistive technology?
5. To what extent do examples of emerging practices designed to minimize barriers and enhance facilitators exist in Virginia schools?

### Significance of the Study

Warger (1998) contended that technology is increasingly being used to assist students with cognitive disabilities who seek to achieve within the scope of a challenging curriculum. Many forms of technology can help students capitalize on their strengths and compensate for their disabilities (Hosmer, 1995; Lewis, 1996).

According to Woodward (1992), students with disabilities need intensive and innovative educational efforts to be successfully initiated into and compete in the workforce after graduation. Assistive technology can help students acquire the skills associated with a task that is required in the postsecondary classroom or workplace (Bryant & Seay, 1998). Students need to have access to assistive technology services

and devices that will make the transition between secondary schools and postsecondary settings more beneficial (Hosmer, 1995).

While the law clearly mandates the inclusion of needed assistive technology in the development of Individualized Education Plans (IEPs), for students with disabilities there are barriers which impede implementation. There exists a need for a system of support to facilitate the successful implementation of assistive technology. The development of such a system requires a commitment from educational leaders.

Administrative supports are essential if any classroom, program, or agency is to implement assistive technology successfully (Hutinger, 1995; Warger, 1998). Educational leaders must serve as facilitators to formulate the essential framework needed to insure that assistive technology will be available to all individuals who require its use to ensure academic success. Goor (1995) maintains that special education administrators, as members of the leadership team, must be prepared to initiate and manage assistive technology because it benefits students with disabilities, and it is mandated by law. Special education administrators are often delegated responsibility for the appropriate implementation of assistive technology. This challenge requires: a) establishing clear guidelines for implementation, b) planning professional development to ensure that instructional personnel acquire the necessary knowledge and skills, c) assessing necessary financial resources, and d) identifying a network of support which includes those with technology expertise (Goor, 1995; Warger, 1998). According to a report found in Inclusive Education Programs (1999), both general and special education

administrators must ensure staff is fully trained in the requirements of the law and remain current on assistive technology issues.

The purpose of this study is to examine the extent to which barriers and facilitators to assistive technology, as identified through a review of the literature, exist in the state of Virginia. The study offered special education administrators opportunities to provide perspectives on the status of assistive technology implementation and the overall role of educational leaders. The results of this study add information related to assistive technology implementation in the state of Virginia to the current literature. The study is designed in a manner that would allow for duplication in other states or localities.

### Theoretical Rationale

The conceptual framework of this study is premised upon a review of the literature that relates to the factors impacting the implementation of assistive technology for students with disabilities. Research has identified key components relating to the topic through both empirical and descriptive analyses. An examination of federal law addressing the needs of students with disabilities provides the basis for the study.

The framework of this study has been established through a comprehensive review of the research and theoretical literature relating to special education administration and assistive technology. Essential components of assistive technology implementation will be examined in light of the work by selected authors. The study will involve a follow-up to the research that has been conducted to examine the barriers and facilitators to the implementation of assistive technology.

While the literature clearly supports the benefits of assistive technology, there are inherent barriers and facilitators to implementation. In 1996 Hutinger reported the results of a two-year study that analyzed the use of assistive technology for students with disabilities. The data indicated that despite the barriers to assistive technology, facilitators did emerge. Similar studies suggested common factors impact which upon assistive technology implementation. Bryant et al. (1998) listed time, commitment, resources, technical support, and access as factors that impact upon implementation. Derer et al. (1996) continued to note that assistive technology facilitated the natural inclusion of students with disabilities. Conversely, Todis (1996) stated that as many as one-third of all devices are abandoned within the first year of student use. While studies document the benefits of assistive technology, continued study will provide additional and more current insight into the field.

The historical review of the laws impacting the presence of assistive technology offers added support for the necessity of this research. Barriers and facilitators to the implementation of assistive technology are included in this study based upon their emergence in studies conducted by researchers and theorists in the field of special education. Information based upon the degree to which factors effect implementation will lend another perspective to this body of research.

Special education administrators are challenged with providing assistive technology to students with disabilities. Additional information on emerging practices with promise for success help to meet this leadership challenge. Facilitation components such as

fiscal resources, division administrative support, appropriate training, and technical support are discussed based upon their presence in the noted studies of Bushrow & Turner (1994); Bryant (1998); Christmas (1992); Derer et al. (1996); Okolo et al. (1995); and Todis (1996). Additional components that may be unique to divisions, in addition to any common themes which emerged are represented in the analysis of the results.

In conclusion, while the literature clearly supports the factors included in the study, researchers have noted outlying influences that impact upon implementation. Such factors are provided for in this research. A complete review of each is discussed in Chapter 2.

#### Limitations and Assumptions

This study is limited to the 133 school divisions in the Commonwealth of Virginia. Responses are limited to the existing knowledge of special education administrators of the status of assistive technology implementation in their respective divisions as well as knowledge of recent federal mandates that are addressed in the survey questions. It is assumed that the information provided is accurate and has been completed by the intended respondents. An additional limitation that may apply to the generalizability of the results of the study is that the research was restricted to the 1999-2000 academic year. Assistive technology requirements are still relatively new and have not been fully implemented in some divisions.

### Definitions

Assistive Technology. Technology designed to accommodate the needs of persons with disabilities (U.S. Department of Education, 1997).

Assistive Technology Device. As defined by Public Law 105-17 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 individuals with disabilities (P.L. 105-17 [IDEA], Section 602 (2), p.37).

Assistive Technology Service. As defined by Public Law 105-17 any service that directly assists an individual with a disability in the selection, acquisition or use of an assistive technology device (P.L. 105-17 [IDEA], Section 602 (1), p. 37).

Augmentative Communication System. Any system that aids individuals who are independent verbal communicators. The system can include speech, gestures, sign language, symbols, synthesized speech, dedicated communication aids or microcomputers (Kentucky Assistive Technology Service Network, 1996).

Barriers. Those variables that impede effective implementation of assistive technology for individuals with disabilities.

Children with Disabilities. According to federal special education regulations, "those children evaluated as having mental retardation, hearing impairments, including deafness, speech or language impairments, visual impairments including blindness, serious emotional disturbance, orthopedic impairments, autism, traumatic brain injury,



other health impairments, specific learning disabilities, deaf-blindness, or multiple disabilities (P.L. 105-17 [IDEA], Section 614 (d) (1) (A)).

Facilitators. Those variables which foster effective implementation of assistive technology for individual with disabilities.

Free and Appropriate Public Education.(FAPE) Each state must have on file with the Secretary information that shows that subject to 300.122, the State has in effect a policy that ensures that all children with disabilities aged 3 through 21 residing in the State have the right to FAPE, including children with disabilities who have been suspended or expelled from school. (P.L. 105-17 [IDEA], Section 300, (121), p. 12426).

Individualized Education Plan. A written statement containing a description of the child's present educational performance; the nature, amount, and duration of special education and related services the child is to receive; the extent of the child's participation in regular education goals and objectives; and specific criteria to measure progress. The IEP should include, if appropriate, the use of technology to support the student in obtaining learning results. If assistive technology is included, it must be provided at no cost to the child or family (P.L. 105-17 [IDEA], Section 614, (A)).

Voice Recognition System. An access system designed to replace the standard keyboard as the method of input. The system is "trained" to recognize utterances that are spoken into a microphone. The utterances are translated into computer commands or sequences of alphanumeric characters and used to operate the computer and software messages (Kentucky Assistive Technology Service Network, 1996).

## Chapter 2: Review of the Literature

### Legal and Policy Foundation for Assistive Technology

Educating our youth with disabilities is a challenge in today's technologically advancing society. Over the years, the federal government has promoted the implementation of various technologies for special education. Federal laws and regulations have included technology mandates and funding to support research, development, training, and services (Blackhurst, 1997; Turnbull & Turnbull, 2000). The first piece of legislation that addressed technology for persons with disabilities was The Federal Act to Promote the Education of the Blind. It was approved on March 3, 1879 in recognition of the needs of the blind for embossed books and tangible apparatus. As a result of this legislation, The American Printing House for the Blind received \$10,000 to produce braille reading materials (Blackhurst, 1997). The years since this early initiative on the part of the federal government have fostered a continued effort to stimulate and support technology applications in the field of special education.

In 1958 Congress enacted Public Law (P.L.) 85-905, creating the Captioned Films for the Deaf Program. Motion picture dialogue, which had been inaccessible to individuals who were deaf since the introduction of sound in movies in 1927, was made available to those in need. This law allowed for the purchase, lease, or acceptance of films for captioning and distribution through the State schools for the deaf. Public Law 85-905 was subsequently amended twice, once in 1962 (P.L. 87-715) and again in 1965 (P.L. 89-258).

Resulting amendments to Public Law 85-905 supported the production of captioned films, training of persons in their use, research to improve the quality and effectiveness of the

production, and expanding utilization of the film medium. In addition to educational and training films, media such as tapes, transparencies, etc. were also included. Provisions were also made for research and the training of personnel. Educational media was not only available to individuals who were deaf, but also expanded to include those who were involved in supporting roles, including instructors and parents (Fein, 1996).

Legislation passed since 1960 represents a continued acknowledgment from Congress that technology plays an essential role in the lives of individuals with disabilities. The Elementary and Secondary Education Amendments (P.L. 90-247) of 1968, extended the existing Instructional Media Program to include the production and distribution of education-related media for use by individuals with all types of disabilities. Family members, employers, and others involved in support of individuals with disabilities were included. Additionally, training and research were factored in as critical components of the law (Fein, 1996).

In 1975 Congress passed landmark legislation with the Education of All Handicapped Children Act, also known as Public Law 94-142, which established the right of all individuals with disabilities to a free and appropriate public education. The impact of Public Law 94-142 has been far-reaching and has guided the delivery of special education services since its passage in 1975 (Blackhurst, 1997; Horne, 1996; Male, 1997). As a result of Public Law 94-142, the concepts of least restrictive environment and reasonable accommodation were extended to children from age 5 to 22. Under the requirements of this law, an individualized education plan (IEP) must be written for each student (Blackhurst, 1997; Cook & Hussey, 1995; Fein, 1996; Horne, 1997; Male, 1997). Blackhurst (1997) noted that during the process of developing

the individualized education plan (IEP) parents, teachers, and administrators must, according to Public Law 94-142, consider technologies that may assist the student in attaining the IEP goals and objectives.

According to the provisions written in Public Law 94-142, the IEP goals and objectives once agreed upon by the parents or guardians of the student must be implemented as written (Fein, 1996). Golinker (1997) explained that through the enactment of this law, the consideration of technology in a child's education program actually predates the congressional coining of the phrase "assistive technology". However, despite what such devices or services have been called there has never been justification for schools refusing to consider, provide, or pay for needed technology support. Golinker (1997) further indicated that the key to access has always been how the device or service is to be used and the purposes it will serve. Since 1979, additional legislation has clarified and expanded the rights of individuals with disabilities to access technology (Fein, 1996).

By the mid-80's Congress realized that technological advances were affording individuals with disabilities opportunities to realize the potential ensured by the laws (Bryant & Seay, 1998). In 1987, Congress passed the Handicapped Infants and Toddlers Act enacted as The Education of the Handicapped Amendments of 1986 (P.L. 99-457). These amendments authorized the spending of federal funds for technology, educational media, and related materials (Cook & Hussey, 1996). The provisions of Public Law 99-457, addressed the needs of both the student and family by including technology that enhanced learning, development,

basic self-help skills, appropriate adaptive equipment, appropriate social skills, and therapy services (Male, 1997).

The provisions of Public Law 94-142, moreover, were extended in Public Law 99-457 to include youth from ages 3 to 5 years. In addition, early intervention programs that serve children in the birth to age 3 years range were also implemented (Cook & Hussey, 1996). For children birth through age 2, the IEP was replaced with the individualized family service plan (IFSP). Through the IFSP process, assistive technology may be addressed and there can be continuity between the IFSP and the IEP (Cook & Hussey, 1996). Part G of Public Law 99-457 concluded by referencing the enhancement of research and development activities in addition to the efforts of the public and private sector, as they relate to the effective and efficient applications of technology for children with disabilities (Fein, 1996).

By 1986 the amendments to the Rehabilitation Act of 1973 included several provisions that involved assistive technology. First, states must include within its vocational rehabilitation plan, provisions for assistive technology throughout the rehabilitation process. Section 508 was also added to the Rehabilitation Act at this time. The requirements of Section 508 have had a significant impact by advancing the requirement that individuals with disabilities who are employed by the federal government have access to electronic office equipment, as appropriate to support job performance. This provision has fostered essential change because the manufacturers of office technology tend to be responsive to the needs of consumers as large as the federal government (Blackhurst, 1996; Cook & Hussey, 1996; Horne, 1997).

Next, Section 508 provided that the actual users of the office equipment have access to the same databases and applications programs as other users. All users with disabilities must have support in manipulating data and related information resources to attain equivalent results as other users. Finally, such users must have access to the same ability to transmit and receive messages utilizing telecommunications systems as others (Cook & Hussey, 1996). Section 508 impacts the lives of individuals with disabilities, not only as part of the Rehabilitation Act, but also because it extends to other legislation such as Public Law 100-407.

Congress passed the Technology Related Assistance for Individuals with Disabilities Act (Public Law 100-407) in 1988, recognizing assistive technology as a need in the lives of individuals with disabilities. The guiding principle of this act is to provide financial assistance to states as they implement consumer-responsive, comprehensive, state-wide programs that focus on technology for individuals with disabilities (Bowser & Reed, 1995; Bryant & Seay, 1998; Derer, Polsgrove, & Rieth, 1996; Fein, 1996). It is important to note that this legislation was adopted with the intent to impact assistive technology applications in the functional lives of all persons with disabilities.

An amendment to the Individuals With Disabilities Education Act (IDEA) in 1997, Public Law 100-407 was the first federal legislation to specifically address the expansion and availability of assistive technology. The law was designed to improve the quality of the devices and services for individuals with disabilities (Behrman, 1994, Cook & Hussey, 1996). Public Law 100-407 included a definition of assistive technology. "Assistive technology is any item, piece of equipment, or product, whether acquired commercially, off the shelf, modified, or

customized, that is used to increase, maintain, or improve the functional capabilities of individuals with disabilities" (20 U.S.C. Chapter 33, Section 1401, p.25).

The provisions of Public Law 100-407 are divided into two parts. Title I is a program that provided grants to the states to fund a consumer responsive system of assistive technology services. States that receive funds may develop any of the following: a) model delivery systems; b) statewide needs assessment; c) support groups; d) public awareness programs; e) training and technical assistance; f) access to related systems; g) interagency agreements; and h) other activities necessary for developing, implementing, or evaluating a statewide service delivery system (Horne, 1997). Consequently, states utilize this wide range of program options to apply funding to areas of greatest need.

Title II authorized programs of national significance in financing, training, investigation of the efficacy of a national information and referral network, public awareness, demonstration, and innovation projects (Cook & Hussey, 1996). This legislation, additionally, extended the provisions of Section 508 to the states under Public Law 100-407. Each state must, therefore, develop consumer-responsive assistive technology services that foster interagency cooperation, promote effective funding strategies, and address the lifelong assistive technology needs of individuals with disabilities (Cook & Hussey, 1996; Fein, 1996; & Horne, 1997). National and state attention has begun to center on the right to have appropriate assistive technology considered when developing and implementing plans for individuals with disabilities.

The passing of the Americans with Disabilities Act (ADA) of 1990 (P.L. 101-336), provided civil rights protections to individuals with disabilities and prohibit discrimination based on sex,

race, religion or national origin (Cook & Hussey, 1996 & Horne, 1997). Equal access and opportunity are guaranteed in employment, housing, transportation, public accommodations, state and local government, and telecommunications (Blackhurst, 1996 & Horne, 1997).

Additionally, Section 508 is broadened through Public Law 101-336 to include other agencies and employers (Blackhurst, 1996). As expected, this law impacted upon the issues of access that involved assistive technology.

Cook and Hussey, (1996) wrote that for some individuals with disabilities special accommodations are required because of the use assistive technology and for others access is facilitated by assistive technologies. Appropriate assistive technology is a necessary component in the effort to remove access barriers and offer equal opportunity to all.

As individuals with disabilities and their advocates increasingly insisted that their rights be acknowledged, the federal government responded with another piece of critical legislation, the Education of the Handicapped Amendments of 1990 (P.L. 101-476), also known as the Individuals with Disabilities Education Act (IDEA). The IDEA definition of assistive technology parallels that of Public Law 100-407. However, the effort to define assistive technology was advanced through IDEA to include services such as:

- The evaluation of the needs of an individual with a disability, including a functional evaluation of the individual in the individual's customary environment.
- Purchasing, leasing, or otherwise providing for the acquisition of assistive technology devices by individuals with disabilities.



- Selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or replacing of assistive technology devices.
- Coordinating and using other therapies, interventions, or services with assistive technology devices, such as those associated with existing education and rehabilitation plans and programs.
- Training or technical assistance for an individual with disabilities, or where appropriate, the family of an individual with disabilities.
- Training or technical assistance for professionals (including individuals education and rehabilitation services), employers, or other individuals who provide services to, employ, or are otherwise substantially involved in the major life functions of individuals with disabilities (Male, 1997).

The Technology-Related Assistance for Individuals With Disabilities Education Act was revised in 1994 and the amendments (P.L. 103-218) were signed into law by President Clinton in March of that same year. While some of the language contained in the amendments mirror the original law (P.L. 100-407), the stated purpose of P.L. 103-218 is, "to provide financial assistance to the States to support systems change and advocacy activities designed to assist each state in developing and implementing a consumer-responsive statewide program of technology-related assistance, for individuals with disabilities of all ages" (U.S. Department of Education, 1997). With the passing of the amendments came more global perspective coupled with a refocusing of the system on advocacy and change.

As a result of the passing of Public Law 103-218, it is now required that state technology related projects identify and eliminate systematic barriers that obstruct the timely acquisition and use of assistive technology devices and services. When consumers need to access devices and services they can refer to the five titles that complete the framework for the act. Title I provided grants to the states for the development and implementation of consumer responsive statewide assistive technology programs (Bryant & Seay, 1998).

Title II was intended to provide for a national classification system to obtain data relating to assistive technology devices and services. The effectiveness of Title II is limited by the fact that since 1991 funding has not been appropriated. A lack of funding has also impacted upon Title III. Title III was designed to foster the development of alternative funding sources by providing low interest loans and encouraging recycling programs (Bryant & Seay, 1998).

Information relating to amendments of IDEA, The Rehabilitation Act of 1973 including the Technical and Conforming Amendments, and the Administrative Requirements under the Head Start Act are outlined in Title IV. A starting date for The Tech Act Amendments (October 1, 1994) was defined in Title V (Bryant & Seay, 1998).

According to federal law assistive technology must be considered for every student with disabilities (Council for Exceptional Children, 1998 Fall). As outlined in IDEA, assistive technology must be a part of a student's Individualized Education Plan (IEP) if it is required for the student to benefit from the educational program (Bowser & Reed, 1995). Such decisions are to be made by a team of persons familiar with the individual needs of the child.

The 1997 reauthorization of IDEA (P.L. 105-17) marked a shift in the traditional applications of assistive technology from a rehabilitative or remedial context to more viable tools for increasing access to the general education curriculum and productivity once in the curriculum (Council for Exceptional Children, 1998 Fall; Warger, 1998). With respect to assistive technology, the focus of the IDEA amendments is to ensure that access will enable youth to achieve improved educational performance and results (Virginia Assistive Technology Project, 1997; Warger, 1998). Moreover, IDEA provided for procedural safeguards which included both mediation and due process protections. The safeguards that ensured the rights of youth with disabilities to appropriate special education and related services include assistive technology. Protections also extended to the right to participate in all decisions regarding and consent for initial evaluation, services, and educational placement (Virginia Assistive Technology Project, 1997).

As IEP teams meet, the requirements of IDEA include considering the benefits of technology when accessing the curriculum and achieving desired outcomes. Today, when considering the need for assistive technology, students must be evaluated on a case-by-case basis. Schools are expected to provide the required technology the student needs to benefit from special education, related services, or supplementary aids and services in regular education classes. In cases where an assistive technology evaluation has not been conducted the family has a right to request one. If the family disagrees with the findings, an independent evaluation can be obtained at public expense. However, if the public agency can prove at a hearing that the evaluation was appropriate, an independent evaluation will not be at public expense. All families of students

with disabilities have due process rights that can be exercised if disputes can not be resolved (U. S. Department of Education, 1997).

In summary, federal laws that apply to assistive technology implementation for students with disabilities have evolved during the latter half of the 20<sup>th</sup> century. The needs of students with disabilities have been addressed through legislation that allowed for embossed books and tangible apparatus to meet the needs of the blind, captioning and distribution of films for the deaf, research, and training related to the use of educational media for all types of disabilities. Financial assistance has been appropriated to states for comprehensive, consumer-responsive programs that include technological advances. Finally, assistive technology must be considered during the planning process as a viable tool that increases access to and productivity in the general curriculum. Students with disabilities can, indeed, benefit from the appropriate access to assistive technology.

### Improving Student Benefits With Assistive Technology

Assistive technology has emerged as a dynamic trend with the potential to greatly improve and influence the educational outcomes of individuals with disabilities (Bushrow, 1995). This potential is addressed in the 1997 Amendments to IDEA. In a handbook developed by the Virginia Assistive Technology project (1997) the amendments to IDEA are summarized with respect to improved accountability and results. The intent of this focus in terms of

assistive technology asserts that access will enable students to achieve better outcomes and improved performance. The amendments encourage high expectations for students. The amendments to IDEA stress not just access, but rather high performance.

The Virginia Department of Rehabilitative Services (1993) reviewed a study that, in part, revealed student benefits derived from the use of assistive technology. Respondents indicated that performing day-to-day activities were easier with assistive technology. The people surveyed felt the overall quality of life had improved making them happier, less dependent, and more productive. Derer et al. (1996) listed student benefits identified in a survey that asked respondents to identify the major benefits they perceived in using assistive technology. The benefits included: changing student's instructional and social ecology; circumventing or minimizing the impact of the disability; enhancing intrinsic skills of students such as coping, independence, productivity, and self-concept; and enabling the student to focus on intangible issues involving a vision of an idealized outcome using assistive technology. It was found that assistive technology facilitated the inclusion of students into natural settings helping them overcome environmental and social barriers. Such studies reinforce the desire to assure appropriate consideration of assistive technology when developing plans.

In 1997, the Council for Exceptional Children identified improved self-concept, skill improvement, and an opportunity to enhance the achievement of IEP goals as facilitators to assistive technology. These findings were based on a national study by Macro International, Inc. and the Office of Special Education Programs. The Council for Exceptional Children (1998) in another study reported that 90% of the respondents cited technology as having a

positive impact on student self-esteem. In addition to an improved self-concept, increased independence, and the ability to visualize goals emerged as facilitators.

Hutinger, et al. (1996) reported results of a two-year study that analyzed how assistive technology was used in educational programs for 14 children with multiple disabilities who had two to ten years experience with assistive technology. A portion of the study indicated that despite the barriers present facilitators did emerge. They included instructional refinement, enhanced communication, improved self-concept, increased independence, and skill improvement.

The literature clearly supports the student benefits associated with the implementation of assistive technology. Federal mandates provide legislative supports for the acquisition of assistive technology for students with disabilities. While federal legislation has made the consideration of assistive technology mandatory when providing educational services to individuals with disabilities there are, regrettably, problems associated with compliance. In recognition of both the compliance issues and benefits realized by the use of assistive technology, Congress has since responded with legislation to support its usage. Some of the potential benefits associated with the use of assistive technology include: enabling the individual to participate in and contribute more fully to activities in the environment, increasing interaction with non-disabled individuals, minimizing the impact of the disability, and accessing developmental, academic, and social opportunities that would otherwise be unavailable (Derer, Polsgrove, & Rieth, 1996; Hosmer, 1995; Todis, 1996).

Despite all the potential benefits of assistive technology and legislative mandates, research indicates repeatedly that there are barriers that impede rather than promote its use. Derer, Polsgrove, and Rieth (1996) discuss several barriers to the use of assistive technology for individuals with disabilities. General systems issues such as the acquisition, reliability, versatility, and appropriateness of the equipment are cited (ATFSCP, 1999; Bushrow & Turner, 1994; Hutinger, Johanson, & Stoneburner, 1996; McGregor & Pachuski, 1996). Additionally, the management of variables associated with delivering assistive technology services and monetary concerns are often cited as presenting barriers (Derer, Plogrove, & Rieth, 1996; Todis, 1996).

Bryant (1998) listed other barriers to the implementation of assistive technology such as: failure of school personnel to inform parents of the potential benefits of assistive technology at IEP meetings, lack of knowledge of parents of the right to an assistive technology evaluation, the schools' inability to conduct such evaluations, and inadequate training of teachers to use assistive technology devices (Bryant, 1996; McGregor & Pachuski, 1996; Todis, 1996).

In an article published by ATFSCP (1999), it is stated that for some students with disabilities there are more basic access barriers encountered throughout their interaction with the educational technology product. Certain motor disabilities limit a student's ability to use a standard keyboard or the standard monitor could prove challenging to a student with visual disabilities. Such barriers challenge educators, parents, and students as they develop IEPs with equal access in mind.

Warger (1998) discussed yet another concern for educators. Recent referrals reflect a growing number of students with mild disabilities whose needs involve access to the curriculum and productivity once in the curriculum. For these students, the more traditional approach to assistive technology is not appropriate. They require that educators start with the curriculum and consider how tools might assist students in achieving outcomes (Golinker, 1999; Warger, 1998). Educators face these challenges in light of the amendments to IDEA by P. L. 105-17 that require consideration of a student's assistive technology needs through the IEP process (ATFSCP, 1999; Golinker, 1997). Appropriately addressing the needs of all students with disabilities, in light of diverse student needs and applicable legislation is proving an unremitting challenge to all stakeholders.

#### Barriers to the Use of Assistive Technology

While documentation of improved student outcomes through the use of assistive technology in special education exists, studies indicate that there are often barriers to its use. Again, barriers are those variables that impede effective implementation of assistive technology for individuals with disabilities. These barriers are summarized in Figure 1, which notes the empirical studies with shading. Descriptive studies in Figure 1 are not shaded.



Figure 1

Barriers to Assistive Technology Implementation

Barriers	Derer, Polsgrove, & Reith (1996)	McGregor & Pachuski (1996)	Hutinger, Johanson, & Stoneburner (1996)	Bryant, Erin, Lock, Allan, & Resta (1998)	Bryant (1998)	Bryant & Bryant (1998)	Bryant & Seay (1998)	Todis (1996)
Fiscal Resources	•	•	•	•	•		•	•
Resource Equity			•	•			•	
Division Administrative Support		•	•	•	•			
Appropriate Training	•	•	•	•	•	•		•
Release Time For Training		•	•	•	•	•		
Availability Of Equipment	•		•		•			
Appropriate Equipment		•	•			•		
Technical Support		•	•	•	•	•		
Assessments Which Document AT Needs		•			•			•
Appropriate Planning		•	•	•	•	•		
Equipment Complexity		•	•		•	•	•	•

Todis (1996) reported that nearly one-third of all purchased assistive technology devices are abandoned within the first year of use. Some of the reasons include: failing to improve independent functioning, the difficulty and expense associated with repairs, devices that are unreliable, the difficulties associated with operation, or requiring too much assistance from others (Todis, 1996). Both empirical and descriptive studies have produced a research-based listing of barriers to the use of assistive technology. Bryant (1998) noted certain barriers to the successful implementation of assistive technology. They include:

- Some school officials fear reprimand if they encourage parents to seek an assistive technology evaluation.
- In some instances, when an evaluation is recommended school officials are ill-equipped to adequately conduct such assessments.
- If the evaluation leads to a recommendation for purchase, school officials sometimes state that money is not available for the purchase.
- There are occasions when evaluations are conducted and devices are purchased, yet teachers are not trained to use them. This can lead to improper use or non-use. In some cases teachers resent the students' use of the devices thinking they afford the student an unfair advantage over other students.

Derer et al. (1996) discussed the findings of the Analysis of Technology Assistance for Children (ATAC). The focus of the study was on the investigation of three areas: (1) the status of assistive technology in educational and related settings with school-age children with disabilities; (2) the benefits and barriers associated with the use of assistive technology; and

(3) the effects of usage. Findings indicate that the respondents perceive barriers to the use of assistive technology as relating to equipment, management of the variables relating to service, expense, knowledge, and training. Similarly, in a study conducted in Pennsylvania, McGregor & Pachuski (1996) reported that barriers to successful use of assistive technology were identified. The personnel involved were experienced, had received inservice training and/or coursework on the use of computers, and had taught students who used assistive technology. Even among this group of professionals it was revealed that they were less satisfied with their ability to utilize technology in teaching. They identified equipment complexity, support, fiscal resources, and training as the greatest barriers.

The barriers to the implementation of assistive technology were examined in a similar study conducted in Texas. As the report indicated, teacher concerns, funding feasibility, and concerns about change are factors that impact the use of assistive technology in schools. The authors concluded that one of the strongest barriers seemed to be perceptions about change. They recommended that this be addressed first in a school system (Bushrow & Turner, 1994).

In 1988 Congress facilitated needed changes by allocating financial resources to states to provide for the establishment of statewide projects that would be responsible for the states' assistive technology delivery system. Congress, however, remained concerned that efforts were insufficient when attempting to eliminate systematic barriers (Bryant & Seay, 1998). Bryant, Seay, O'Connell, and Comstock-Galagan (1996) summarized the sentiments of Congress by stating: "Assistive technology affords persons with disabilities opportunities that previously

have been mostly inaccessible; however, there exist systems that often preclude timely acquisition of assistive technology devices and services-these systems must be changed."

Christmas (1992) described a study conducted in Michigan by Project Access. Findings indicated that leadership support and teacher training were leading barriers to the use of assistive technology. These findings are supported in subsequent studies that found both leadership support and teacher training to have significant impact on the implementation of assistive technology (Bryant, et al., 1998; Bushrow & Turner, 1994; Hutinger, 1995; Hutinger, et al., 1996).

In the Fall of 1998, the Council for Exceptional Children outlined certain barriers to the use of assistive technology. Some devices may be too cumbersome, tedious, or the equipment may require too much involvement by the student. As stated in previous works, assistive technology devices can be very expensive.

#### Facilitators to the Use of Assistive Technology

Based on the research, the facilitators to the use of assistive technology numbered far less when compared to the barriers. As previously stated, facilitators are defined as those variables which foster effective implementation of assistive technology for individuals with disabilities. These facilitators are summarized in Figure 2, which notes the empirical studies with shading. Descriptive studies in Figure 2 are not shaded.

Figure 2

Facilitators to Assistive Technology Implementation

Facilitators	Derer, Polsgrove, & Reith (1996)	Council for Exceptional Children (1997)	Hutinger, Johanson, & Stoneburner (1996)	Okolo, Cavalier, Ferretti, & MacArthur (1995)	Bryant & Seay (1998)	Bryant & Bryant (1998)	Lewis (1998)
Fiscal Resources	•		•	•	•		
Resource Equity		•	•				
Division Administrative Support	•		•	•			
Appropriate Training	•	•	•	•			
Release Time For Training		•		•	•	•	
Availability Of Equipment		•	•				•
Appropriate Equipment		•	•			•	
Technical Support		•		•			
Assessments Which Document AT Needs	•				•	•	
Appropriate Planning		•	•	•		•	
Equipment Complexity							

What follows is a discussion of the variables that have been identified through research as being essential to a program that effectively implements assistive technology.

All of the empirical literature discussed in this study listed appropriate training as a facilitator required for the effective implementation of assistive technology (Council for Exceptional Children, 1997; Derer et al., 1996; Hutinger et al., 1996; Okolo et al., 1995). A study discussed in a Council for Exceptional Children (1997) publication related that (51.6%) of respondents felt that appropriate training was a necessary facilitator. A multiple path training approach was suggested by Derer et al. (1996). Training would involve both low intensity (workshops, mini-modules, and demonstrations) or high intensity (preservice and coursework) formats. This training, however, is dependent upon funding that has been appropriated for assistive technology implementation.

Okolo et al. (1995) discussed the necessity of adequate funding when implementing assistive technology into educational settings. The securing of funds was discussed as the responsibility of the administrator as part of an overall plan for successfully implementing assistive technology. Hutinger et al. (1996) writes that if children are to benefit from assistive technology then adequate funding for equipment and materials is necessary. While funding is indeed critical, supports are also critical to the success of implementation.

Throughout the literature administrative support is viewed as a necessary facilitator to assistive technology. Okolo et al. (1995) documented the importance of the administrator's leadership in establishing a philosophy for technology implementation. Administrators

play a key role in all phases of assistive technology implementation. Derer et al. (1996) relates that administrative action is vital to all components of assistive technology.

The literature supports facilitators as necessary to the successful implementation of assistive technology. Technical support, release time, and appropriate planning were also identified as facilitators (Council for Exceptional Children, 1997; Derer et al., 1996; Hutinger et al., 1996; Okolo et al., 1995). This study will examine the facilitators that have been identified by researchers included in this review along with others that may emerge as a result of the research.

#### Roles of General and Special Education Administration in Assistive Technology

##### Implementation

Goor (1995) stated that special education administration must be prepared to initiate and manage special education because it clearly benefits individuals with disabilities, and it is mandated by law. Administrators are faced with real challenges relating to providing assistive technology services and devices. If the Individualized Education Plan committee determines that an evaluation is needed to determine the necessity for an assistive technology device or service, and it is decided that the student with disabilities would benefit from the device or service, it must be purchased at no cost to the child or family (U.S. Department of Education, 1997). Assistive technology devices and services can present severe budgetary challenges as well (Bender & Bender, 1996; Bryant & Seay, 1998; Goor, 1995). The special education administrator has the responsibility for implementing procedures that address such barriers to implementation.

Podemski, Marsh, Smith, and Price (1995) summarized the role of the special education administrator as one that should be conceived as a comprehensive and integrated whole rather than a collection of discrete and unrelated functions. There is a need to abandon the more dichotomous perspective of general and special education for a more interrelated view of the services available to students with disabilities (Podemski, Marsh, Smith, & Price, 1996; Sage & Burrello, 1996). A common thread which has been noted in much of the administrative literature that relates to special education is the need for a truly unified system that is inclusive of all students (McDonnell, McLaughlin, & Morrison, 1997; Sage & Burrello, 1994).

As services for students with disabilities become more unified the role of the special education leader is evolving. Both special and general education administration share in the responsibility for providing appropriate equipment and staff training (Inclusive Education Programs, 1996). Services have expanded from a few programs to a comprehensive, full array of options for exceptional learners (Goor, 1995). In light of the changes in special education, the Professional Standards and Practice Sub-Committee of the Council for Exceptional Children (1997) established eight knowledge and skill statements for administrators of special education. Each of these statements are followed with several objectives. As part of the skill guidelines, special education administrators are to develop and implement a plan that provides a wide array of instructional and assistive technologies for learning environments. Clearly, special education administrators are faced with multi-faceted challenges as they fulfill roles as leaders in providing services to students with disabilities.



Assistive technology presents a challenge for most special education administrators. There are factors that support the preceding statement. They include change, cost, teacher training, time, and complexity (Bushrow & Turner, 1994; Bryant, 1998; Christmas, 1992; Derer, et al. 1996; Okolo, et al. 1995; Todis, 1996). Special education administrators must be prepared to initiate and manage assistive technology because it is mandated by law (Goor, 1995). The Office of Special Education Programs (1992) has indicated that school districts must determine the need for assistive technology on a case-by-case basis (Fein, 1996; Goor, 1995). According to Free and Appropriate Public Education (FAPE) guidelines the Individualized Education Plan committee can request an assistive technology evaluation (Bryant & Seay, 1998). If such a device or service is deemed necessary for the student with disabilities to receive maximum educational benefit, then the item is paid for by the school district (Bryant & Seay, 1998; Goor, 1995).

Assistive technology can be obtained for students who do not qualify for special education services, but services or devices must be needed to meet educational goals (Goor, 1995). These students may invoke Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act to obtain the necessary equipment or services (Goor, 1995).

The special education administrator has responsibility for adhering to changing federal mandates that apply to students with disabilities. These administrators must keep abreast of legislative changes and technological advancements to be prepared to implement them when needed. Organizations such as the Council for Exceptional Children (1997) provide guidance to special education administrators relating to the appropriate implementation of technology.

The special education administrators' role in the implementation of assistive technology is evolving. They must be increasingly more knowledgeable about legislative mandates, student needs, staff concerns, funding availability, and the benefits and barriers to technology in their localities. Technology involves change and the special education administrator will need to be prepared for the challenge (Bushrow & Turner, 1994).

While the research has, to a limited degree, addressed the barriers and facilitators to providing assistive technology devices and services to individuals with disabilities, the role of the educational administrator had not been explored. What follows is an effort to examine the issues relating to the status of assistive technology implementation and the role perceptions of special education administrators.

### Chapter 3: Methodology

This study has been designed with four major purposes: (a) to identify the factors that impact assistive technology implementation for individuals with disabilities, (b) to identify the extent to which these factors impede the implementation of assistive technology in Virginia's public schools, (c) to identify the extent to which these factors facilitate the implementation of assistive technology in Virginia's public schools, (d) to identify examples of exemplary practices designed to minimize barriers and enhance facilitators to assistive technology implementation in Virginia's schools, and (e) to examine the perceptions of special education administrators regarding their role in assistive technology implementation. Data was collected from division level special education administrators in the Commonwealth of Virginia. The methodology and procedures used to investigate the research questions addressed in this study has been summarized in this chapter.

#### Research Questions

##### What are the Factors Which Impact the Use of Assistive Technology by Students With Disabilities in the State of Virginia

1. What factors impact the implementation of assistive technology?  
Part II, Questions 1-11 and Part III, Questions 1, 2, and 4
2. To what extent do these factors impede the implementation of assistive technology in Virginia schools?  
Part II, Questions 1-11 and Part III, Question 1

3. To what extent do these factors facilitate the implementation of assistive technology in Virginia schools?

Part II, Questions 1-11 and Part III, Question 2

4. What are the perceived roles of the special education administrator in the implementation of assistive technology?

Part III, Question 3

5. To what extent do examples of emerging practices designed to minimize barriers and enhance facilitators exist in Virginia schools?

Part III, Question 4

#### Instrumentation

A review of related studies did not yield an appropriate instrument for use in this study. Therefore, an instrument was developed and validated for this purpose (see Appendix A). Survey methodology was chosen because it allowed for "sampling respondents over a wide geographical area in a timely manner" (Gall, Borg, & Gall, 1996, p. 289). Survey questions were based on a review of the current literature relating to assistive technology. The questions were based on implementation factors found in two or more empirical sites. The survey was designed to determine the extent to which barriers and facilitators to assistive technology exist in Virginia schools. Additionally, the role of the special education administrator when implementing assistive technology was examined. The final focus was on the examples of emerging practices considered by

administrators to be ones that minimize barriers and increase facilitators in their divisions.

The survey has three sections (see Appendix A). Part I contained questions regarding demographics for the purpose of describing the sample. Part II consisted of the factors specific to the barriers and facilitators gleaned from the literature. Part III is comprised of open-ended questions which allowed respondents to elaborate on the information found in Part II, as well as, discuss the administrative role and examples of emerging practices. Response results are used to answer Research Questions and Research Hypotheses.

Part I, Items 1-9, were designed to obtain information that would allow for describing the sample in terms of position, highest level of education, and years in present position. Respondents were asked to rate their knowledge of assistive technology and their division's effectiveness when considering implementation. Information regarding additional personnel with responsibility for assistive technology and the presence of written local guidelines/criteria in their divisions was requested. Finally, respondents were asked to provide an approximate number of students with disabilities utilizing assistive technology.

Part II, Items 1-11, were identified in the literature based upon their presence in two or more empirical studies. Respondents were asked to identify each factor as a barrier or facilitator in their division. The extent to which the factors exist was indicated on a Likert scale ranging from small extent to great extent. The items provided information regarding the division's fiscal resources, resource equity between schools, administrative

support, training components, equipment availability, appropriateness and complexity of equipment, technical support, assessments, and planning.

Part III, Items 1-4, included open-ended questions in which respondents described additional factors that impact assistive technology implementation. Special education administrators described their roles as professionals responsible for implementing assistive technology. The final item focused on procuring information that related to innovative practices in school divisions.

#### Data Requirements

A review of current literature relating to assistive technology and special education administration formed the basis for item inclusion in the survey instrument. The survey items were developed to determine the impact of key elements on the implementation of assistive technology, the role of the special education administrator in the provision of assistive technology services, and emerging practices in school divisions.

#### Expert Panel

A 9-member panel of experts in the field of special education, who have both knowledge and responsibility related to assistive technology implementation, was asked to provide feedback on the survey to determine construct and content validity. The panel consisted of eight field practitioners and one adjunct university professor. Included were (1) special education administrator, (3) assistive technology specialists, (1) special education teacher, (2) occupational therapists, (1) adjunct professor in special education, and (1) specialist from a Virginia Technical Training and Assistance Center (T-TAC).

The original survey form and accompanying letter received by the expert panel are found in Appendix B.

Following each item on Part I the panel was asked to make comments relating to an item's inclusion in the survey. For Part II the panel was provided with a definition of assistive technology and specific examples to provide clarity on the intent of the survey. An interpretation of the meaning of the factors and a rating of the quality of the item were requested. Opportunities were also provided for general comments.

Item inclusion in Part I and III was supported by responses from the panel. Comments regarding clarity and quality were analyzed and utilized to retain, modify, or remove items. Seventy eight percent interrater reliability was set as the minimum acceptance of an item on the final survey. Table 1 represents a summary of the item analysis for Parts II and III and indicates the percentages of agreement with the interpretation of the factor as written.

Suggestions made by the panel for Part I related to importance, intended respondents, relevance, and clarity. The item requesting that respondents reveal "gender" was removed based on the comments from the panel. It was also noted that the inclusion of the term "other" when identifying the respondent could lead to confusion. The cover letter that accompanied the final version requested that only a special education administrator or assistive technology administrator respond to the survey.

The focus of the items in Part II was on barriers and facilitators to assistive technology implementation as supported by their inclusion in a minimum of two empirical studies in

the literature review. In Part III, the items were open-ended allowing respondents to provide additional information. Panelists indicated the clarity, quality, and relationship to the defined purpose by rating each item in Parts II and III as either "poor", "good", "very good", or "excellent". Items that received an approval percentage of forty-four or less, indicating over fifty percent of the panel assigned a "poor" rating, were removed from the final version. A rating of fifty-six percent approval indicated the item would be reworded or removed. Items that were retained without modification had at least a seventy-eight percent acceptance rate when the "good", "very good", and "excellent" ratings were combined for each item.

Table 1

Expert Panel Review of Items

Item	% Indicating Rating Approval
1 Part II	100
2	78
3	100
4	67
5	78
6	89
7	78
8	44
9	78
10	78
11	44
12	89
13	56
14	78
1 Part III	100
2	89
3	89
4	100
5	78



Based on comments made by the expert panelists, revisions were made to the final version of the survey (see Appendix A). The panelists consistently agreed that "fiscal resources" was a critical factor and should be included in the survey along with "appropriate training". Accordingly, these items were not altered in the survey and recorded as items 1 and 4.

Feedback from the panelists resulted in an eighty-nine percent agreement rating for "appropriate equipment" and "equipment complexity." Neither item was altered in the revised survey. A seventy-eight percent approval rating was noted for "administrative support", "availability of equipment", "technical support", "adequate assessment", "appropriate planning", and "equity of access." As indicated by panelists "administrative support" lacked specificity. It was clarified and included as "division administrative support." Additional comments resulted in "adequate assessment" reworded to "assessments which document assistive technology needs (AT)." Finally, "equity of access" was revised and stated as "resource equity (between schools)."

Two items, "release time" and "time", was rated sixty-seven and fifty-six percent approval. The panel expressed concerns that these items were too broad and could be widely interpreted by respondents. They were, subsequently, addressed in one item that read "release time for training." The remaining items received a forty-four percent approval rating. Both "perceptions of change" and "environmental factors" were deleted based on comments from the panel that indicated the items could not be reworded to avoid confusion.

The four questions that comprised Part III were rated seventy-eight percent or more. Suggestions from the panelists noted redundancy as a primary concern prompting the need to revise each item for clarity. They were all reworded to more clearly reflect the defined purpose of the section. Though revised, each remaining item was retained in the final version of the survey. Questions 1 and 2 were written to allow respondents an opportunity to indicate additional barriers and facilitators to the implementation of assistive technology. Special education administrators were asked to define their roles as professionals responsible for the implementation of assistive technology in Question 3. The final question focused on gleaning information about either adopted or developed practices that minimize barriers and enhance facilitators to the implementation of assistive technology.

#### Data Collection

To obtain information about the current practices related to assistive technology service delivery and perceptions special education administrators have regarding their roles, division level administrators from the (133) school divisions in the Commonwealth of Virginia provided the sample for this study. The listing of names and addresses for the 1999-2000 school year were obtained from the Virginia Department of Education.

The survey found in Appendix A, was disseminated with a cover letter found in Appendix C, to all special education administrators in the State of Virginia. The surveys were mailed with a stamped, self-addressed, return envelope to the special education administrators. Two weeks following the due date, follow-up mailings were sent with

another copy of the survey to those who did not respond initially. Follow-up mailings, phone calls, and e-mail were utilized to increase the response rate. Respondents were assured of the confidentiality of their responses.

### Data Analysis

Respondents' demographic data from Part I was analyzed and reported using means, frequencies, and standard deviations. These same descriptive statistics were used to describe the variables in Part II. Respondents indicated the degree to which variables impact their ability to implement assistive technology.

The analysis of the data collected in Parts I and II included only descriptive statistics because of the design of the survey instrument. "Descriptive statistics are techniques by which data may be organized and summarized for purposes that include determining relationships" (Gall, Borg, & Gall, 1996, p.175). Descriptive statistics provided the information needed to appropriately analyze and report the results of this survey.

Responses to the open-ended questions in Part III relating to factors that impact assistive technology were examined for common words and shared meaning. Analysis was based on factors that emerged as common to the majority of divisions and those that may be distinct to only a few.

### Ethical Safeguards

All participants were assured of anonymity in this study (see Appendix C). The names of participants and/or school divisions did not appear on the questionnaire. Surveys were coded simply as a means to determine the necessity of follow-up contact.

Participants who did not respond to the original request received postcards. E-mail and phone contact was made to non-respondents following the postcards.

The study was conducted in keeping with the research proposal that was submitted to and approved by the Human Subjects Committee of The College of William and Mary. All participant requests for copies of results were honored.

## Chapter 4: Results

This study examined the factors that impact assistive technology implementation in Virginia's school divisions. Additionally, the role of the special education administrator and emerging practices that relate to assistive technology were reviewed. The primary focus of this study included: (a) a review of the literature to determine the factors that impact the implementation of assistive technology, (b) the extent that these factors impede assistive technology implementation in Virginia schools, (c) the extent that these factors facilitate assistive technology implementation in Virginia schools, (d) the perceptions of special education administrators regarding their role in assistive technology implementation, and (e) the existence of emerging practices that impact assistive technology in Virginia schools. Data were collected from the division level special education administrators in Virginia's public schools by employing survey methodology using a questionnaire.

A revised version of the survey was mailed to the special education administrators in each of the (133) public school divisions in the state of Virginia. Each potential respondent received an envelope that contained a letter outlining the purpose of the study and assuring anonymity, a copy of the survey, a self-addressed, stamped envelope for the return of the survey, and a two-dollar bill. Within two weeks of the mailing of the surveys, 99 (74%) had been returned. Reminder postcards were sent to non-respondents in conjunction with e-mails and phone calls. This effort resulted in the receipt of 14 (11%) additional responses. The final response rate was 85% (n=113).

Of the 113 surveys returned, one was unusable. It was returned with the two-dollar bill and a note indicating the respondent did not have the time or desire to participate in the survey. In 12 cases, there were missing responses or "not applicable" noted for one or more items. Such instances had minimal effect on the analysis of the data. The information from the 12 cases was retained in the data by noting only the responses that were clearly indicated.

#### Demographic Information: Responding Special Education Administrators

Part I of the survey provided the demographic information relative to respondents. The final version of the survey included 9 items designed to provide the data needed to develop a demographic profile. The responses indicated position, level of education, years in the present position, knowledge of assistive technology as defined by IDEA, the availability of full or part-time coordinators/specialists, number of students with disabilities utilizing assistive technology, the presence of written local criteria/guidelines for assistive technology, and the division's effectiveness when implementing assistive technology. The statistical data relative to demographics are presented in Table 2.

Of the responding administrators, the majority were (93.8%) special education administrators. Six (5.4%) held positions best described as assistive technology specialists. The only respondent to indicate "other" was a special education coordinator. Seventy-four (66.1%) of all respondents held masters degrees, seventeen (15.2%)

indicated the Ed.S. degree as the highest level of education, and seventeen held doctoral degrees.

Table 2

Frequency Counts and Percentages for Special Education Administrators in the Survey

Descriptive Information N=112	Frequency Count	Percent (%)
<b>I. Position</b>		
Special Education Administrator	105	93.8
Assistive Technology Specialist	6	5.4
Other	1	.9
<b>II. Level of Education</b>		
B.S./B.A.	2	1.8
M.A./M.Ed./M.S.	74	66.1
Ed.S	17	15.2
Ed.D./Ph.D.	17	15.2
Other	2	1.8
<b>III. Years in Present Position</b>		
0-5	45	40.5
6-10	33	29.5
11-15	18	16.1
16-20	7	6.3
21 or more	9	8.0

The number of years respondents had held their present position indicated 45 administrators (40.5%) had been in their jobs 5 years or less. The administrators with 6-10 years experience (29.5%) accounted for the next largest group. A decreasing number of administrators had held their positions for 11-15 years (16.1%), 16-20 years (6.3%), and 21 years or more (8.0%).

Table 3 presents a summary of the data related to respondents' knowledge of the requirements for assistive technology as defined in IDEA. Administrators were asked to rate their knowledge on a scale that ranged from limited to very high.

Table 3

Frequency Counts and Percentages for the Knowledge of the Requirements for Assistive Technology

Descriptive Information	Frequency Count	Percent (%)
Knowledge Level		
Limited	7	6.3
Moderate	52	46.4
High	36	32.1
Very High	17	15.2

Most administrators (46.4%) rated their knowledge of the requirements for assistive technology as moderate, while the next largest group (32.1%) felt their knowledge would



be rated as high. The lower percentages were reflected at the extremes, 6.3% with limited knowledge and 15.2% with very high knowledge of requirements.

Respondents were asked to provide information relative to two questions that were designed to determine the number of individuals considered either full or part-time coordinators with direct responsibility for supervising the implementation of assistive technology. Table 4 contains the frequency counts and percentages of full or part-time coordinators whose responsibilities involved assistive technology services.

Table 4

Frequency Counts and Percentages for the Number of Full-Time and Part-Time Assistive Technology Coordinators with Assistive Technology Responsibility

Full or Part-Time Coordinators	Frequency	Percent (%)
Full-Time Coordinator	15	13.4
No Full-Time Coordinator	97	86.6
Part-Time Coordinator	18	16.5
No Part-Time Coordinator	91	83.5

Of the 112 responding school divisions, fifteen (13.4%) have full-time coordinators with responsibility for assistive technology implementation. The remaining ninety-seven (86.6%) reported no full-time coordinator with responsibility for assistive technology. Additionally, there were eighteen (16.5%) reporting divisions with a part-time

coordinator and ninety-one (83.5%) without a part-time coordinator responsible for assistive technology implementation.

The school divisions who currently have written assistive technology guidelines or criteria are reflected in the data contained in Table 5. Results indicate the guidelines or criteria vary throughout the divisions from a few lines added to the local procedures manual to a separate guide developed for assistive technology. This statement is based on the notes added to the survey by respondents.

Table 5

Frequency Count and Percentages for the Written Local Criteria/Guidelines for Provision of Assistive Technology or IEP Team Decision Making

Local Criteria/Guidelines Present	Frequency Count	Percent (%)
Yes	26	24.1
No	82	75.9

Respondents were asked to rate their division's effectiveness in relation to implementation of assistive technology as determined by the extent to which it is provided for those students found eligible and the need is reflected in the IEP. The data presented in Table 6 indicates the majority of responding administrators rated their effectiveness as somewhat effective (42.3%) and very effective (50.5%). The ratings at the extremes were lower, not effective (.9%) and superior (6.3%).

Table 6

Frequency Count and Percentages for the Division's Effectiveness in Implementing Assistive Technology for Students with Disabilities

Effectiveness Rating	Frequency Count	Percent (%)
Not Effective	1	.9
Somewhat Effective	47	42.3
Very Effective	56	50.5
Superior	7	6.3

The approximate number of students with disabilities receiving assistive technology in each division based on the IDEA definition is presented in Table 7. Table 7 includes descriptive statistics.

Table 7

Mean Scores, Standard Deviations, and Ranges for the Approximate Number of Students with Disabilities Utilizing Assistive Technology

Divisions with Students Utilizing AT	Mean	<u>SD</u>	Range
99/112	215.92	586.56	4999

Note. The mean score, standard deviation, and range were affected by the inclusion of an outlier (n=5000) in the data.

For the total approximate number of students utilizing assistive technology in the school divisions, the responses ranged from  $n=1$  to  $n=5000$ . The mean score was (215.92). The standard deviation was (586.56) and the range (4999). The majority of respondents (75%) indicated the approximate number of students utilizing assistive technology was  $n=100$  or less. The remaining twenty-five percent reported between  $n=125$  and  $n=2000$  students with one outlier ( $n=5000$ ) in the data.

### Findings for Research Questions

The study explored four questions that were designed to provide information related to the factors that impede and facilitate assistive technology implementation, the extent to which these factors impact assistive technology implementation, and emerging or innovative practices designed to minimize barriers and enhance facilitators to assistive technology in Virginia schools. An additional question regarding perspectives on administrative roles was also posed. A variation of a Likert Scale was used to identify the extent to which certain factors impede or facilitate assistive technology implementation.

For Part II of the survey instrument, the respondents were asked to examine a total of eleven factors that were identified in the literature as both barriers and facilitators to assistive technology implementation. Following consideration of each factor, respondents were instructed to identify the factor as either a barrier or facilitator in their respective divisions.

Descriptive statistics were employed to analyze and report the findings for Part II of the survey instrument. Respondents used a Likert Scale to indicate the extent to which the factor was considered a barrier or facilitator. Selections were made on a four-point scale ranging from small extent to great extent with point values assigned to each place on the scale. Point values on one scale ranged from a -1 (small extent) to -4 (great extent) for barriers and for facilitators the scale ranged from +1 (small extent) to +4 (great extent).

#### Research Questions

1. What factors impact the implementation of assistive technology?
2. To what extent do these factors impede the implementation of assistive technology in Virginia schools?
3. To what extent do these factors facilitate the implementation of assistive technology in Virginia schools?
4. What are the perceived roles of the special education administrator in the implementation of assistive technology?
5. To what extent do examples of emerging practices designed to minimize barriers and enhance facilitators exist in Virginia schools?

Tables 8-29 represent the factors that respondents indicated as either a barrier or facilitator to assistive technology in their respective school divisions, and the degree to which they were considered to impact assistive technology. Negative ratings were assigned to the barriers and positive ratings for the facilitators. The descriptive statistics in each table were derived from the total of all ratings for each factor.

The mean scores for each factor reveals the degree to which respondents viewed each as either a barrier or facilitator. Table 8 presents Fiscal Resources as a barrier with a mean score of (-1.07) on the scale. This indicates that Fiscal Resources are perceived as low average as a barrier to the implementation of assistive technology.

Table 8

Descriptive Statistics for Fiscal Resources

Factor	Number	Mean	SD	Minimum	Maximum
Fiscal Resources	100	-1.07	2.63	-4.00	4.00

On the scale that ranges from "small extent" to "great extent", the mean score (-1.07) indicates that while this factor is viewed as a barrier, it is not placed very close to the "great extent" point on the scale. Table 9, however, provides notable information related to frequency and percentages.

Table 9

Frequency Table for Fiscal Resources

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	15	15.0	15.0
-3.00	23	23.0	38.0
-2.00	22	22.0	60.0
-1.00	13	13.0	73.0
1.00	2	2.0	75.0
2.00	4	4.0	79.0
3.00	15	15.0	94.0
4.00	6	6.0	100.0
Totals	100	100.0	

It is important to state that of the total number of respondents to this factor (n=100), 73% indicated Fiscal Resources as a barrier in their divisions. Of the 73% of respondents whose response noted it was a barrier, the larger proportion (45%) gave this factor a (-2) or (-3) rating. For the respondents whose responses indicated Fiscal Resources were a facilitator (27%), the majority of responses (15%) were given a (+3) rating. The conclusion, which can be drawn is that when Fiscal Resources are adequate this can be an important facilitator, conversely, as a barrier this factor can have similar impact.

As indicated in Table 10, Resource Equity (between schools) was viewed as a facilitator by the majority of respondents. The mean score for Resource Equity was (2.20). This leads to the conclusion, that for the majority of respondents Resource Equity is viewed as a facilitator to the implementation of assistive technology in school divisions.

Table 10

Descriptive Statistics for Resource Equity

Factor	Number	Mean	SD	Minimum	Maximum
Resource Equity (between schools)	98	2.20	2.11	-4.00	4.00

Table 11 indicates that 83.6% of all respondents viewed Resource Equity as a facilitator to assistive technology in their school divisions. This factor presents itself as a barrier in only 16.3% of the responding divisions. The majority of school divisions reported that resources are shared equally among the schools in their locality.

Table 11

Frequency Table for Resource Equity (between schools)

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	1	1.0	1.0
-3.00	4	4.1	5.1
-2.00	7	7.1	12.2
-1.00	4	4.1	16.3
1.00	7	7.1	23.5
2.00	8	8.2	31.6
3.00	41	41.8	73.5
4.00	26	26.5	100.0
Totals	98	100.0	

The scores reflected in Table 12 relate to Division Administrative Support and were indicative of perceptions that support on the administrative level exists in the localities. The mean score for respondents to this factor characterized it as a facilitator with a mean score of (.42).

Table 12

Descriptive Statistics for Division Administrative Support

Factor	Number	Mean	SD	Minimum	Maximum
Administrative Support	90	.42	2.46	-4.00	4.00

The information displayed in Table 13 present bimodal results that find Division Administrative Support a facilitator in 56.7% of the responding divisions and a barrier in 43.3%. Of the total number of respondents, the largest group of administrators (n=27) assigned a rating of 3.00 to this factor. This, however, should be considered along with



the mean (.42) which also leads to the conclusion that Division Administrative Support is a factor that can be considered a facilitator, but not to a "great extent".

Table 13

Frequency Table for Division Administrative Support

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	5	5.6	5.6
-3.00	8	8.9	14.1
-2.00	16	17.8	32.2
-1.00	10	11.1	43.3
1.00	7	7.8	51.1
2.00	16	17.8	68.9
3.00	27	30.0	98.9
4.00	1	1.1	100.0
Totals	90	100.0	

Training emerged in the literature review as a critical factor in assistive technology implementation. In Table 14, Appropriate Training was viewed as a barrier to assistive technology in Virginia school divisions. The mean score (-.30) notes that survey respondents feel that this factor is a barrier, but not to a "great extent".

Table 14

Descriptive Statistics for Appropriate Training

Factor	Number	Mean	SD	Minimum	Maximum
Appropriate Training	98	-.30	2.96	-4.00	4.00

A total of 58.2% of administrators placed this factor on the scale as a barrier in their school divisions and 41.7 % noted it was a facilitator, resulting in another example of bimodal data. Table 15 shows that Appropriate Training was rated as a facilitator by

(n=41) respondents. Of this group of respondents, 32.6% gave this factor a +3 or +4 rating. Clearly, this factor is a facilitator to a "great extent" when it is present in a school division. However, in 58% of the school divisions in Virginia Appropriate Training is a barrier.

Table 15

Frequency Table for Appropriate Training

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	13	13.3	13.3
-3.00	18	18.4	31.6
-2.00	21	21.4	53.1
-1.00	5	5.1	58.2
1.00	2	2.0	60.2
2.00	7	7.1	67.3
3.00	20	20.4	87.8
4.00	12	12.2	100.0
Totals	98	100.0	

Table 16 indicates the factor Release Time for Training resulted in a mean score of (-.56) from all respondents. This is not a score that places the mean toward the point on the scale that indicates it is a barrier to a "great extent".

Table 16

Descriptive Statistics for Release Time for Training

Factor	Number	Mean	SD	Minimum	Maximum
Release Time For Training	99	-.56	2.91	-4.00	4.00

It can be concluded that for this factor, as shown in Table 17, more respondents report it as a barrier (63.6%). When needed training is present, however, it is viewed as a facilitator. Of the respondents, 39.4 % report that Release Time for Training is a facilitator in their school division with 30.3 % of the group rating this factor as +3 or +4. However, the fact remains that in 64% of the school divisions in Virginia Release Time is a barrier.

Table 17

Frequency Table for Release Time for Training

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	13	13.1	13.1
-3.00	21	21.2	34.3
-2.00	23	23.2	57.6
-1.00	6	6.1	63.6
1.00	1	1.0	64.6
2.00	5	5.1	69.7
3.00	19	19.2	88.9
4.00	11	11.1	100.0
Totals	99	100.0	

Table 18 notes the mean score (-.50) for the Availability of Equipment places this factor on the scale as a barrier. As a barrier, this factor is not viewed as having a great impact on assistive technology implementation.

Table 18

Descriptive Statistics of Availability of Equipment

Factor	Number	Mean	SD	Minimum	Maximum
Availability of Equipment	98	-.50	2.67	-4.00	4.00

It is noteworthy that 62.2 % of respondents in Table 19 rate this factor as a barrier in the school divisions and 37.8% reported it as a facilitator. The impact of either the presence or absence of Availability of Equipment in a division seems to be vital because 50.0% gave this factor a -3 or -4 rating and 24.5 % assigned a +3 or +4 rating.

Table 19

Frequency Table Availability of Equipment

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	12	12.2	12.2
-3.00	14	14.3	26.5
-2.00	23	23.5	50.0
-1.00	12	12.2	62.2
1.00	5	5.1	67.3
2.00	8	8.2	75.5
3.00	18	18.4	93.9
4.00	6	6.1	100.0
Totals	98	100.0	

The mean score for Appropriate Equipment (.23) in Table 20 places the rating on the scale as a facilitator, but not to a "great extent".

Table 20

Descriptive Statistics of Appropriate Equipment

Factor	Number	Mean	SD	Minimum	Maximum
Appropriate Equipment	99	.23	2.68	-4.00	4.00

Table 21 reveals the frequencies and percentages for Appropriate Equipment. As a barrier (n=51) gave this factor a negative rating. A slightly smaller number of

respondents (n=48) viewed this factor as a facilitator. Of this group, (n=36) place Appropriate Equipment toward the "great extent" point on the scale reflecting more bimodal data. When this factor is present in a school division, the impact is positive and can improve the implementation of assistive technology. However, according to this study appropriate equipment is a barrier in 52% of the school divisions.

Table 21

Frequency Table Appropriate Equipment

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	7	7.1	7.1
-3.00	10	10.1	17.2
-2.00	21	21.2	38.4
-1.00	13	13.1	51.5
1.00	3	3.0	54.5
2.00	9	9.1	63.6
3.00	29	29.3	92.9
4.00	7	7.1	100.0
Totals	99	100.0	

Technical Support was reported in Table 22 as a facilitator. The mean score (.42) suggested that as a facilitator it is not viewed as having an overall impact toward the "great extent" point on the scale.

Table 22

Descriptive Statistics for Technical Support

Factor	Number	Mean	SD	Minimum	Maximum
Technical Support	99	.42	2.84	-4.00	4.00

Support factors emerged from the analysis of the data as a notable facilitator when present in a school division. The respondents to Technical Support included 44.4% who viewed this factor as a barrier and 55.5% who indicated it was a facilitator in Table 23.

Table 23

Frequency Table Technical Support

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	9	9.1	9.1
-3.00	14	14.1	23.2
-2.00	14	14.1	37.4
-1.00	7	7.1	44.4
1.00	4	4.0	48.5
2.00	12	12.1	60.6
3.00	29	29.3	89.9
4.00	10	10.1	100.0
Totals	99	100.0	

As noted in Table 24, the mean score for this factor (-.37) is indicative of the collective position that this factor is a barrier in most school divisions. Again, the placement of the mean score for Assessments that Document Assistive Technology Needs is clearly not noted on the scale as a "great extent".

Table 24

Descriptive Statistics for Assessment Which Document Assistive Technology Needs

Factor	Number	Mean	SD	Minimum	Maximum
Assessments Which Document Assistive Technology Needs	97	-.37	2.97	-4.00	4.00

As defined in Table 25, the percentages for Assessments Which Document Assistive Technology Needs resulted in 57.7% of administrators finding this factor to be a barrier and 42.3% found it to be a facilitator in their school divisions. While this factor emerged as a barrier in more school divisions, the percentages again indicate and support the assumption that it is as important to the implementation of assistive technology when it is present as a facilitator.

Table 25

Frequency Table Assessments Which Document Assistive Technology Needs

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	17	17.5	17.5
-3.00	17	17.5	35.1
-2.00	14	14.4	49.5
-1.00	8	8.2	57.7
1.00	2	2.1	59.8
2.00	9	9.3	69.1
3.00	29	21.6	90.7
4.00	9	9.3	100.0
Totals	97	100.0	

Appropriate Planning, with a mean score of (.08), was found to be a facilitator in the majority of school divisions as shown in Table 26. The score, however, was not placed very close to the point that indicated it is a barrier to a "great extent".

Table 26

Descriptive Statistics for Appropriate Planning

Factor	Number	Mean	SD	Minimum	Maximum
Appropriate Planning	99	.08	2.74	-4.00	4.00

While the mean is essentially zero, the data as displayed in Table 27 is bimodal. Appropriate Planning resulted in a similar number of respondents that noted in Table 27, that in reporting divisions it was a barrier 52.6% and facilitator 47.4%. This is interpreted to mean that the presence of Appropriate Planning as a facilitator is important to a school division as they implement assistive technology.

Table 27

Frequency Table Appropriate Planning

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	6	6.1	6.1
-3.00	17	17.2	23.2
-2.00	19	19.2	42.4
-1.00	10	10.1	52.6
1.00	4	4.0	56.6
2.00	11	11.1	67.7
3.00	23	23.2	90.7
4.00	9	9.1	100.0
Totals	99	100.0	

The mean score for Equipment Complexity (-1.38), as indicated in Table 28, is a significant barrier in school divisions. It is also important to note that the maximum score assigned this factor was (3.00). None of the respondents placed this factor at (4.00) on the scale. This was the only factor that had this result.

Table 28

Descriptive Statistics for Equipment Complexity

Factor	Number	Mean	SD	Minimum	Maximum
Equipment Complexity	96	-1.38	2.04	-4.00	3.00



Table 29 presents the final factor in the survey, Equipment Complexity, which produced results that indicate it is viewed as a barrier (n=77) by more respondents than any other factor. It was seen as a facilitator by only (n=19) responding administrators. The percentage of respondents placing this factor on the scale as a barrier was 80.2%. Only 19.8% of administrators viewed Equipment Complexity as a facilitator in their respective school divisions. Equipment Complexity is a problem for most school divisions in Virginia.

Table 29

Frequency Table for Equipment Complexity

Ratings	Frequency	Valid Percent	Cumulative Percent
-4.00	10	10.4	10.4
-3.00	20	20.8	31.3
-2.00	28	29.2	60.4
-1.00	19	19.8	80.2
1.00	2	2.1	82.3
2.00	10	10.4	92.7
3.00	7	7.3	100.0
4.00			
Totals	99	100.0	

School divisions in Virginia are organized into eight Regional Superintendents' Study Groups. Data was analyzed to determine geographic variances across the state. As illustrated in Table 30, the data, when compared by Superintendents' Regional Study Groups, varied widely. Fiscal Resources emerged as a barrier in each of the Regions except 3 & 8. This factor was viewed as a barrier to the greatest extent in Region 2.

The factor Resource Equity (between schools) was rated as a facilitator in each of the Regions. The mean scores ranged from (.33) to (3.13). This represents a wide variance in the scores. Division Administrative Support was viewed by the respondents to be a facilitator in the majority of the Regions. The mean scores range from (.67) to (1.38) as a facilitator. As a barrier, Region 2 indicates this factor presents challenges with a mean score of (-2.00).

Appropriate Training emerged as a definite barrier in Region 8 (-2.50). Region 6 followed closely with a mean score of (-1.12). For the Regions viewing this factor as a facilitator, the placement on the scale was not as close to the "great extent" point. Release Time for Training was rated a barrier in Regions 2, 5, 6, 7, & 8. The mean scores ranged from (-.10) to (-1.53).

Availability of Equipment emerged as a barrier in six Regions. The mean scores ranged from (-.17) to (-1.63). This factor was only rated as a facilitator in Regions 7 & 8 with mean scores of (.20) and (.17) respectively. Appropriate Equipment was considered to be a facilitator in all except Regions 6 (-.76) & 8 (-.50). As a facilitator, the mean scores ranged from (.00) to (1.33).

Technical Support was rated a facilitator in seven of the reporting regions. The mean scores ranged from (.18) to (1.20). In three of the Regions (3,6,& 8) Assessments Which Document Assistive Technology Needs are indicated to be barriers with mean scores that range from (-.56) to (-2.18).

Table 30

Factors That Impact Assistive Technology Implementation Compared By Superintendents' Regional Study Groups

Factor	Mean Scores Region 1	Mean Scores Region 2	Mean Scores Region 3	Mean Scores Region 4	Mean Scores Region 5	Mean Scores Region 6	Mean Scores Region 7	Mean Region 8
Fiscal Resources	-1.50	-2.50	.13	-.08	-1.63	-1.12	-1.60	.33
Resource Equity (between schools)	1.11	3.00	3.13	1.18	2.38	2.18	2.70	.33
Division Administrative Support	.67	-2.00	1.38	1.33	1.31	-.69	.70	1.00
Appropriate Training	.11	-.33	.75	.83	-.60	-1.12	-.30	-2.50
Release Time For Training	.11	-.83	.19	.17	-1.06	-1.53	-.10	-.67
Availability of Equipment	-.56	-.17	-.38	-.33	-.38	-1.63	.20	.17
Appropriate Equipment	.00	1.33	.69	.50	.13	-.76	.70	-.50
Technical Support	.30	.17	.19	.75	.87	.18	1.20	-.17
Assessments Which Document AT Needs	.22	.45	-.56	.45	.25	-2.18	.20	-1.00
Appropriate Planning	-.33	-.92	.00	.92	.13	-.29	1.10	.83
Equipment Complexity	-1.33	-1.00	-2.20	-.91	-1.33	-1.65	-.70	-1.17
Total	-.14	-.22	.33	.49	.00	-.77	.37	-.30

The factor, Appropriate Planning, was found to be a barrier in three Regions (1,2, & 6). As a facilitator the mean scores ranged from (.00) to (1.10). Equipment Complexity was viewed as a barrier in each of the Regions, the mean scores ranged from (-.70) to (-2.20).

The total mean scores compared by Regions indicate that factors that impact assistive technology implementation in each of the Regions are viewed as barriers in 50 percent of the Regions and facilitators in the remaining 50 percent. The mean scores for the barriers range from (-.14) to (-.77) and for facilitators (.00) to (.49). The barriers total means places them closer to the "great extent" point on the scale than the facilitators. There are notable differences in the reporting of the factors when compared by Regions. Such differences have important implications for administrators, policy makers, teachers, parents, and students.

The data shown in Table 31 is based on the December 1, 1998 count of students receiving special education services. This is the most recent year for which verified data is available. The groups included responding Virginia school divisions with a special education population that numbers:

Group 1: Fewer than 500 students with disabilities

Group 2: 500 to 1,000 students with disabilities

Group 3: 1,001 to 2,000 students with disabilities

Group 4: 2,001 to 5,000 students with disabilities, and

Group 5: More than 5,001 students with disabilities.

Table 31

Factors That Impact Assistive Technology Implementation Compared by Special

Education Population

Factors	Mean Scores Group 1	Mean Scores Group 2	Mean Scores Group 3	Mean Scores Group 4	Mean Scores Group 5
Fiscal Resources	-1.19	-1.73	.25	-.86	-.57
Resource Equity (between schools)	2.45	1.24	2.67	2.14	2.57
Division Administrative Support	.60	.05	.55	1.50	-1.00
Appropriate Training	-.43	-.95	-.08	.14	1.86
Release Time for Training	-.04	-1.27	-.75	-1.71	-.57
Availability of Equipment	-.61	.05	-1.50	-1.00	.86
Appropriate Equipment	-.12	.27	.50	.71	1.71
Technical Support	-.25	.68	1.33	1.29	2.14
Assessment Which Document AT Needs	-.56	-.64	.08	-.57	1.50
Appropriate Planning	.18	-.18	1.25	-.57	-1.14
Equipment Complexity	-1.24	-1.65	-1.33	-1.57	-1.43
Total	-.11	-.32	.26	-.06	.56

Comparing data by the number of students receiving special education services allows for insight based upon the size of school divisions and how the factors that impact assistive technology implementation may vary based on the number of students served.

Fiscal Resources was reported as a barrier in (80%) of the five groups with mean scores of (-.57) to (-1.73). The one group (3) that viewed this factor as a facilitator had a special education student population of (1,001) to (2,000). The mean score for this group was (.25) which places it at a point that is not indicative of a facilitator to a great extent.

Resource Equity (between schools) was determined to be a facilitator in each of the school divisions. The mean scores ranged from (1.24) to (2.67). Group 2 with (500) to (1,000) students with disabilities, reported the lowest mean score and Group 3 with (1,001) to (2,000) with disabilities had the highest. Of all the factors, the result scores of Resource Equity places it at a point closest to the great extent on the scale.

Division Administrative Support was recognized as a facilitator in each of the five Groups except Group 5, which represented a population of more than 5,001 students. Group 5 had a mean score of (-1.00). As a facilitator, Group 4, had a mean score of (1.50). Appropriate Training was reported to be a barrier for Groups 1, 2, & 3. The mean scores ranged from (-.08) to (-.95). For Groups 4 & 5, Appropriate Training is a facilitator with mean scores that include (.14) and (1.86). Release Time for training emerged as a barrier for each of the five Groups with mean scores that range from (-.04) to (-1.71).

Availability of Equipment was reported to be a barrier in Groups 1, 3, & 4. The mean scores for these groups ranged from (-.61) to (-1.50) which places this score to the "great extent" point on the scale. As a facilitator, the scores (.05) and (.86) were not as close to the "great extent" point. Appropriate Equipment was viewed as a barrier in only one

group. Group 1 had a mean score of (-.12). The mean scores for the remaining groups ranged from (.27) to (1.71) as a facilitator.

As a facilitator, Groups 2, 3, 4, & 5 had mean scores of (.68) to (2.14) for Technical Support. Only Group 1 had a mean score of (-.25) indicating it is a barrier for this population range. The factor, Assessments Which Document Assistive Technology Needs, emerged as a barrier for Groups 1, 2, & 4. The mean scores ranged from (-.56) to (-.64). Groups 3 & 5 had scores that placed this factor on the scale as a facilitator with scores of (.08) and (1.50)

Appropriate Planning was viewed as a barrier in Groups 2, 4, & 5. The mean scores ranged from (-.18) to (-1.14). The facilitator scores reflected the positions of Groups 1 & 3, with mean scores of (.18) and (1.25), respectively. The final factor Equipment Complexity was reported to be a barrier in all groups with mean scores that ranged from (-1.24) to (-1.65), placing these scores close to the "great extent" point on the scale.

In conclusion, the total mean scores for each of these groups indicated the factors are seen broadly as barriers in Groups 1, 2, & 4. Groups 3 & 5 found these factors to be facilitators. The mean scores range from a (-.32) as a barrier to (.56) as a facilitator. Neither of these scores placed close to the "small extent" or "great extent" point on the scale. The divisions differ in terms of size, for the smaller divisions the total mean scores (-.11) and (-.32) indicate they are experiencing challenges implementing assistive technology. These differences must be considered when making decisions that relate to proving appropriate assistance at either the state or local level.

The data presented in Table 32 is based on a 1999 school census report from the Virginia Department of Education reflecting the total student population.

Group 1: Fewer than 2000 students

Group 2: 2,001 to 5,000 students

Group 3: 5,001 to 10,000 students

Group 4: 10,001 to 20,000 students, and

Group 5: More than 20,001 students.

Fiscal Resources was viewed as a barrier for Groups 1, 2, 3, & 5. The mean scores ranged from (.75) to (1.56). The group that reported this factor as a facilitator was Group 4. The mean score (2.43) is placed close to the "great extent" point on the scale. Resource Equity was noted to be facilitator in each group with mean scores that included (1.13) to (2.48).

The factor, Division Administrative Support, emerged as a barrier in Groups 2 & 4, with mean scores of (-.09) and (-.21). Groups 1, 3, & 5 found this factor to be a facilitator with mean scores (.00) to (1.19). Appropriate Training was noted to be a barrier in four of the five groups. The mean scores ranged from (-.21) to (-1.00). Only Group 5, with a mean score of (1.25) reported this factor to be a facilitator. Release Time for Training was found to be a barrier in each group. The mean scores ranged from (-.13) to (-1.79).



Table 32

Factors That Impact Assistive Technology Implementation Compared by Total

Division Student Population

Factors	Mean Scores Group 1	Mean Scores Group 2	Mean Scores Group 3	Mean Scores Group 4	Mean Scores Group 5
Fiscal Resources	-.76	-1.55	-1.56	2.43	-.75
Resource Equity (between schools)	2.29	2.48	1.13	1.14	2.33
Division Administrative Support	1.19	-.09	.00	-.21	.00
Appropriate Training	-.75	-.24	-1.00	-.21	1.25
Release Time for Training	-.17	-.42	-.13	-1.79	-.83
Availability of Equipment	-.56	-.73	.00	-1.00	.17
Appropriate Equipment	-.04	-.25	.06	1.00	1.42
Technical Support	-.36	-.06	.56	1.36	2.08
Assessment Which Document AT Needs	-.39	-.55	-.50	-.79	.91
Appropriate Planning	.42	-.06	.00	.57	-.67
Equipment Complexity	-1.33	-1.19	-1.87	-1.36	-1.33
Total	-.06	-.23	-.26	.12	.43

Availability of Equipment was indicated to be a barrier in Groups 1, 2, & 4 with mean scores of (-.56) to (-1.00). Groups 3 & 5 found this factor to be a facilitator with mean scores of (.00) and (.17). The factor, Appropriate Equipment, was viewed as a barrier in Groups 1 & 2, with mean scores (-.04) and (-.25). Groups 3, 4, & 5 reported this factor to be a facilitator with mean scores of (.06) to (1.42).

The next factor, Technical Support, was noted to be a barrier by Groups 1 & 2. The mean scores included (-.36) and (.06). Groups 3, 4, & 5 found this factor to be a facilitator with mean scores from (.56) to (2.08). Assessments Which Document AT Needs was reported to be a barrier in Groups 1-4 with mean scores (-.39) to (-.79). Only Group 5 noted this factor was a facilitator with a mean score of (.91).

Appropriate Planning emerged as a barrier in Groups 2 & 5 with mean scores (-.06) and (-.67). As a facilitator, Groups 1, 3, & 4 resulted in mean scores of (.00) to (.57). Equipment Complexity was reported to be a barrier in each group, with mean scores that ranged from (-1.19) to (-1.87)

Finally, the total scores for this group indicated the factors were viewed overall as a barrier in Groups 1, 2, & 3. The mean scores ranged from (-0.6) to (-.26). Groups 4 & 5 reported the factors to be a facilitator with mean scores (.12) to (.43). The scores for both barriers and facilitators, in the larger districts, place them at the mid-point of the scale.

Table 33 presents a view of the total means for each factor that impacts the implementation of assistive technology. Ranking is indicated in descending order

according to the mean scores of each of the factors. These cumulative scores denote the degree to which each was seen by responding administrators as having an impact on implementation.

Table 33

Total Means for the Factors That Impact Assistive Technology Implementation

Factors	Mean Scores
Resource Equity (between schools)	2.20
Division Administrative Support	.42
Technical Support	.42
Appropriate Equipment	.23
Appropriate Planning	.08
Appropriate Training	-.30
Assessments Which Document AT Needs	-.37
Availability of Equipment	-.50
Release Time for Training	-.56
Fiscal Resources	-1.07
Equipment Complexity	-1.38

In summary, the overall results of Part II of the survey suggest that 55% of the factors listed on the survey were viewed more as barriers than as facilitators to assistive

technology implementation. Of the factors respondents felt were barriers, the mean scores ranged from (-1.38) for Equipment Complexity to (-.30) for Appropriate Training. This implies that the impact of barriers on implementation can be viewed closer to "small extent" on the four-point scale. The facilitators had a mean score range of (2.20) for Resource Equity (between schools) to (.08) for Appropriate Planning.

Part III focused on additional information that may not have emerged in the previous parts of the survey. This section consisted of four open-ended items that afforded respondents an opportunity to express views that had not been previously examined in the survey. The first item related to additional information or factors that impede assistive technology implementation. In contrast, the next item centered on other facilitators that were noted in individual school divisions. Thirdly, respondents were asked to elaborate on their roles as professionals responsible for implementation. The final item was designed to elicit information on practices that had either been developed or adopted to minimize barriers and enhance facilitators in school divisions. Tables 34-37 presents an analysis of the data received from Part III of the survey.

Of the 112 usable surveys, the responding school division administrators included eighty (71%) responses to Item 1, Part III (see Appendix D). The responses included in Table 34 represent references to factors that were not examined in Part II of the survey. The most frequently cited factor related to the general knowledge base of both general and special educators. The discussion ranged from inaccurate information and

perceptions to an almost complete lack of any concept of assistive technology. This gap in the continuum of information extended to some of the other factors noted in Item 1.

Table 34

Frequency Count of Comments on Other Factors that Impede Assistive Technology

Implementation

Factors That Impede Assistive Technology Implementation	Frequency Count
General knowledge of special educators	11
General knowledge of general educators	10
Accessibility and information regarding up-to-date equipment	9
Information for parents and parental involvement	5
The need to emphasize low tech solutions or reasonable options which have student applicability	4
Fiscal concerns relating to upgrading, new purchases, and replacement of devices	4
Staffing concerns	4
Scheduling difficulties	3
Assessments made by various agencies may not be realistic	3
Information relating to available resources	2
Students that transfer into the division without appropriate records	2
Varying levels of staff competence	1
Software and devices that do not fulfill manufacturers claims	1
Decisions that are made prior to the IEP meeting	1
Limited array of trial devices	1
Storage of equipment	1
Monitoring of equipment used in a student's home	1
Developmental needs of students outpace AT	1
Integrating some AT into the regular instructional day	1
Unrealistic view of AT as "cure all"	1
Inadequate planning for full inclusion of students	1

Information was also the theme of three additional factors. A lack of information on available resources, information for parents, and accessibility and information regarding up-to-date equipment were also cited as factors that impede assistive technology implementation. The difficulties relating to information were further manifested in statements related to varying levels of staff confidence, scheduling challenges, emphasizing low-tech or more reasonable solutions, and making decisions prior to the IEP meeting.

Some of the remaining identified factors related to the devices or equipment directly. They included storage difficulties, upgrading and replacing equipment, monitoring of equipment, and software or devices that fail to fulfill expectations. Such equipment related problems plagued a number of the reporting divisions. Despite the comments relating to other factors that impede assistive technology implementation there were almost as many relating examples of facilitators that advance implementation. These are summarized on Table 35.

Of the 112 school division administrators reporting, seventy-five (68%) listed factors for Item 2 that were not included in Part II of the survey as facilitators to assistive technology implementation (see Appendix E). Many of the factors relate directly to human resources such as proactive personnel and an advisory committee, which were cited most often by administrators. The team approach was the second most frequently cited facilitative factor. Knowledgeable parents were viewed as facilitators to the process along with informed occupational and physical therapists.

Table 35

Frequency Count of Comments on Other Factors that Facilitate Assistive Technology

Implementation

Factors That Facilitate Assistive Technology Implementation	Frequency Count
Proactive personnel and advisory committees	19
Use of a team approach	15
Community, school board, teacher support	13
The involvement of T-TACs	7
Adequate staff to address AT needs	5
Grant money	5
A regional program	3
Informed OT/PT	3
Knowledgeable parents who participate in their child's education	2
Interagency cooperation	2
Focus on individual needs of students	1
SOL requirements	1
Inclusionary practices	1
Appropriate information	1
Vendor shows and demonstrations	1
A student successfully using AT	1

Programs that were regional and involved opportunities to share information, training opportunities, and trial devices were cited as additional facilitators. In yet another example of cooperation, the Technical Assistance and Training Centers (T-TACs) were given credit by some divisions for assisting them in their efforts to provide appropriate services to individuals with disabilities. The facilitators that emerged in Table 35 indicate that efforts exist to address the barriers to assistive technology.

The role of the special education administrator was examined in Part III, Item 3 of the survey (see Appendix F). Table 36 includes those tasks cited as definitive of the role of

the special education administrator. Some of the tasks relate directly to assistive technology implementation. The special education administrators' role, as reported, includes the major responsibility for assistive technology implementation within their respective divisions. A majority indicated that they administer assistive technology with minimal assistance. There were responses that reflect this can be an overwhelming task.

Table 36

The Role of the Special Education Administrator Including Tasks and Frequency Count

Tasks	Frequency Count
Ensure the implementation of IEP's as written	37
Locate and/or provide training opportunities for all staff	33
Address staff needs	31
Planning for implementation of assistive technology	24
Meet with assistive technology teams	18
Supervise coordinators	17
Interpret regulations for school division	11
Ensure that a process for referral, evaluation, and reporting is in place	9
Write and administer grants	7
Coordinate with technology director	6
Dissemination of information	4
Coordinate with technology coordinators for funding	3
Follow-up with teachers and parents	3
Ensure that purchased items are utilized, maintained, and any needed adaptations are made	2
Facilitate contact with manufacturers and providers	2
Support curricular integration	1
Secure, maintain, and catalog equipment	1
Serve as a resource to department chairs	1
Arrange for transportation	1
Assist with the case manager approach	1

Despite such varying responsibilities many administrators have proceeded to adopt or develop practices that enhance the provision of assistive technology services. Table 37



provides a summary of emerging practices as described in Part III, Item 4 (see Appendix

G).

Table 37

Practices That Minimize Barriers and Enhance Facilitators to the Implementation of Assistive Technology and Frequency Counts

Practices	Frequency Counts
Regional collaboration	4
Development of an assistive technology manual	4
AT team members 1 Occupational Therapist, 1 Physical Therapist, 1 Hearing Impaired Teacher, Speech Language Clinician, Development of Guidelines for accessing the team	3
The use of Flow-Through money to support AT implementation	2
Development of a flow chart that explains referral, assessment, and recommendations	1
Developing the idea of sharing personnel and resources among several small divisions.	1
Site-based management allows school level individuals opportunities to identify, train, and purchase materials	1
AT center, AT committee, staff development, presentations at conferences, AT web page, lending library being finalized	1
In the process of developing a resource guide for teachers	1
Hire specialist for conferences	1
Core Group to work as a team to help students, teachers, and parent utilize assistive technology	1

The results reported indicate that, while there are examples of practices that were adopted or developed to minimize barriers and enhance facilitators, a void exists in extending these practices to all divisions across the state. There were differences that emerged when the data were analyzed according to Superintendents' Regional Study Groups, Special Education Population, and Total Division Population. These results have important implications for stakeholders that will be elaborated on in the final chapter. Regional collaboration and the development of an assistive technology manual were cited most often as practices that most administrators viewed as minimizing barriers and enhancing facilitators. Having the needed related service personnel to provide appropriate services was also noted in the responses as having a positive impact on assistive technology implementation.

The collective results of this survey support the conclusion that while barriers to assistive technology are present throughout Virginia school divisions (total mean -.06), facilitators do exist and administrators are engaged in finding ways to appropriately implement assistive technology. The final chapter contains a summary of findings and recommendations for expanding opportunities to improve the overall delivery of assistive technology services to individuals with disabilities.

## Chapter 5: Summary, Discussion, and Recommendations

This chapter includes a summary and discussion of the research findings of this study and explains how the findings relate to other works in the field of assistive technology. Additionally, the implications of the research findings for special education administration and recommendations for continued research are discussed.

### Summary of Findings

The purpose of this study was to examine the body of knowledge that identifies factors which impact assistive technology implementation. The study was also designed to reveal the extent to which factors presented in the literature exist in the state of Virginia. Finally, the role of the special education administrator and emerging practices related to assistive technology implementation were examined.

A review of the current literature related to this topic revealed that research is limited, and implementation of assistive technology as mandated by law remains a challenge for administrators. This challenge exists despite the fact that legislation supporting technology for individuals with disabilities can be traced back to the Federal Act to Promote the Education of the Blind which was approved on March 3, 1879 (Blackhurst, 1997). The term "assistive technology" has been redefined and mandated in current federal legislation. The purpose of the Technology-Related Assistance for Individual with Disabilities Act (P.L. 103-218) is to provide financial assistance to the States to support systems change and advocacy activities (U.S. Department of Education, 1997). In addition, the reauthorization of IDEA (P.L. 105-17) marked a shift in the traditional

applications of assistive technology from a rehabilitative context to a tool for increasing access to and productivity once in the general education curriculum (Council for Exceptional Children, 1998 Fall; Warger, 1998).

The responsibility for both access to and productivity in the general education curriculum for students with disabilities rests mainly with general and special educators. The application of the laws related to assistive technology and the decisions effecting how these devices are to be used will be incorporated into the student's educational program are important keys to appropriate access. The findings of this study concur with previous works in that despite the potential benefits, research, and legislative mandates, barriers to the appropriate implementation of assistive technology continue to exist.

The barriers examined in this study were identified in the body of literature that focused on assistive technology. General system issues such as the acquisition, reliability, versatility, and appropriateness of the equipment were found to impede implementation (ATFSCP, 1999; Bushrow & Turner, 1994; Hutinger et al., 1996; McGregor & Pachuski, 1996). Monetary concerns and management variables are also cited as barriers to assistive technology (Derer et al., 1996; Todis, 1996). Such barriers present a constant challenge to educators, parents, and students as they develop IEPs with access to the general curriculum in mind.

As barriers to the implementation of assistive technology impede service delivery to individuals with disabilities daily, researchers have also been able to identify facilitators to this process. Factors such as appropriate training, adequate funding, and

administrative leadership among others are supported in the literature as necessary to the successful implementation of assistive technology. (Council for Exceptional Children, 1997; Derer et al., 1996; Hutinger et al., 1996; Okolo et al., 1995). Clearly, the literature supports the presence of facilitators as critical to successful assistive technology service provision.

As the list of factors that impact assistive technology implementation was gleaned from the literature it became evident that many of these factors emerged as both barriers and facilitators. As a result of this conclusion, the study was designed to examine the extent to which factors exist as barriers or facilitators and to what extent they impact the respondents. The literature review did not yield a study that had focused on a similar view of implementation.

In this study the factors that impact the use of assistive technology in schools, the extent that these factors facilitate or impede implementation, and the presence of emerging factors that impact assistive technology implementation were all explored. The special education administrators (133) in the State of Virginia were surveyed using an instrument that was designed, piloted, and validated for this purpose. Eighty-five percent (n=112) of the surveys were returned in a usable form. Data for the five research questions were summarized using descriptive statistics. The data for each research question is summarized as follows:

1. What factors impact the implementation assistive technology?

Part II, Questions 1-11 and Part III, Questions 1, 2, and 4 on the survey provide the data for this research question. Through a review of the literature eleven factors were identified as either barriers or facilitators to the implementation of assistive technology. They were included in Part II of the survey along with additional factors that were gleaned from Part III, Questions 1, 2, and 4. Results indicate that for the eleven factors listed in Part II respondents viewed Fiscal Resources (n=73), Appropriate Training (n=57), Release Time for Training (n=63), Availability of Equipment (n=61), Appropriate Equipment (n=51), Assessments Which Document Assistive Technology Needs (n=56), Appropriate Planning (n=52), and Equipment Complexity (n=77) as more of a barrier in their division.

The following factors emerged as facilitators: Resource Equity (between schools) (n=51), Division Administrative Support (n=82), and Technical Support (n=55).

Part III, Question 1, resulted in the identification of additional barriers by 71% of respondents that included: the general knowledge of both general and special educators, the accessibility and information regarding up-to-date equipment, information for parents and parental involvement, and the need to emphasize low-tech solutions or reasonable options which have student applicability. These barriers were cited by at least four different responding divisions as additional factors.

Part III, Question 2, revealed additional factors that emerged as facilitators in 68% of the responding divisions. These factors included: proactive personnel and advisory

committees, community, school board, and teacher support, the use of the team approach, and the involvement of the T-TAC's.

2. To what extent do these factors impede the implementation of assistive technology in Virginia schools?

This question was examined by asking respondents to identify each factor as either a barrier or facilitator and then utilizing a scale that assigned point values that ranged from -1 (small extent) to -4 (great extent) for barriers. The mean scores for each factor indicated the extent to which respondents viewed an item as either a barrier or a facilitator in their divisions. Mean scores for barriers ranged from (-1.38 to (-.30) on the four-point scale. The mean score (-1.38) was applied to the factor "Equipment Complexity" indicating this factor presented itself as a barrier to the greatest extent. The remaining factors that emerged as barriers included "Fiscal Resources" (-1.07), "Release Time for Training" (-.56), "Availability of Equipment" (-.50), "Assessments Which Document Assistive Technology Needs" (-.37), and "Appropriate Training" (-.30). The mean scores for these factors indicate that while they did emerge as barriers, the facilitator within the school divisions kept the mean scores toward the "small extent" end of the scale.

3. To what extent do these factors facilitate the implementation of assistive technology in Virginia schools?

This question was also examined by asking respondents to identify each factor as either a barrier or facilitator and then utilizing a scale that assigned point values that

ranged from +1 (small extent) to +4 (great extent) for facilitators. The mean scores for each factor indicated the extent to which respondents viewed this item as a facilitator in their division. Mean scores for facilitators ranged from (+2.20) to (+.08) on the four-point scale. The mean score (+2.20) was applied to the factor "Resource Equity (between schools)" indicating this factor, when present in a division, is a facilitator to the greatest extent. The remaining factors that emerged as facilitators included "Division Administrative Support" (.42), "Technical Support" (.42), "Appropriate Equipment" (.23), and "Appropriate Planning" (.08). It seems that while facilitators do exist, they are placed close to the "small extent" point on the scale with the exception of "Division Administrative Support".

4. What are the perceived roles of the special education administrator in the implementation of assistive technology?

This question was examined through Part III, Question 3. The results were reported on a frequency table that focused on common words and shared meanings. A total of twenty such themes emerged from the verbatim quotes on the survey. The majority of responses related to the administrator's responsibility for implementing IEPs. The next area of responsibility centered on locating and/or providing training opportunities for staff. The responses lead to the conclusion that administrative responsibility for assistive technology implementation is far-reaching and varies greatly. While some indicated that they are committed to exploring new and innovative technologies, others spoke of



assistive technology as just another responsibility added to job duties that are already overwhelming.

5. To what extent do examples of emerging practices designed to minimize barriers and enhance facilitators exist in Virginia schools?

This question was examined through Part III, Question 4. The results yielded only eleven practices that respondents reported as emerging practices. Four of the practices were reported by more than one respondent. They included:

- regional collaboration,
- the development of an assistive technology manual,
- the assistive technology team members, occupational therapist, physical therapist, hearing impaired teacher, speech language clinician, and the development of guidelines to access the team, and
- the use of flow-through money to support assistive technology implementation.

#### Discussion of Findings

The following sections contain a discussion of the findings of this research study, which explored the factors that impact the implementation of assistive technology. First, there is a review of the demographic findings to describe the respondents. In the subsequent sections, a discussion of the findings related to the factors that facilitate or impede implementation, the extent that the factors facilitate or impede implementation, the perceived role of the special education administrator in the implementation of

assistive technology, and the existence of emerging practices that impact assistive technology implementation in Virginia schools.

### Demographics

The information collected in Part 1 of the survey presented a profile of the respondents to the study for the purposes of description and generalization to future research. A majority of the respondents were special education administrators (93.8%) and six others (5.4%) held positions best described as assistive technology specialists. The educational level of the respondents indicated that most (66.1%) of all respondents held masters degrees with (40.2%) having held their positions for 5 years or less.

Of the comments made in response to the question as to the knowledge level of the requirements for assistive technology (46.4%) of all respondents rated their knowledge as moderate, while the next largest group (32.1%) indicated their knowledge would be considered high. Generally, this data supports that knowledge of the requirements for assistive technology is sufficient for successful implementation and that this factor is not presenting itself as a barrier.

Responses to the next area of inquiry indicated that special education administrators are primarily responsible for the implementation of assistive technology in their respective divisions. Of the responding administrators (86.6%) indicated that they have no full-time coordinator and (83.5 %) report that there is no part-time coordinator with responsibility for assistive technology implementation in their school divisions. Comments from Part III, Question 4, relate that assistive technology teams have been

formed in some school divisions in a effort to compensate for the absence of administrative leadership with responsibility for assistive technology implementation. It should be noted, however, that the members of these teams are persons with other assigned duties. The members of these teams encounter the same difficulties as the special education administrator. They are individuals with other job responsibilities. Based on the responses received from the survey, persons such as speech pathologists, occupational therapists, physical therapists, and technology coordinators are being asked to also serve as assistive technology specialists. This is noteworthy when considering respondents' views of their divisions' effectiveness in implementing assistive technology.

When respondents were asked to rate their division's effectiveness in implementing assistive technology for individuals with disabilities, the study revealed that most administrators (42.3%) felt that they were somewhat effective and others (50.5%) indicated they were very effective. This is interesting given the overall view that there are substantial barriers and facilitators to assistive technology implementation. The possibility exists that administrators delegate these responsibilities and may not follow-up to evaluate the success or failure of their approach to service delivery.

One of the keys to successful implementation of assistive technology rests with the IEP team. Factors such as the clear lack of administrative assistance responsible for assistive technology could be compensated for through the use of the team approach despite the fact that these persons have other duties that are assigned to them. Golden (1998) states that development of expertise within the school may raise awareness of

assistive technology and create an environment in which assistive technology is considered more often for meeting student needs. As a result of this expertise, purchasing may increase and should not be viewed negatively if the results include improved access to the general education curriculum. When staff is knowledgeable about the full range of assistive technology, they can effectively evaluate the need for the devices and address misconceptions related to the use of the equipment (Golden, 1998).

#### Barriers to the Implementation of Assistive Technology

This study includes a review of both empirical and descriptive studies that produced a research based listing of the factors that are considered barriers to assistive technology implementation. Derer et al.(1996) noted in a study that focused on the status of assistive technology; the benefits and barriers that despite the effects of usage certain barriers did exist. Other cited barriers included service, expense, knowledge, and training (Bushrow & Turner, 1994). This study supports the findings of these and other studies reviewed. In both Parts II and III, barriers that parallel the empirical studies emerged. The factor that emerged most often in Part III, Question 1, related directly to the issue of "general knowledge."

The results of this study revealed that issues related to training such as "Appropriate Training" and "Release Time for Training" are barriers. "Fiscal Resources" also emerged as a barrier to implementation along with issues relating to knowledge which emerged from identification of additional factors that impede assistive technology implementation.

Respondents agreed that accessibility and information regarding up-to-date equipment presents a challenge for administrators. Difficulties involving information can also affect what is available for parents. Today, special education administrators face numerous challenges when responding to the need to implement assistive technology. Yet, in the midst of such challenges significant facilitators continue to emerge.

#### Facilitators to the Implementation of Assistive Technology

As previously indicated, the facilitators to assistive technology implementation are often the same as the factors that are considered barriers. All of the empirical studies reviewed for this study described "training" as a necessary facilitator to appropriate implementation (Council for Exceptional Children, 1997; Derer et al., 1996; Hutinger et al., 1996 & Okolo et al., 1995). A study discussed in a Council for Exceptional Children (1997) publication found that (51.6%) of respondents felt that Appropriate Training was a necessary facilitator.

The results of this study concur, factors involving training received the highest mean scores. "Release Time for Training" had the highest mean score with (3.11) and "Appropriate Training" was next with (3.02). Indeed, assistive technology would prove to be of little use without the knowledge needed to ensure that devices are used properly by those persons these devices are intended to benefit.

The respondents, through their responses to Part II, Question 2, provided an expanded listing of factors that are considered facilitators to assistive technology in their school divisions. Responses relating to "proactive personnel and advisory committees" were

the most frequently cited. This response was followed closely by the "use of a team approach" and "community, school board, and teacher support." The T-TACs were also mentioned by respondents as facilitators to implementation.

#### Implications for Special Education Administrators

A void was also found to exist in the literature referencing the role of the special education administrator related to assistive technology. Current information centered primarily around administrators and their roles related to the mandates of the laws. Podemski et al. (1995) summarized the role of the special education administrator as one that encompasses a more comprehensive and integrated whole and not one that involves discrete and unrelated functions.

The results of this study have yielded implications for special education administrators. As the barriers and facilitators to assistive technology implementation emerged from the research, the opportunity to provide information to administrators became evident. As noted, while the barriers do exist, facilitators have been documented through both previous studies and this research. In localities where the administrator does not have a coordinator with direct responsibility for assistive technology implementation, the formation of teams can offer more appropriate and improved services. Such teams are reported to include the technology coordinator, occupational therapist, physical therapist, speech pathologist, and special education teacher. Some respondents stated that they have more than one team addressing this topic and conducting on-going evaluation of the process.

For those school divisions where collaborative, regional efforts are occurring respondents reported positive results. These results included shared materials and expertise, improved communication, increased professional development opportunities, and assistance with the development of guidelines, and evaluation. Localities that participate in regional programs are experiencing benefits that could be replicated in other school divisions given the opportunity to be involved in cooperative efforts.

The Annual Plans submitted by each division in an attempt to secure federal special education funds based on the December 1 student count, should include a requirement that assistive technology policy statements and guidelines be addressed. This effort would result in an opportunity for the state to gather information from each locality regarding the presence or absence of appropriate guidelines. Such data would allow the state to target the divisions in need of assistance with compliance.

The implications for special education administrators primarily center on those that involve collaborative efforts. Assistive technology teams, regional programs, and the information gleaned from Annual Plans could all result in improved services to individuals with disabilities. As on going evaluative efforts reveal barriers to implementation, the suggestions noted here could result in a sharing of methods to eliminate difficulties and enhance facilitators.

#### Recommendations for State Policy Makers

The results of this study yielded implications for state policy makers. The recommendations included in this section are based on an analysis of the data collected

state resources for staff development, fiscal needs, and administrative support. Clearly, in the case of assistive technology, not all school divisions are equal.

In Virginia, there are special education agencies that serve as regional centers to aid school divisions. The T-TACs might, in some cases already do, assist districts in the areas they are experiencing challenges and share examples of emerging practices designed to decrease barriers.

Approximately eighty-five percent of all respondents report that they do not have a full or part-time person available to assist with this effort. In some of the districts assistive technology teams have been formed to consider the needs of individuals with disabilities. These teams, however, are comprised of persons with other duties such as speech pathologists, occupational therapists, physical therapists, and technology coordinators. Cross-district consortia is another approach that could assist such localities by sharing methodology, collaborating with area colleges and universities, and providing information related to local, state, and national training opportunities.

Special education administrators need the help of state policy makers as the localities are confronted with multi-faceted responsibilities. It is crucial that administrators conduct on-going evaluation of their programs to ensure compliance with federal and state mandates. Additionally, the concerns of all stakeholders must be addressed. Both parents and students must be included in this effort, since issues such as unrealistic expectations and device abandonment present legitimate program concerns. The community must be involved to foster a more positive view of assistive technology.



Some of this equipment can be very expensive and can lead to negative perceptions by the public.

In summary, the recommendations for state policy makers center on recognizing the variability of localities to contribute positively to the effort to provide appropriate assistive technology to individuals with disabilities. The needs can be both recognized and addressed through a variety of cooperative efforts. This process will need to be continuously evaluated to determine the need for program changes.

#### Recommendations for Future Study

The field of special education is constantly changing and evolving. As students with disabilities encounter new challenges everyday in an effort to compete in a society that is also changing, the need and demand for assistive technology will increase accordingly. Both state and local efforts to address these needs are also increasing in order to comply with laws that require that assistive technology be considered as a part of every IEP meeting.

Therefore, it is recommended that this study be expanded to obtain the views of the classroom teacher. It would be interesting to compare the factors that teachers view as barriers and facilitators and indicate the extent to which they exist to the results of this survey which focused only on special education administrators and assistive technology coordinators. As the Commonwealth of Virginia moves to address assistive technology from a state level perspective it would be useful to repeat this or a related study within the next two-years. This would serve to measure the progress that has been made as a

result of increased professional development opportunities through local colleges and universities, internet courses, and conferences at the local, state, and national levels.

The data that were examined, based on the Superintendents' Study Groups, Special Education Population by Division, and Total School Population by Division, could be extended to investigate additional questions and provide insights that have not been discussed in this study. This research could cover topics such as why the data varies by region and population size or if a demographic change would affect differences. It would be interesting to learn if the current data changes after some of the efforts that are being considered, along with those that are already in place, have added time to impact assistive technology.

Regional programs and T-TACs are having an impact, along with a state-wide task force charged with the responsibility of educating consumers regarding assistive technology. Virginia is in the initial stages of successfully implementing assistive technology for individuals with disabilities. The opportunities for further study of this topic are unlimited.

**Appendix A**

**Final Version of the Survey**

Date

Title FirstName LastName  
JobTitle  
SchoolDivision  
Address  
City State PostalCode

Dear Title LastName,

Meeting the assistive technology needs of students with disabilities, as defined in IDEA 97, is a challenging responsibility for today's special education administrator. As a doctoral candidate at the College of William and Mary, I am conducting a dissertation study to examine the factors which impact assistive technology implementation. This survey research is designed to collect information relating to both the barriers and facilitators associated with implementation.

I am requesting your valuable assistance with this study. Results of this study will reflect information gathered from Special Education Administrators throughout the state of Virginia. Please be assured that the results will be reported completely anonymously. The identification of surveys is being used strictly for follow-up purposes to increase the response rate.

The questions on the survey are designed to obtain information from the individual who has division level responsibility for special education services. I am assuming that you are that person. Your candid responses, as the Special Education Administrator, to the survey questions will provide the information necessary to complete this study. I am aware of the many requests for your valuable time. The survey has been designed to take approximately 20 minutes to complete. Please accept the enclosed \$2 as a token of my appreciation for your completing and returning this survey in the enclosed self-addressed, stamped envelope by **October 22, 1999**.

If you have questions regarding this study, please feel free to contact me at 804/458-1477, by fax at 804/541-4010, or e-mail at [sabail@techcom.net](mailto:sabail@techcom.net). A summary of the results will be provided to you at your request. Please accept my sincere thanks for your assistance with this research.

Sincerely,

Sheila B. Bailey  
Doctoral Candidate  
The College of William and Mary

(Reminder postcard to return survey)

Dear Colleague:

This is a reminder to please return the Questionnaire titled A Study of the Factors Which Impact Assistive Technology Implementation. I appreciate your valuable time and expertise in support of this research effort.

Sheila B. Bailey

Doctoral Candidate  
The College of William and Mary

## Appendix B

### Correspondence to Special Education Administrators

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## A STUDY OF THE FACTORS WHICH IMPACT ASSISTIVE TECHNOLOGY IMPLEMENTATION

### SURVEY

#### **PART I: Demographics-Please answer the following questions.**

1. Position:  Special Education Administrator  
 Assistive Technology Specialist  
 Other (please identify) \_\_\_\_\_
2. Check your highest level of education:  
 B.S./B.A.  M.A./M.Ed./M.S.  Ed.S.  Ed.D./Ph.D.  
 Other (please identify) \_\_\_\_\_
3. Number of years in your present position:  
 0-5  6-10  11-15  16-20  21 or more
4. How would you rate your knowledge of assistive technology?  
 Limited  Moderate  High  Very High
5. Does your school division have a FULL-TIME coordinator(s)/specialist(s) with direct responsibility for supervising the implementation of assistive technology?  
 Yes  No If so, how many? \_\_\_\_\_
6. Does your school division have a PART-TIME coordinator(s)/specialist(s) with direct responsibility for supervising the implementation of assistive technology?  
 Yes  No If so, how many? \_\_\_\_\_
7. Based upon the definition of assistive technology found at the beginning of PART 2, how many students with disabilities are currently utilizing assistive technology in your division? \_\_\_\_\_
8. Are there written local criteria/guidelines for provision of assistive technology or to support IEP Team decision making?  Yes  No
9. How do you rate your division effectiveness in implementing assistive technology for student with disabilities? (Effectiveness as determined by extent to which assistive technology is provided for those students found eligible and the need is reflected in the IEP.)  
 Not effective  Somewhat effective  Very effective  Superior

## PART II

### Definition of Assistive Technology

Assistive technology is defined by IDEA 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 individuals with disabilities" (20 U.S.C. Chapter 33, Section 1401, 25). Assistive technology refers to a broad range of devices conceived and applied to ameliorate the educational problems faced by individuals who have disabilities. The definition includes commercial, modified, and customized devices. Such devices include, but are not limited to: an augmentative communication system, an expanded keyboard, the sip and puff switch, a speech synthesizer, a touch screen, or voice recognition systems (Cook and Hussey, 1996).

**Instructions: Please indicate on the scale the extent to which the factors associated with the implementation of assistive technology can be considered a barrier or facilitator in your school division. After you have marked either barrier or facilitator, please indicate to what degree you consider your selection a factor.**

#### Factors

#### Scale

- |   |                                  |                            |                            |                            |   |
|---|----------------------------------|----------------------------|----------------------------|----------------------------|---|
| 1. Fiscal Resources                     | <input type="checkbox"/> Barrier |                            |                            |                            | <input type="checkbox"/> Facilitator    |
|   | Small Extent                     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 Great Extent |
| 2. Resource Equity<br>(between schools) | <input type="checkbox"/> Barrier |                            |                            |                            | <input type="checkbox"/> Facilitator    |
|   | Small Extent                     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 Great Extent |
| 3. Division Administrative<br>Support   | <input type="checkbox"/> Barrier |                            |                            |                            | <input type="checkbox"/> Facilitator    |
|   | Small Extent                     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 Great Extent |
| 4. Appropriate Training                 | <input type="checkbox"/> Barrier |                            |                            |                            | <input type="checkbox"/> Facilitator    |
|   | Small Extent                     | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 Great Extent |





**PART III**

**Instructions: Please answer the questions below. Feel free to attach additional pages if needed.**

1. What other factors impede AT implementation

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2. What other factors enhance AT implementation.

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3. Special Education Administrators Please define your role as a professional responsible for the implementation of assistive technology.

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4. Has your division adopted or developed practices that minimize barriers and enhance facilitators to the implementation of assistive technology? Yes/No (Please Circle One) If, yes please give some examples.

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## Appendix C

### Correspondence to Expert Panel and Survey Form

Date

Title FirstName LastName

JobTitle

Address

City, State PostalCode

Dear Title LastName:

Thank you for agreeing to assist me with my dissertation research by lending your expertise to the refinement of the enclosed instrument. I know this is a busy time and I appreciate your allowing time to provide your valuable insights. I plan to conduct research titled "A Study of the Factors Which Impact Assistive Technology Implementation".

The survey is divided into three parts. Part I requests demographic information. On separate response sheets space for comment on each item has been provided. Please let me know what you think of the item's inclusion in the section.

Part II is a listing of factors, extracted from the literature, that have been identified as barriers and facilitators to assistive technology implementation for students with disabilities. I have provided the legal definition and a more specific definition for the intent of the survey. The scale is intended to indicate whether the factor is a barrier or facilitator and to what degree. I need your interpretation of the factors to decide if additional definitions are required. In addition to the requested information, I welcome feedback on scales and formatting.

The open-ended questions in Part III are intended to allow respondents an opportunity to expand on the information provided in Part II. Please comment on the clarity and quality of the questions.

Please return the survey and response sheets in the attached self-addressed stamped envelope by June 23, 1999. Your participation as an expert reviewer is deeply appreciated.

Sincerely,

Sheila B. Bailey  
Doctoral Candidate  
College of William and Mary

## Expert Panel

**Directions:** Your task as an expert judge is to evaluate the quality of each survey item. Carefully read each of the following survey items and judge the quality of the item by answering the questions on the separate response sheets. The questions in the Demographics section include only space for comments. Thank you for your input.

### A STUDY OF THE FACTORS WHICH IMPACT ASSISTIVE TECHNOLOGY IMPLEMENTATION

#### SURVEY

##### **PART I: Demographics-Please answer the following questions.**

1. Position:     Special Education Administrator  
                   Other (please identify) \_\_\_\_\_
  
2. Gender:     Male     Female
  
3. Check your highest level of education:  
                   B.S./B.A.     M.A./M.Ed.     Ed.S.     Ed.D./Ph.D.
  
4. Number of years in your present position:  
                   0-5     6-10     11-15     16-20     21 or more
  
5. How would you rate your knowledge of assistive technology?  
                   None     Limited     Moderate     High
  
6. Do you have a FULL-TIME coordinator(s)/assistant(s) with direct responsibility for supervising the implementation of assistive technology?     Yes     No  
If so, how many? \_\_\_\_\_
  
7. Do you have a PART-TIME coordinator(s)/assistant(s) with direct responsibility for supervising the implementation of assistive technology?     Yes     No  
If so, how many? \_\_\_\_\_
  
8. Based upon the definition of assistive technology found at the beginning of PART 2, how many students with disabilities are currently utilizing assistive technology in your division? \_\_\_\_\_

9. How do you rate your division effectiveness in implementing assistive technology for student with disabilities?  
\_\_\_ Not effective \_\_\_ Somewhat effective \_\_\_ Very effective \_\_\_ Superior

## PART II

### Definition of Assistive Technology

Assistive technology is defined by IDEA 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 individuals with disabilities" (20 U.S.C. Chapter 33, Section 1401, 25). The survey items in this questionnaire reflect a more narrow focus as adapted from Cook and Hussey (1996). Assistive technology refers to a broad range of devices conceived and applied to ameliorate the educational problems faced by individuals who have disabilities. The definition includes commercial, modified, and customized devices. Such devices include, but are not limited to: an augmentative communication system, an expanded keyboard, the sip and puff switch, a speech synthesizer, a touch screen, or voice recognition systems.

**Instructions: Please indicate on the scale the extent to which the factors associated with the implementation of assistive technology can be considered a barrier or facilitator in your school division. After you have marked either barrier or facilitator, please indicate to what degree you consider your selection a factor.**

### Factors

### Scale

- |                           |              |     |     |     |                  |
|---------------------------|--------------|-----|-----|-----|------------------|
| 1. Fiscal Resources       | ___Barrier   |     |     |     | ___Facilitator   |
|                           | Small Extent | ___ | ___ | ___ | ___ Great Extent |
|                           |              | 1   | 2   | 3   | 4                |
| 2. Administrative Support | ___Barrier   |     |     |     | ___Facilitator   |
|                           | Small Extent | ___ | ___ | ___ | ___ Great Extent |
|                           |              | 1   | 2   | 3   | 4                |
| 3. Appropriate Training   | ___Barrier   |     |     |     | ___Facilitator   |
|                           | Small Extent | ___ | ___ | ___ | ___ Great Extent |
|                           |              | 1   | 2   | 3   | 4                |





13. Time

	__Barrier		__Facilitator		
Small Extent	<u>    </u> 1	<u>    </u> 2	<u>    </u> 3	<u>    </u> 4	Great Extent

14. Equity of Access

	__Barrier		__Facilitator		
Small Extent	<u>    </u> 1	<u>    </u> 2	<u>    </u> 3	<u>    </u> 4	Great Extent

**PART III**

**Instructions: Please answer the questions below. Feel free to attach additional pages if needed.**

1. The factors listed in Part Two were based on a review of the current literature, however it was not intended to be inclusive of all factors that may impact assistive technology implementation. Please list any addition factors that you have encountered in your division and indicate the extent to which they are considered a barrier or facilitator to assistive technology in your division.

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- 2. In your opinion, what are the factors that contribute to the barriers that you indicated in Part II and Part III, Question 1.**

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- 3. In your opinion, what are the factors that contribute to the facilitators that you indicated in Part II and Part III, Question 1.**

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- 4. When considering those factors that you indicated would be barriers and facilitators to assistive technology in your school division, please define your role as an educational administrator responsible for the implementation of assistive technology.**

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- 5. In reviewing the literature it is apparent that there are examples of creative and emerging practices that have helped to minimize barriers and enhance facilitators to the implementation of assistive technology. If your division has adopted or developed such practices please describe them.**

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## Appendix D

### Text of Verbatim Comments Part III Question 1

## Verbatim Responses to Part III

### Item #1

What other factors impede assistive technology implementation.

<u>Response</u>	<u>Comments</u>
1.	Your survey has targeted those areas most difficult for us-training, availability of appropriate equipment, technical support, and appropriate assessments.
2.	Money is always a factor, but Medicaid gives a boost in most instance. Training to use equipment and inventory sharing of equipment/materials with another division has not been done. We have also written and received monies through Assistive Technology Grants, through Technical Assistance, Check-Out Systems, and Local Foundations.
3.	General knowledge of what is available and how it used to enhance the student's education.
4.	Information to parents which drives requests for complex accommodations before more "natural" ones are tried.
5.	Budget factors for staffing to meet AT needs. Time for training, research, keeping AT team up to date. Time for helping teachers acquire more special ed technology awareness and expertise.
6.	I think the above pretty much covers our situation. We lack both resources and expertise in conducting AT assessments or using AT w/students, as well as incorporating AT in our student's IEP's. The administration & teaching staff are eager to develop our resources and expertise.
7.	Lack of knowledge concerning best practices and updated technology.
8.	Lack of technical support.
9.	AT team is in the process of developing. Attended 1 <sup>st</sup> conference July 99. Need more training.
10.	Accessibility & information regarding up-to-date equipment.
11.	No additional factors - We are unsure of how to determine the need for these services and the finances to deliver them.
12.	The main factors which may impede AT implementation in our schools is the difficulty in scheduling opportunities for all the key facilitators in the child's life to meet on a regular basis to discuss his/her needs in regards to AT.

13. Various levels of competency of staff. Release time for training (group)
14. I believe your list is an accurate representation of the most compelling factors. I have a budget initiative for the 2000-01 school year to develop a dedicated half-time position for AT team leader. That will give us greater flexibility and allow us to be more responsive.
15. Multiple applications and emphasis on low tech solutions. Need to consider reasonable options which have student applicability.
16. Knowledge of possible AT equipment. Training is the biggest problem for teachers.
17. Constant need to upgrade technology or purchase newer versions.
18. Lack of awareness of what AT is and isn't - fear of equipment - lack of promotion of low tech devices - creativity
19. Finances would be major! Lack of staff/administrative time in training is second.
20. Lack of time for staff to familiarize themselves with equipment and programs. Problems with the software not doing what the manufacturers claims it is suppose to do.
21. Private providers OT/PT - members make decisions outside of IEP meeting.
22. You've covered most of them- Classroom staff use can be a barrier. If staff is unfamiliar with the equipment or see it as more trouble than its worth - the staff becomes the barrier.
23. Some items are very expensive. The direct service providers & special education teachers are not always aware of new technologies and devices.
24. Lack of a position/person to oversee this specific area. Resistance of students to use it. Resistance of general education teachers to have students use assistive technology devices. (very few)
25. Teachers are aware of student needs, but are unable to identify appropriate assistive technology devices. As a result much of the time is spent using things out and searching for those devices which will provide the most benefit.
26. We generally use staff from T-TAC to conduct assessment relative to specialized AT needs. Recommendations usually involve trying several pieces of equipment to determine the most appropriate device(s). Unless T-TAC has these for loan. We are very limited in providing an array of trial equipment.

27. Our division is so small that it is easy to make individual decisions about AT. We have not yet had any barriers to getting & using any AT we thought was needed for an individual child to succeed.
28. Need more training and technical assistance.
29. Often the assessments made at Kluge, by T-TAC etc. are not realistic. Example - Recommending "Naturally Speaking" but child's speech is not distinct enough. Recommending laptops for a child that cannot track visually. Seems to be a real lack of understanding or working out the barriers before recommending that this will work or that will work.
30. Cost is a concern. So far we have managed to cover expenses for equipment.
31. New children transferring into system without appropriate records.
32. It's still treated as new, and is in fact an "unknown" to many. As time goes by, more and more spec. educ. professionals gain familiarity with AT. It will be regarded as routine.
33. I think you've hit them all!
34. In the rural districts it is the lack of funds, parental involvement, responsibility and personnel.
35. None that I know of.
36. Teachers have so many responsibilities - It seems to be an "expert" in all of them is impossible. Training for yet one more initiative is difficult to arrange.
37. Basically it is a combination of 2 factors reflected above.
  1. Knowledge base of what would be helpful
  2. Financial resources to provide
38. Understanding/Input from parents. Training by knowledgeable support staff. Confidence level and usage by spec. ed. teachers.
38. We need knowledge of the various equipment out there.
39. Knowledge of what is available for various disabilities.
40. Our division has no real difficulty with AT. We are involved in a regional program due to our small size and contract via the county to supply our students appropriately.
41. The teachers willingness to learn and use equipment. Storage of equipment.
42. None that I can think of at the present time.
43. Knowledge of AT devices & best utilization by SPED teachers Regular classroom teachers can be resistant to

- AT devices until trained on use and can see the benefits of its use TRAINING 3 1/2 hour drive to nearest T-TAC to view & receive training on new AT devices.
44. The funding of appropriate materials and the ability to receive an accurate evaluation. (Not just make a report to make some money)
45. Every parent believes that it, apparently is their right to request an AT evaluation even when there is no indicator that the equipment is necessary. Laptop computers are very fragile and have to be replaced frequently. It is more cost effective to replace them than to repair them.
46. Monitoring of equipment use within the student's home is essentially absent thus AT use is primarily 5 1/2 hour, 5 days, 180 day experience- despite our best intentions.
47. Costs associated with AT Developmental needs of students outpace the AT Complexity of AT equipment
48. None
49. Knowledge of possible "menu" choices Lack of training for individual teachers who must self determine need
50. Our school division is very small and we do not have the staff nor the resources to have coordinators for AT. Our T-TAC offers training in AT which our staff have to attend but if it is only offered at one time and is not repeated teachers will not attend unless school is in session and they are released to go to the training.
51. The major factor that impedes AT implementation in our division is lack of training on what is available, how to use it and student needs. We are so small and teachers deal with a wide diversity of student needs it is difficult for them to be experts in everything. Finding time to take part in trainings is very difficult our teachers need to be able to evaluate students AT needs, need knowledge of appropriate AT equipment & how to use it.
52. None
53. Understanding of integrating some AT into the regular instructional day technical difficulties at the school level
54. None that I am aware of at this time
55. Keeping up to date Repairs Lack of access to position (because of small#) for AT coordinator
56. I believe you have covered most
57. 1. Reluctance of teaching staff to implement - includes time constraints difficulty planning into daily activities  
3. Funding - can always use more technology, replacement



- of outdated or broken equipment.
4. Scheduling training of staff can be difficult to coordinate "without after school hours"
5. Although we provide staff development regarding how to access AT, referral, etc. some staff still do not know how to identify need and access services.
58. Training needs to emphasize low tech options first and more of them NCR, note taker paper is an excellent example of a low tech aide. Alpha Pro Smart is another good example.
59. More training needed
60. Determining the most appropriate AT device for a particular student.
61. Lack of knowledge of new/latest AT devices, etc.
62. Money and time are the biggest factors. We have a model for assessment but not an adequate lab or lending library. We don't have the time needed for consultations. Parents are expecting miracles out of the assessment process.
63. The primary factors that impede the use of AT implementation is appropriate equipment and training.
64. Money from sources for funding equipment.
65. One factor that impedes AT implementation is school staff members who feel that nothing is needed or will work for a child simply because a child has limited, controllable mobility. Therefore, we in central office, are not made aware of the needs of certain students who could greatly benefit from AT.
66. Lack of knowledge of what is available. Lack of time to research what is available. Lack of knowledge of vendors.
67. Motivation- Teachers want the AT Sp. To do it for them.  
Integration- Teachers do not know how to use technology to facilitate learning. Instead they see it as a "cure all". Ex. "Johnny can't read give him some tech" - recent request!  
Creation of an active communicative classroom  
Not enough staff to provide follow-up  
We have got the equipment - the classrooms do not have the computers Rely on tech. Dept. to turn off security so the AT specialist can load software  
Lack of release time for training  
Lack of basic computer knowledge on part of the classroom teacher
68. Fiscal resources to fund an AT liaison or specialist who would provide to staff and technical assistance. Currently we have a staff member 2-days/week
69. Knowledge base of all teachers
70. Our division needs an AT coordinator We have a trained AT team

- but they have teaching responsibilities and we need release time for them to conduct assessments
71. Constant change in what is available Constant change in students Complexity of AT
  71. Time factors for teams to meet and plan for students
  72. Actually time & limited trained personnel are the factors
  73. Covered well with above choices
  74. We are a small school system with limited resources & funds
  75. The philosophy that full inclusion of students who are severely physically disabled and non-verbal can be successfully mainstreamed before the students or staff have had opportunity to develop a functional means of accessing the curriculum or actively participating in classroom instruction.
  76. None with the exception of parents wanting more and the best when a less complicated device is appropriate. Some AT is so expensive-this year one parent requested several thousand dollars in AT but the OT & PT said we could meet FAPE with about \$2,000 We are lucky to have reasonable, resourceful OT & PT staff.
  77. Small school district with no AT specialist. Difficult to keep abreast of changing technology and methods of incorporating it into the schools. We also need an assessment tool to determine needs.
  78. I do not feel we have a problem providing appropriate assistive technology to our students. I have a great team of educators working with and for our students.
  79. A lack of knowledge about AT - some training has been done but not for everyone
  80. The lack of coordinator/staff that would assist teachers in identifying appropriate AT for individual students.

## Appendix E

### Text of Verbatim Comments Part III Question 2

Item #2

What other factors facilitate assistive technology implementation.

<u>Response</u>	<u>Comments</u>
1.	We have some personnel who are very proactive. The Special Education Advisory Committee is helping in making these needs known.
2.	We are small (725 students in K-12) and know students well; therefore we look at individual needs very carefully
3.	Excellence in resourcing and teacher logical expertise support
4.	Student success
5.	The only factor enhancing AT implementation is our willingness to devote the time, energy, and available resources to improving our AT knowledge/skills/resources
6.	School Board Support Community Support Teacher enthusiasm
7.	Division Administrator support
8.	Teachers are willing to work with students in need of AT
9.	We do employ three staff members to work with students to provide needed technology services
10.	Another factor that may enhance AT implementation in our schools is the willingness and openness of the school community to assist the child in his/her environment using AT. Also, the use of a team approach helps the teachers and students feel better supported.
11.	Having a trained AT team that serves several divisions.
12.	Very knowledgeable & concerned staff or AT team Division technology director very helpful
13.	Supportive administration Fiscal resources Proper assessment of needs
14.	Staff willing to be trained and use the equipment
15.	Our regional program is an excellent mechanism for training, programming, resources, brain storming
16.	None
17.	We have a trained AT team consisting of a special education teacher, an OT, PT, and speech therapist. The team is trained to perform evaluations, formulate programs, and train teachers in the use of technology.

The assistive technology team participates in national, state, and regional workshops to become more familiar with available resources.

18. Knowledgeable staff who see AT as a tool to support student success.
19. A team of teachers/specialists have been trained in A.T. assessment and an assessment kit is available to them. A small A.T. grant has been available from DOE for the past couple of years which has helped greatly.
20. Motivation of teacher responsible for using assistive technology
21. T-TAC Assistance
22. Accessibility Breadth of devices Trial periods to ascertain if the device is truly appropriate
23. Educated parents who take part in their child's education and who are knowledgeable about assistive technology which may benefit their own child.
24. Again with the use of T-TAC staff, once we know the appropriate equipment, we have the means of purchasing and providing consistent with the child's needs.
25. We have sent one occupational therapist to get certification in assessing for technology use IDEA mandates it.
26. Membership in the Shenandoah Valley Regional Program Judy Sorrell's grant has been extremely effective in training our AT Teams annually.
27. Selecting the "right" people for the team
28. Staff development, proper understanding of what is required of an LEA, training in how to use the specific piece of AT
29. The OT & PT's information and assistance are very valued.
30. The requirements for SOL are making individuals & teams look at the enhancement AT implementation can assist with
31. We sent a team for training initially & then we have continued to send them to training sessions. Some of the team members were previously trained in other school divisions
32. Those teachers who are interested in it and use it are the best "testimony" of its effectiveness.
33. Desire from those in private sector to access through recommendation. But now must be careful not to over-respond
34. -Annual AT grant provided by VDOE for past 3 years  
-We have computer technicians as support staff readily

- available
35. Knowledgeable staff/support staff i.e. technology coordinator
  36. Use of evaluations through T-TAC has been most valuable.
  37. Regional program and strong interagency cooperation.
  38. Success of students in mainstream
  39. -Staff caring & want to do best & most appropriate for all students.  
-Commitment by school divisions to provide best services  
-Staff willing to take a risk to try new methods or devices to improve services
  40. T-TAC's support
  41. The newly developed LCS Assistive Technology lending Library
  42. "Teaming" and on-going training Assistive Technology Team provides an "in-house" body of experts who are available for assessments and consultation
  43. Willingness of TAC centers to provide training
  44. Cooperation between agencies for needed services.
  45. Parental involvement
  46. Willingness of staff to try different things
  47. We have been able to utilize the AT grant from the VADOE to purchase equipment for several students. This has helped greatly.
  48. Good teachers, aides, etc.
  49. -willingness of staff & parents to explore options  
-county-wide technology resource teacher training program which includes a mandated AT Course  
-support from school based administrators
  50. Availability of information. Specialization of assistive technology
  51. teacher creativity, knowledge
  52. 1. Training of 2 teams through T-TAC @ GMU  
2. Knowledgeable OT, PT, and Speech staff that handle the majority of AT needs at the school  
3. Local resources to help educate our staff and parents  
4. Support from administration is critical and a facilitator here  
5. Technology training for all staff regarding basic computer use.
  53. Parents often want anything anyone talks to them about whether it is appropriate or not.

54. Willingness of staff to utilize AT
55. The need is obvious
56. We recently had a "4-man" team trained in AT evaluation to receive grant \$ to purchase an assessment kit for AT
57. The availability of grants – All of our K-3 regular education classrooms have classroom FM audio enhancement systems in place.
58. The same factors impede & enhance  
An interested team enhances  
A disinterested team impedes  
Many enhances, time enhances lack of impedes
59. Our system makes every attempt to give our students that what is necessary in order to get full educational benefit.
60. Public awareness of various devices with vendors moving about the state to show-off their wares having parents and school staff invited to see how devices work.
61. -motivated teachers  
-administrative support – recognition of the importance of A. T.  
-money to make purchases  
-a collaborative team to include the parents for follow-up at home  
-up to date computers in every class
62. Administrative support and the team approach are extremely outstanding in our school system. We have an application process which is centralized and provides a method for teachers to request consultation for student evaluation and request devices/software they do not have in their schools
63. Hardware problems
64. Qualified individuals to access need for assistive technology.
65. 1. Enthusiasm of staff  
2. When a student is successful using AT
66. AT eval team trained within district  
Very knowledgeable related service staff in areas of speech, PT, OT, vision, hearing
66. Our school system is small (10,000 typical students) with adequate funding- helps!
67. -Knowledge of devices

- Training to use devices
  - Limited teacher awareness of technology
68. Opportunities for teaming among related services staff
  69. Funding, service providers that know what's available and look for the most reasonable way to get the job done – not the most expensive equipment-
  70. Many teachers are willing to incorporate AT into instruction Sp. Ed. Director highly supports AT implementation.
  71. I have a great team of educators who support and encourage any assistive technology needs. Once a need is identified the appropriate staff makes recommendations and the items are ordered.
  72. Support from all aspects.



## Appendix F

### Text of Verbatim Comments Part III Question 3

Item #3

What are the perceived roles of the special education administrator in assistive technology implementation.

<u>Response</u>	<u>Comments</u>
1.	I am responsible for implementation of all IEP's planning and implementation of staff development regarding assistive technology, approve the purchase of all equipment
2.	As special education administrator I must see to provision of IEP equipment as well as appropriate inservice and training
3.	The assistive technology team works w/the schools. Presently, I meet w/ the team on a regular basis.
4.	Special education is one of <u>many</u> hats I wear. AT is a field I have very little training in and my teachers haven't had courses that instruct in the use of AT either.
5.	Support curricular integration as an assistive technology / envisioning strategy/ modality
6.	Supervisor- As senior coordinator I am now responsible for AT in the district. A team has been selected, trained and is in the process of developing procedures.
7.	Supervise the special education coordinator who is responsible for the implementation of AT. Depend on her for implementation.
8.	I believe it is my role to locate appropriate training opportunities for our relevant staff (myself included) w/re: to AT and to work with our technology coordinator to secure funds to support training & purchase equipment etc.
9.	Administration of Assistive Technology Grant which provide training and access to devices and services
10.	Overseeing IEP development
11.	1. Grant writing

2. Training self and others
3. Assessment of need
12. I delegate the assessment, training, and implementation to speech-language pathologists & occupational therapists, primarily
13. My role is to meet with IEP teams and to assist in securing assistive technology needed to meet students needs.
14. My role is to ensure that once assistive devices are ordered that these devices are utilized and maintained. If devices are not/can not be ordered I make sure adaptations are made in equipment if necessary.
15. As the special education coordinator, I am responsible for a large number of students with significant disabilities. I am one of the core group team members who provide support in the schools for these students.
- \*16. I try to find the \$ to make AT happen  
I assist in coordinating training efforts-  
I continue to follow up on local efforts
17. Mostly rely on AT team for eval. & recommendations  
rely on dir. of technology for specific companies  
resources/ budget issues
18. As Director of Special Education I would be responsible for ensuring the AT team is well trained, that schools are receptive and that school staffs understand the process for involvement with the AT team. I am also responsible for advocating through the budgetary process & through our limited freedom with funds to support the effort.
19. I supervise the coordinator of the AT team and responsible for activities of 750 staff members.
20. I have to secure the funding for such devices. I am also responsible for the training of my staff in the use of AT devices. Another of my duties is to find the solution to the needs of my staff.
21. My role is to ensure the implementation of IDEA
22. I participate in AT team meetings  
Participate in conferences

Release time provision

Educating sp ed staff re: AT what it means,  
what it is

23. I am responsible for the total sp. edu services for all disabled students 2-21 in the school division  
Assistive tech. is only one small piece of the pie.  
Admin time is far too limited to devote more time to AT.
24. I oversee AT assessments.  
Supervise the AT- Team  
Supervise in determining the appropriateness of devices being used.  
Provide for the training of AT Team members
25. Role includes review of assessments and conferring with staff re: essential need of AT to benefit
26. I oversee all aspects of Sp. Ed. Incl. AT.  
Based on AT needs I locate funds & support use of equipment with building principals & teachers.
27. The buck begins here! Requests for AT come to me for funding.
28. Interpret regulations for school division.  
Ensure appropriate implementation of regulations.  
Oversee teacher application of AT  
Locate resources related to AT
29. I oversee the total program for students with special needs. To have the ultimate responsibility that each child is receiving services as indicated by his/her IEP, assistive technology included.
30. Acting as a resource for staff  
Facilitating contact with providers & manufacturers  
Supporting staff in decision making process.
31. Must find money to purchase needed assistive technology; must be knowledgeable of what is available for all children who need assistive technology; find persons who can train staff and parents to use assistive technology; and follow up to see if assistive technology is being used.
32. I generally sit in on eligibility and IEP meetings. Also, I have access to assessment results relative to AT needs. As the IEP committee determines

- appropriate equipment, it is my responsibility to secure such and make it available to the student.  
As budget will allow, I purchase for schools and classes computer equipment on an on-going basis.
33. I am the point person for training and resources.
  34. My role is to provide people and resources for the implementation of assistive technology.  
We are currently planning to train a county-wide team through George Mason.
  35. See that para. and prof. personnel are trained in its use. Securing assessment of needed equipment for individual students. Purchasing, maintaining, cataloging equipment.
  36. I have selected a team representing various disciplines who accept referrals, evaluate & prepare a written report on AT individualized by student.
  37. To find training  
To support financial needs of training  
To support purchase of equipment  
To support planning time/evaluation
  38. To take the lead in facilitating understanding of and acquisition of appropriate AT, case by case  
Our county is small and rural; Thus I have to take an active role
  39. I attend the IEP meetings when I know BIG TICKET items will be requested. I ensure the guidelines are followed. I seek OT/PT advise as appropriate. Finally, I secure the funds.
  40. Being a rural school district. The Sped Administrator have no administrative assistance directly. Therefore, the Sped Administrator is responsible for a great deal of the implementation in terms of purchase.
  41. I provide leadership, write grants and am responsible for the budgetary concerns. I also provide monies for attendance at conferences.
  42. In a very small district, I am responsible for the implementation of everything. AT is on the list of "things to do" – I have emphasized the use of AT, the consideration of AT, and the purchase of AT as much as possible over the last 2 years.
  43. Overall authorizations based on recommendations

- from staff.
44. My role is to assist special educators & parents in becoming aware of criteria for AT usage & to ensure proper implementation of IEP's (which include AT)
  45. Serve as resource to our dept. chairs on info. Out there
  46. As a special education administrator, I have total responsibility for the implementation of assistive technology in our school division.
  47. It is my responsibility to receive information on AT & on the children who need it & match them appropriately at a reasonable cost to the system.
  48. I am the contact person to the regional staff responsible for supplying our divisions needs.
  49. Responsible for the implementation of all IEP's  
If assistive technology is written into an IEP  
I have a role
  50. Primary responsibility for determining if AT is required or needed in order for a child to be able to have access to the general curriculum, funding for the AT, providing or securing training for the AT and everything else.
  51. AT decisions are made during IEP mtgs.  
As Sp. Ed. Admin., I am member of IEP Team. Decisions are based upon individual needs. The focus is on the best and most appropriate services for each and every child.  
As Sp. Ed. Admin. I am continually working with the technical director & other agencies to gain knowledge of the most appropriate devices & their implementation.
  52. My role is to arrange the evaluation and implement the needs as specified by the IEP.
  53. I am responsible for the budget, both managing and planning. I am also responsible for determining when our school division will request mediation or due process when an issue can not be resolved.
  54. Responsible for leadership, training, awareness.  
Also responsible to insure AT is addressed as a consideration in all IEP meetings.

55. Development and maintenance of the assistive technology team (AT Team)  
Encourage and promote ongoing training  
Maintain awareness of legal and administrative decisions regarding AT use and devices  
Acquire funding through grants, regional programs, etc.
56. As the Director I am in charge of all decisions to purchase AT devices for students. When applicable I will negotiate any/all equipment purchases with vendors, etc.
57. I contact technical assistants to provide evals & make recommendations – I contact vendors for purchase, I distribute information to relevant personnel regarding AT conferences, workshops, etc. & I encourage participation
58. Purchase of AT  
Review IEP's to check on follow through  
Approve needed training for teachers
59. I am a Special Education Administrator in a small school division (3300) and am responsible for implementation of all services.
60. Based on the IEP's, AT is obtained to support IEP – Need to continue attention to teacher training
61. It is my job to see to it that IEP forms are followed by the school staff
62. My responsibilities include making sure AT needs are considered for all students, obtaining appropriate AT evaluations if needed, budgeting resources to purchase necessary equipment, and analyzing need for appropriate training of personnel.
63. Provide appropriate evaluation, purchase appropriate AT devices, provide training, etc.
64. Director of Special Education, The coordinator of assistive technology reports directly to me. We work very closely in training staff, parents, administrators in AT & Special ed legal issues associated w/ AT
65. Locate & purchases
66. Develop criteria to assist IEP team in discussion of AT

- Disseminate regulations relating to AT
- Schedule training for staff
- Keep up to date - professional development
- Encourage teachers to attend AT demonstrations
- 67. To determine long range planning needs of students who may require assistive technology.
- 68. I help to coordinate requests for AT evaluations by determining which team members are needed and assigning evals. I also participate in doing evals, training staff, and students, and selecting AT. I also provide staff development for teachers or ways to incorporate AT into their classrooms.
- 69. We try to plan for assistive technology when we do the evaluation, eligibility and/or IEP mtgs.
- 70.
  - 1) Provide information to parents and staff regarding AT assessments.
  - 2) Schedule appointments for assessments.
  - 3) Provide or arrange transportation for assessments.
  - 4) Assist in securing devices.
- 71. Providing for all IEP requirements, providing training for staff
- 72. My role is to ensure that the regulations are followed in identification and provision of services to children, including the provision of assistive technology as appropriate. This includes the education of teachers regarding appropriate provision of AT services.
- 73. Once the decision is made for a particular student, it is my responsibility to secure it.
- 74. Inform staff of regulations  
Provide access to staff development  
Define role of school division  
Inform supt. and school board of needs and requirements to ensure funding when appropriate.
- 75. I assist the special ed teachers and IEP Teams in making decisions in regards to the type of assistive technology necessary. I am also the responsible party for finding the funds necessary to purchase the device.
- 76. I am responsible for identifying personnel who is able to be fully trained to supervise



- the identification, testing, and fitting of AT devices.
77. Needs are brought to my attention & I facilitate acquiring the equipment.
  78. I am totally responsible for providing all the AT required as per IEPs.
  79. My responsibility is to assess students needs for AT, computer access, software needs, and communication needs. I provide follow up support and training to teachers, student, and family. I am in charge of the AT resource center & provide training on software use, basic computer skills, & devices.
  80. I am the instructional specialist for OI, OHI, OT, PT, VI, TBI, and AT. I coordinate a county-wide AT committee which plans how to address the needs of our students and staff. I disseminate information to staff in all our schools. Manage our AT web page and coordinate applications for devices & consultations from teachers. I also manage our AT purchases and grants.
  81. The teachers make me aware of whats needed. I provide funds for them to go to trainings and encourage the to use TTAC
  82. Support for other professionals when they see a need for assistive technology.
  83. Fiscal management of resources for AT  
Helping AT teams look at appropriate use of low tech alternatives  
Provide training  
Budget for outside AT evals
  84. Oversee programs  
Distribute funds  
Support personnel
  85. I feel my role is to facilitate the process of ensuring appropriate materials and services for students.
  86. I work to provide needed equipment as per IEP.
  87. Providing people the time to screen, writing policy & procedures and being available

- to assist with follow-through/consultation are my main roles. "Finding" money is another.
88. Facilitate sharing info & resources w/staff  
Try to budget for needy  
Contact person for referral person to connect staff/outside sources
  89. I facilitate support based on request from teachers, eligibility results, on IEP decisions.  
I seek out resources & plan training if needed to meet student needs.
  90. Oversee a staff of 23 specialists  
Oversee a budget of over \$2,000,000 to insure allocation of services, training and AT devices for student population of 20, 000 bridging all disabilities
  91. My role is to secure the funding and decide if what is recommended is the needed & is the best purchase for the individual.
  92. I must be the AT Coordinator and trainer.  
Too Much!
  93. I supervise the overall special education and student services needs for my school system. I believe assistive technology is some students' only way of communication and I support (strongly support) the implementation of assistive technology.
  94. I encourage teachers to seek appropriate devices and work with the technology staff.
  95. Supervising and making sure training is done & AT is considered for each child.
  96. Review requests for assistive technology, provide assistance to teachers by utilizing outside evaluations and in-house evals. Provide resources for the purchasing of equipment. Utilize related services staff in the evaluation and recommendation phase.

**Appendix G**

**Text of Verbatim Comments Part III Question 4**

Item #4

To what extent do examples of emerging practices designed to minimize barriers and enhance facilitators exist in Virginia schools.

<u>Response</u>	<u>Comments</u>
1.	The division has a general technology coordinator. Conferences and specialists are hired. Also Kluge, Woodrow Wilson, and other Centers are utilized.
2.	In process
3.	We have an AT team, eventhough their experience & skill level varies. We have a budget for acquisition of devices.
4.	We're very limited at this point. We use calculators, spell-checkers, some software with many of our children. We use devices recommended by our OT, PT, & vision therapists w/ a smaller # of children, and we use a lot of equipment w/ the very small # of children in our programs for students w/severe and profound disabilities. We'd really like to improve our assessment/services for students w/mild/moderate disabilities.
5.	Assistive Technology Team is in its initial stage. It is exploring options to minimize barriers and enhance facilitators to the implementation of assistive technology
6.	Open, effective communication Training where needed.
7.	Assistive Technology Core Group Part-Time AT Speech-Language Pathologist Part-Time AT Coordinator/Facilitator The core group works as a team to help students, teachers, and parents

- utilize AT.
8. An AT "Team" The purchasing of "an assessment kit"  
The idea of sharing personnel and resources among several small divisions.
  9. AT team has written criteria for evaluations; recommendations & assistance for IEP team
  10. I believe I can respond "yes" with some accuracy. We recognized the need, began with putting an effective team together (IOT, IPT, IHI teacher, and their "lead", a s/l clinician who is now a diagnostician) We developed a set of guidelines for access the team. We have trained staff regarding the expectation of IDEA '97 in this area, and how/why/when to access the "team".
  11. We have AT resources also computers in every classroom, Budget includes \$50,000 to purchase equipment with AT evaluation team identify students specific needs.
  12. Yes, We discuss with our staff the use of assistive devices and demonstrate various devices. Monthly departmental meetings are held in which the specific needs can be discussed.
  13. Regional participation
  14. Each student is handled on a case by case basis and AT is handled by the case manager who if need be would get technical assistance from our OT or TTAC
  15. The assistive technology team participates in national, state, and regional workshops to become more familiar with available resources.
  16. Process for eval & report of results in place. Opportunities for consultation to teachers regardless of Sp. Ed. classification of students. Have tried to find equip., information, software that support all students in working thru SOL's
  17. Not specific to AT. We do have procedures for use of T-TAC for resources and staff development.

18. Our system is very inclusionary. Therefore students with assistive technology needs are provided with optimal equipment so as to facilitate access to regular education programs.
19. AT Team and Referral Process in place.
20. We are providing training regarding assistive technology devices and have now a teacher that addresses assistive technology.
21. We are working on a resource guide for teachers now & will be providing training, this year if possible (scheduling staff development is a real problem).
22. We document whether the IEP Team deems AT is needed & what AT, if any, is required. We also specify in our Annual Plan how we define AT & its usage. We have no procedure/practice guidelines beyond what is denoted in the IEP & the Annual Plan.
23. Adequate training i.e. appropriate school personnel attend local and statewide workshops, inservices, etc. Consultation with T-TAC (Training and Assistance Centers-VCU)
24. New schools with AT adaptability and accessibility  
Regional program serves our students & we follow their guidelines
25. Decisions are made based on the needs of each child.
26. We have a step-by-step procedure for referral & assessment of requests for AT
27. Developed an "Assistive Technology Team" (1OT, 1PT, 1Speech, 2SPED Teachers, 1Vision Teacher, 1Computer Technician) The team is responsible for assessment, consultation, and monitoring of students and devices. These training sessions are provided each year through the Shenandoah Valley Regional Special Education Program. Additional funding is also provided through the regional program.
28. In all training opportunities we stress the legal requirements associated with AT. Resources are allocated as a priority for AT

- needs of students.
29. Site based management allows individuals at school level to identify, train, purchase, and implement.
  30. Designated funds specifically for AT Training
  31. Hire personnel to assess needs - provide training
    - 1) County-wide in-service on how to access AT, identify needs, procedures, etc.; use AT in classrooms
    - 2) Development of AT teams - special ed teacher, speech/language pathologist, OT, PT. We are hoping to train a third team this year.
    - 3) Proactive in implementing AT as per IDEA
    - 4) Look at individual student needs for all students, not limited to specific programs.
    - 5) Availability of computers in each classroom allows for widespread use.
  32. T-TAC helps with evaluation. We have done training workshops for teachers and designated lead teachers with certain pieces of technology.
  33. We are now able to provide AT assessment & provide AT devices noted on such assessment.
  34. OT/PT providers as part of the support team are very helpful. Assistance from DRS and T/TAC are also invaluable.
  35. Sending me and others to continuing ed  
Trying to support requests for acquisition of equipment for students & to begin a lab  
Forwarding relevant materials
  36. We have set aside approximately 1% of our flow-through dollars (\$6,953) to be used for assistive technology for students. We have also designated all of our money that will come from medicaid reimbursements to use for student assistive devices.
  37. As the AT specialist I have the final word if the student needs it he gets it. We are not allowed to use specific names of products in an IEP. For example - Write Out Loud & Lo Writer would have to be defined as talking word processor and word predictor software. This is because

- if we did not have this in our center we could use something else.
38. Written appreciation process  
AT Center  
Part time AT liaison  
AT Committee  
Staff Development  
AT Web Page & training module  
Presentation at numerous state conferences
39. We are beginning this since we participated in a 4 day summer workshop.
40. Added AT to handbook  
Provided training for AT team  
Wrote Sliver Grant to improve AT inventory and training
41. We just hired an AT coordinator part-time this school year. This is a "hot" topic of our committee.
42. Working in that direction. Procedures being finalized. Lending library of materials being enhanced.
43. Our division meets each individual need as stated within the IEP guidelines.
44. Yes, We have an assistive technology manual and user friendly forms. Staff development also helped personnel understand AT.
45. 1. Provide county-wide inservice for special educators  
2. Provide a referral service for students to be referred for specific AT support for customized adaptations and follow-up consultations  
3. Provide a range of equipment (low-tech to high-tech) to match needs of students.  
4. Provide a software library for special educators to check out programs for classroom use  
5. Provide on-going technical support to all special educators as necessary  
6. Sponsor "Software Review Teams" and "Web Review Teams"
46. We are planning to assign a team to develop an assessment instrument this school year.



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