

ASSISTIVE TECHNOLOGY AS AN ACCOMMODATION ON ACCOUNTABILITY
ASSESSMENTS: AN ANALYSIS OF ATTITUDES AND KNOWLEDGE OF SPECIAL
EDUCATION PROFESSIONALS

by

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B.S., Kansas State University, 1988
M.A., Kansas State University, 1990
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AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Curriculum and Instruction
College of Education

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Abstract

No Child Left Behind legislation has required public schools to increase efforts to measure and track student performance through school, district, state and nation-wide assessments. Researchers argue that it is essential for all students, including special education students, to be included in accountability assessments in order to help measure and track educational progress and compare the performance of schools, districts and states in terms of achieving educational goals. One method for including more special needs students in accountability assessments is to use accommodations during testing. Assistive technology is an accommodation that is approved for use on accountability assessments in many states and has the potential to significantly impact the performance of special education students.

The primary purpose of this research was to gather and analyze data from special service providers (staff of a special education cooperative) and educators and administrators (employees of the school districts the cooperative serves) on the subject of using assistive technology as an accommodation on Colorado State Assessment Project (CSAP) testing. The researcher conducted a survey to measure the attitudes and knowledge of educators and special service providers on this subject. The survey was a five point Likert scale comprised of ten items designed to measure “attitudes” and ten items designed to measure “knowledge”. Data was analyzed using backward regression analysis to compare scores between groups and consider the impact that years of work experience had on survey scores.

The researcher used responses from survey data to select ten survey respondents to participate in in-depth interviews. Interview data was analyzed using pentadic analysis, a method of rhetorical analysis designed by Kenneth Burke (1945).

Survey results indicated that the knowledge and attitudes scores between the two groups were similar, however regression analysis identified a significant increase the attitude scores of employees of the special education cooperative as they gained work experience. Scores of district employees did not increase on either scale as participants gained work experience. Analysis of interview data provided rich description of participants' knowledge and attitudes concerning the use of assistive technology as an accommodation and enabled the researcher to identify significant similarities and differences between groups of employees and the state standards intended to guide their decision making on this subject. Results of this research suggest a need for improving education on the subject of assistive technology, related state regulations and improving resources to foster the use of assistive technology as an accommodation on accountability assessments.

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Approved by:

Major Professor
Dr. Marjorie Hancock

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CHAPTER 1 - Introduction

No Child Left Behind (NCLB) legislation has required public schools to increase efforts to measure and track student performance through school, district, state and nation-wide standardized assessments (NCLB, 2002). Although the purpose and validity of such wide spread testing is often viewed as controversial, it appears as though standardized assessments will remain a part of educational accountability for public schools in the foreseeable future. Traditionally students with special needs have been excluded from accountability assessments (Elliot, McKevitt & Kettler, 2002; Erickson, Thurlow & Thor, 1995; Thurlow, Lazarus, Thompson & Morse, 2005). Researchers argue that it is essential for all students, including students with special needs, to be included in accountability assessments to determine educational progress and compare the performance of schools, districts and states in terms of improving education (Browder, et al., 2003; Kleinert, Kearns & Kennedy, 1997; McKevitt & Elliot, 2001). Thurlow, Elliot and Ysseldyke (2003) articulated the consequences of not including special education students in accountability assessments. The researchers asserted, “We do not obtain a fully representative accurate picture of education, particularly of student performance in education if we do not have all students in the accountability system” (p. 6). If data collected from accountability assessments are used to measure the performance of schools, evaluate programs and shape future educational policy, it is essential that special education students are included in accountability assessments.

The Problem

Including special needs students in standardized accountability assessments presents unique challenges (Browder, Karvonen, Davis, Fallin & Courtade-Little, 2005; Kubiszyn & Borich, 2007). Many public school administrators and educators have gone to great lengths to include special needs students in accountability assessments and provide them with appropriate tools for academic success. While working in public schools, the researcher has also witnessed instances where students with special needs have been intentionally excluded from participation in accountability assessments. The researcher has observed special education students sitting in the middle of a class coloring worksheets while their general education peers worked furiously

on assessments. In another instance, the researcher arrived at a school to work with a student and was informed by his teacher that the student, and several special education peers had been asked by school administrators to stay home on assessment days. In an even more extreme case, a student with a significant cognitive disability was expelled for “truancy” only days before she was scheduled to participate in state-wide accountability assessments. This incident occurred in a school that rewards general education students for attending school on assessment days with food, movies and prizes. Thurlow et al. (2003) reported that schools sometimes make poor or unethical decisions to avoid having students that are perceived to be “low performers” participate in accountability assessments. These researchers cited instances where students were retained in a grade so that they would not be eligible to participate in accountability assessments and inappropriately identified for special education services in order to exclude them from participating in accountability assessments.

At the most basic levels the directives of special education and standardized accountability assessments are in conflict. The Individuals with Disabilities Education Act (IDEA) mandates that special education students have an Individual Education Program (IEP). Cook and Hussey (2002) reported that “special education under IDEA is specifically designed instruction to meet the unique needs of a child with disabilities with the necessary supplementary aids and related services” (p 12). Thurlow et al. (2003) reported that many accountability assessments are norm-referenced and that “a key aspect of norm-referenced testing is that individuals in the normative sample all take the test under the same ‘standard’ conditions” (p. 39). Accommodating special needs students is not always possible in the eyes of school administrators who are charged with insuring test validity.

Thurlow et al. (2003) acknowledged that some testing companies are starting to recognize a need for accommodations with accountability assessments. In addition, some assessment developers have designed alternate versions of assessments for special needs students. Despite these efforts to make standardized assessments more appropriate for special education students, there is still much work to do on the task of including all students in standardized accountability assessments in ways that are meaningful.

An important step toward including special needs students in standardized assessments may be demonstrating that they can participate in existing assessments, however, changes must also be made in the way tests are standardized, normed and administered. Including special

education students in accountability assessments will not be meaningful unless special education students have been included in the research and pilot studies used to design standardized assessments.

McKevitt and Elliot (2001) reported that there have been few studies that address the use of accommodations with special education students on accountability assessments. In addition to calling for more research, these authors suggested that “Findings from these studies must be disseminated to educators so their decision-making about use and fairness of accommodations can be informed and appropriate” (p. 9). Clearly, more research on the subject of using accommodations on accountability assessments is justified.

The Purpose

The purpose of this research project was to gather information related to the developing relationship between accountability assessments, special education students and the educators and special service providers responsible for providing special education students with a free and appropriate public education. Specifically, this research was focused on the attitudes and knowledge of educators and special service providers on the subject of using assistive technology as an accommodation to help support special education students to participate in standardized accountability assessments. Increasing the appropriate use of assistive technology as an accommodation on accountability assessments could have a positive impact on increasing the participation of special needs students in accountability assessments. In addition, assistive technology has the potential to improve student performance on testing designed to measure and monitor the progress of all public school students (Elliot & Roach, 2002). Additional evidence to support these assertions is presented in the literature review. Gaining a better understanding of the knowledge and attitudes of special educators and service providers concerning the use of assistive technology on standardized assessments is an appropriate research goal.

The researcher’s motivation for gathering information on this subject is twofold. Although there has been some research on the use of accommodations on standardized assessments (Elliot et al., 1999; Elliot & Roach, 2002; McKevitt & Elliot, 2001) the researcher was unable to find any reference to studies that focused primarily on using assistive technology on accountability assessments. Conducting surveys and in-depth interviews with educators on the subject of using assistive technology as accommodations for accountability assessments will

contribute to a limited body of knowledge on this subject. Information gleaned from special education teachers, their administrators and special service providers should be useful for helping to guide appropriate decision-making and the development of public policy related to the use of assistive technology accommodations on accountability assessments. Even those who question whether or not educators are the best guides for designing policy changes should acknowledge that a better understanding of the existing knowledge and attitudes that educators hold toward using assistive technology as an accommodation on accountability assessments is an essential part of creating appropriate policy and affecting change in the status quo.

The information generated from this research will serve a practical application in the author's current position of employment. The researcher is responsible for helping to develop an effective assistive technology program for the special education cooperative where he works. The results of a survey of related service staff working for the South Central Board of Cooperative Educational Services (BOCES) that was administered by the researcher in the fall of 2006 indicated that a significant portion of the staff did not use assistive technology with the students. Even fewer staff members knew of a special education student who used assistive technology as an accommodation on accountability assessments.

Developing an effective assistive technology program requires an accurate understanding of the attitudes and knowledge of educators and special service providers. Members of IEP teams are responsible for providing services to special needs students in addition to determining what accommodations they can use to perform academic tasks and standardized assessments (Elliot & Roach, 2002). The researcher has reviewed studies of assistive technology and accommodations on accountability assessments, but did not find significant research on the subject of using assistive technology as an accommodation on standardized assessments. Exploring these issues through research is appropriate.

The Context

This research focused on educational policies and practices in south central Colorado, where the researcher works. All Colorado students enrolled in public schools in grades three through ten are expected to take a standardized accountability assessment called the Colorado Student Assessment Program (CSAP). CSAP is a standards-based assessment designed to provide a picture of student performance to schools, districts, educators, parents and the

community. Colorado has two other academic testing programs, The Colorado American College Testing Program (Colorado ACT) and the Colorado National Assessment of Educational Progress (NAEP), but these tests are not administered in as many schools or across as many grades as the CSAP. The Colorado ACT is administered only to 11th grade students and the NAEP is administered only to 4th and 8th grade students in selected schools (Unit of Student Assessment, 2006).

The primary purpose of the assessment program is to determine the level at which Colorado students meet the Colorado Model Content Standards in the content areas assessed (Unit of Student Assessment, 2006). Sections of the assessment address four content/subject areas:

- Reading
- Writing
- Mathematics
- Science

The primary format of the tests is multiple choice questions administered with a test booklet and bubble sheets for recording answers. Students participating in the reading content area are required to read a passage from the test manual and students completing the writing portion of the assessment are required to perform written composition based on a writing prompt.

The Colorado Department of Education (CDE) specifically encourages the consideration and appropriate use of test accommodations on this assessment for several specific groups of students including:

- English Language Learners
- Students with an IEP
- Students with a 504 plan¹
- General education students who meet the state guidelines for using accommodations to perform academic work.

Colorado is one of the few states that allows regular education students to use accommodations on accountability assessments. Colorado regulations require that students must have used accommodations to perform academic work in the content area being assessed for at least three

¹ A 504 Plan is a mechanism for addressing the needs of students who have an identified medical condition or disability that requires support, but does not otherwise qualify for special education services.

months prior to the administration of the CSAP and use of that assessment has been appropriately documented (Unit of Student Assessment, 2006).

The CDE offers a list of standard presentation and response accommodations to qualifying students who take CSAP assessments. Students who meet the criteria can use these accommodations without requesting permission from local or state testing officials. Among the standard accommodations listed by the CDE is the use of assistive technology (Unit of Student Assessment, 2006).

The CDE also provides criteria for helping IEP teams select appropriate accommodations for students taking the CSAP as well as guidance on implementing accommodations. The CDE issues a clear warning concerning the importance of maintaining the integrity (validity) of CSAP tests when using accommodations. It should be noted that the CDE provides for the use of non-standard accommodations (Unit of Student Assessment, 2006). When students have been using an accommodation that is not included in the CDE guidelines to perform school work, the student's IEP teams may still request that the student be allowed to use that accommodation when participating in the CSAP. Requests to use non-standard accommodations are proposed by IEP teams and then reviewed by CDE officials who approve or deny the use of the accommodation. It should, however, be noted that the CDE grants the power to local IEP teams regarding the use of non-standard test accommodations. Even if an accommodation is not approved by the CDE:

The team however may decide that the student must have the non-approved accommodation/modification. In this case, the student will be assigned a “no score” for the purposes of state, district and school CSAP reports and school accountability reports. (Unit of Student Assessment, p. 48)

Schools still have access to the test scores of students who are assigned a “no score” but have completed the CSAP. These scores are simply not included in state and local reports. This is significant because the “no score” option allows students with special needs to participate in accountability assessments and demonstrate what they can do and what they know using accommodations. Although including these test scores in state and local statistical analysis may compromise the validity of the CSAP, “no-score” test results can still provide state and local educators important information for program evaluation, development and student achievement.

In the introduction to the CSAP Procedures Manual the authors present the following directive in large font and bold print; “All means All” (Unit of Student Assessment, 2006). This statement refers to the legal and ethical obligation of schools and districts to include all students in CSAP assessments. The manual states:

All Public school students enrolled in a Colorado school in grades tested must be accounted for in the Colorado Student Assessment Program (CSAP). Recognizing that students have many different needs and circumstances, a large part of this manual is devoted to answering the question, “How do we appropriately handle special situations so that all students can participate meaningfully in Colorado’s state testing program? (Unit of Student Assessment, p. 1)

The Unit of Student Assessment has also created an alternate assessment, the CSAP Alternate (CSAPA) for students with significant cognitive disabilities. This alternate accountability assessment was designed to measure the progress of students who work toward benchmarks in content areas that are significantly different than their typically developing peers. According to the CSAP Manual, “A very small number of students with significant cognitive disabilities will require the CSAP Alternate (CSAPA) to demonstrate growth toward expanded benchmarks” (Unit of Student Assessment, p. 42). It should be noted that students who are eligible to take the CSAPA are still eligible to use assistive technology and other accommodations during testing.

Research Questions

The research questions for this project can be divided by the methods of research. The researcher gathered information through survey data and in-depth interviews. The researcher has analyzed survey data, using quantitative methods and statistical analysis in order to answer the following questions:

- 1) Is there a significant difference in the *knowledge* possessed by less experienced and more experienced educators on the subject of using assistive technology as an accommodation on CSAP assessments?
- 2) Is there a significant difference in the *attitudes* possessed by less experienced and more experienced educators on the subject of using assistive technology as an accommodation on CSAP assessments?

- 3) Is there a significant difference in the *knowledge* possessed by special service providers and special education teachers on the subject of using assistive technology as an accommodation on CSAP assessments?
- 4) Is there a significant difference in the *attitudes* possessed by special service providers and special education teachers on the subject of assistive technology as an accommodation on CSAP assessments?

The research question that is answered through qualitative methods and analysis of in-depth interviews follows:

- 5) How do members of IEP teams describe the process of using assistive technology as an accommodation on accountability assessments?

Significance

The number of special education students in public schools is significant. Figures vary, but data suggests that special education students account for approximately 10-15% of the general student population (Thurlow et al., 2003). Although policies vary from state to state, Colorado mandates that all students participate in state-wide accountability assessments. In the state of Colorado, statutes require every student enrolled in a public school to participate in state assessments in the designated content areas for their grade (Unit of Student Assessment, 2006). Despite state and federal mandates, research indicates that a significant number of special education students are being excluded from participating in accountability assessments.

Thurlow et al. (2003) referred to research that indicated that significant numbers of students participate in accountability assessments; up to 90% nationwide. Although 90% participation does not meet standards outlined in NCLB (2002), that figure dwarfs the percentage of special education students who currently participate in accountability assessments. Research indicates that rates of exclusion vary from state to state, and among districts, but overall rates of participation of special education students in accountability assessments are relatively low (Thurlow et al.). The authors cited research suggesting that “33-87%” of all special education students are excluded from participating in accountability assessments (p.5). Elliot, Thomas &

Schulte (1998) reported research from a U.S. Department of Education study, which indicated that before NCLB was implemented:

Less than 50% of students with disabilities participated in statewide assessments of academic achievement in 26 states and outlying areas (e.g., Puerto Rico). Twelve of these states reported that less than 10% of students with disabilities participated in large-scale assessments. (p. 6)

The percentage of special education student participation should increase as educators become more familiar and comfortable with the relatively new process of accountability assessments. Accountability assessments are intended to monitor and measure the progress of all students in public schools, excluding even a relatively small portion of public school students from accountability measures is not acceptable. According to NCLB, a child whose educational performance is not subject to accountability assessments and the related progress monitoring, could be “left behind.”

Regional Profile

The South Central BOCES serves a unique geographic and demographic region of the United States. This administrative unit provides special education services for 13 school districts in rural Colorado. The geographic area covered by the South Central BOCES is approximately 10,000 square miles. Many of the communities in this region are economically depressed. According to the Colorado Department of Education, in 2007 approximately 48% of the students enrolled in schools served by the South Central BOCES were eligible for the Free and Reduced Lunch program, compared to a state average 33.63%. “Free and reduced lunch” is one of the most reliable indicators of determining the economic well being of an academic population. The district with the highest percentage of students qualifying for free and reduced lunch in 2007 was Aguilar with 80% (Colorado Department of Education, 2007a).

Many schools in this region are low-performing according the state accountability program. Nine of the thirteen school districts that receive special education services from the South Central BOCES had at least one school that did not meet AYP for the 2006-2007 school year (Colorado Department of Education, 2007a). Another unique demographic feature of this region is the high percentage of Hispanic students. Approximately 28% of the students in Colorado public schools are Hispanic. In the districts served by the South Central BOCES,

approximately 48% of students are identified as Hispanic (Colorado Department of Education, 2007a). According to a “fact sheet” produced by The National Council of La Raza, (NCLR) an organization that advocates for the rights of Hispanic and Latinos in the United States, Colorado ranks sixth among states in terms of percentage of Latino population (NCLR, 2005). The same report indicated that Latinos as a group can make significant contributions a community’s economy, but as a group, Latinos are also uniquely susceptible to poverty:

Latinos make a significant contribution to the labor force, representing an increasing share of workers and taxpayers, yet they are overwhelmingly vulnerable to economic downturns and experience high poverty rates, especially among working families with children. (NCLR, 2005, p. 1)

Many of the Hispanic families in this region of Colorado are not recent immigrants and are native English speakers, but educating students that come from poor households can still pose a unique challenge to districts. In addition, there are students from “migrant families” who are second language learners and attend districts with more agrarian economies on a “seasonal” basis.

The population of individual school districts ranged from approximately 50-1,800 students. Most of these districts are best described as “rural”. According to the National Education Association, rural districts can offer unique opportunities to students including small class sizes, “But many rural school districts are under funded and some lack a steady revenue stream. Moreover, they are disadvantaged by size as well as geography” (National Education Association, 2008b, ¶4). The same article states, “Rural schools serve over 40 percent of our nation’s students, but receive only 22 percent of federal education funding” (National Education Association, ¶6). The NEA asserted that access to technology is also a significant issue for rural schools.

Limitations

The unique characteristics of the districts where this research has been conducted means that results may not be broadly generalized to other schools and districts. Information from this research, however should be of unique interest to school districts with similar demographic qualities (e.g., poor, rural and significant Hispanic population), significant populations that

should be of interest to researchers and policy makers interested in improving the quality of education in the United States.

This study relied exclusively on special service providers, public educators and administrators for participants. Research indicates that students and parents are also key members of IEP teams and should be included in research on the subject of accommodations with accountability assessments (McKevitt & Elliot, 2001). The researcher does not contest this point, but recruiting a representative number of students and parents for this study was not feasible. The researcher was guaranteed access to special education staff by the special education director for the South Central BOCES and was successful recruiting an adequate population of educators and special service providers to participate in this study. Special education teachers and service providers are often the gate keepers of critical knowledge and information about special education procedure for IEP teams. This research will not include parents or students in surveys or in-depth interviews, but the researcher does recommend including these populations in additional research on this subject.

In the spirit of full disclosure, the researcher admits to being affected by a personal bias related to his experience working with assistive technology and participating special education staff. The researcher has a pronounced interest in promoting the use of assistive technology as a tool for special education students. In addition, the researcher has an interest improving the knowledge and attitudes of educators, special education staff and their administrators on the subject of using assistive technology as an accommodation on accountability assessments.

Finally, this research does not contribute new information to the question of whether or not accommodations and assistive technology affect student performance on accountability assessments, or whether the use of these tools threaten the validity of standardized test results. Research on these issues of efficacy and validity is not conclusive, but research included in the literature review supports the use of accommodations and assistive technology for special needs students on accountability assessments. This research project focused on the attitudes and knowledge of a key group of people who are instrumental in making decisions and providing support for special education students. The researcher also recognizes the limitations of the research methods of this study and will address these issues in Chapter 3 of this dissertation.

Definition of Terms

Accountability assessment -Any of a number of standardized assessments implemented by federal, state and local educational organizations intended to measure and assist in tracking the performance of public school students. In Colorado, the battery of CSAP tests is the primary accountability assessment used on an annual basis to measure student performance. In some articles, researchers refer to accountability assessments as “high stakes testing.”

Accommodation -“Testing accommodations are changes in the way a test is administered or responded to by a student. Testing accommodations are intended to offset distortions in test scores caused by a disability without invalidating or changing what the test measures” (Elliot et al. 1999, p. 2). At times the term “accommodation” is confused or used interchangeably with the word “modification”. That is not the case in this research project. A modification is defined as “a change in the content of the test, whereas an accommodation is considered a change in the way a test is administered” (Elliot & Roach, 2002, p. 4).

Adequate Yearly Progress (AYP) -This term is a performance standard central to NCLB. Scores from accountability assessments are a central component of determining whether or not schools have met AYP. Edyburn (2006) defined AYP as “A mathematical metric designed to demonstrate sustained incremental effort at closing the achievement gap. By 2014, all students are expected to be performing at grade level” (p. 36).

Assistive technology -“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” (Technology-Related Assistance for Individuals with Disabilities Act, Public Law 100-407, 1988). In public school settings commonly used assistive technology includes computers, adapted computing programs, augmentative communication devices, books on tape, alternative means of accessing equipment (e.g., switches, alternative keyboards) and Braille. In addition to equipment, assistive technology services include evaluation, student training, teacher education and additional program supports that accompany a special education service.

Kenneth Burke -Burke is one of the most significant rhetorical theorists of the 20th century (Wess, 1996). Burke developed the theory of Dramatism which uses the structure of drama as a method for organizing and analyzing communication. Pentadic Analysis is a method of Dramatism that identifies the primary elements in a communication event as *act*, *scene*, *agent*, *agency*, and *purpose*. Burke argued that analyzing a communication event by identifying these elements will lead to better understanding of how and why people make decisions and act accordingly. Burke used the term “symbolic act” to refer to the phenomenon that is being analyzed as characterized through the languages of individuals participating in the communication event.

CSAP -“The Colorado State Assessment Program (CSAP) is a standards-based, standardized assessment designed to provide a picture of student performance by schools, districts, educators, parents and the community. The primary purpose of the assessment program is to determine the level at which Colorado students meet the Colorado Model Content Standards in the content areas assessed” (Unit of Student Assessment, 2006, p. 12). The term “CSAP” is also frequently used by students and staff to refer to the specific tests administered as part of this program.

IEP -Individualized Education Program (IEP) is defined by Hallahan and Kaufman (1993) as a provision of Public Law 94-142. An IEP is a written educational program that is designed for every student that qualifies for special education services. “The program must state present levels of functioning, long- and short-term goals, services to be provided, and plans for initiating and evaluating the services” (p. 25). Some individuals refer to an IEP as an Individualized Education *Plan*, but in most legislation and public policy it is referred to as a “program”.

IEP Team -Individuals who plan and implement a student’s IEP are members of the IEP team. IEP teams can be comprised of the student, their family, representatives from community agencies, family friends, special education staff, regular education staff and school administrators.

Special service providers -Any member of a group of special education support staff (other than special education teachers or paraeducators) that provides students with therapeutic and miscellaneous support services. Special service providers are members

of IEP teams and include psychologists, occupational, physical and speech therapists as well as specialists in autism, early childhood, and deaf education.

IEP Team -team of educators assigned with the task of providing teachers and students with instructional strategies, accommodations, modifications and other educational supports with the purpose of providing teachers and students with educational supports. The Child Study Team is charged with documenting student performance, response to interventions and if appropriate, a serving as a first step toward referring a student for special education evaluation.

504 Plan -A document designed to meet the unique needs of a student who does not qualify for special education services. A 504 plan may include accommodations, modifications, special educational strategies and other efforts to provide qualifying students with appropriate educational supports. 504 plans are a general education process, but may include special education professionals and interventions.

Response To Intervention -Response to Intervention (RTI) is an educational initiative defined by the Colorado Department of education “the RTI Model utilizes instructional strategies such as universal screening and on-going data analysis to inform instructional interventions, flexible use of building personnel with students, as well as collaborative problem solving among staff and parents to enhance all students’ performance” (CDE, 2008, p. 3). Child Study Teams are frequently used as a mechanism for implementing RTI.

Organization of Study

Chapter 1 presented an introduction to this research project. It included an overview of relevant issues, the statement of the problem, the purpose of the study, a description of the context of the study, the research questions, a description of the limitations of the study and a definition of terms. Chapter 2 is a review of literature which provides background on legislation related to the topic, accommodations, assistive technology, educator attitudes and knowledge on the topic of assistive technology, accommodations and accountability assessments and a review of Burke’s pentad (1945), (the communication theory that the researcher used to analyze data gathered in participant interviews). Chapter 3 describes the quantitative and qualitative research methodologies and procedures used in this study. Chapter 4 contains a description of findings

revealed through quantitative analysis of the survey data. Chapter 5 contains the data and qualitative analysis of interview data and some information collected from surveys. Chapter 6 contains the conclusions of the study as well as implications for practice and recommendations for further research.

CHAPTER 2 - Review of Literature

The first section of this literature review is a brief outline of legislation that has led to an increased focus on standardized assessment as a measure of educational accountability, focusing specifically on No Child Left Behind (NCLB). The second section examines the use of accommodations as a means for including more special education students in standardized assessment and providing them with a level playing field for demonstrating knowledge and skills. The third section provides a description of assistive technology and the role that it plays in special education. The fourth section of this chapter focuses on the attitudes and knowledge that special educators and service providers possess on the subject of special education students using assistive technology accommodations on standardized assessment. The final section introduces Dramatism and pentadic analysis (Burke, 1945).

Legislation

Although educators are not always pleased with mandates resulting from legislation intended to spur educational reform, those familiar with the history of special education in the United States cannot deny the impact that legislation has had on the education of special education students in public schools. Prior to legislative reform, students with special needs and/or disabilities only attended public schools when they were able to fit in with their general education peers. In these instances, special needs students were required to use the same facilities and perform the same work as their peers (Hallahan & Kaufman, 1993). Residential schools and state institutions provided educational opportunities for students with special needs, but attendance at these schools often required students to move away from home. These institutions and special schools provided some students with improved educational opportunities, but they did not provide special needs students an education with typically developing peers.

The Rehabilitation Act of 1973 helped to establish the concepts of “reasonable accommodation” and “least restrictive environment” in public education. This legislation also tied federal funds to compliance with the law (Cook & Hussey, 2002). In the same year, section 504 of the Vocational Rehabilitation Act, [Public Law 93-112] addressed issues of civil rights for all citizens of the United States. Although not specific to education, the legislation set a

broad precedent on the subject of discrimination based on “handicapping conditions”. The law mandated that no individual in the United States “shall, solely by reason of his handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program receiving Federal assistance” (29 U.S.C. § 794). Section 504 regulations continue to be used as the basis for “504 plans” which provide services and supports for students with identified disabilities who do not otherwise qualify for special education services (Kaufman, 1993).

The Education for All Handicapped Children Act (EHA) of 1975 is credited with increasing the number of students with disabilities in public school settings (Flippo, Inge & Barcus 1995; Kaufmann, 1993). Once special education students were allowed to attend school with their typically developing peers, the discussion related to educating students with disabilities changed. While some continued to question whether or not students with special needs had a right to be educated, but many accepted this fact and turned their attention to how these students could be best educated. As a result of EHA, more special education students were moved out of special schools and segregated programs, into neighborhood public schools. Some of these students were even integrated into regular classrooms. In addition, more students who had not been previously identified as having special needs were identified and provided with special education support (i.e., students with learning disabilities, mild perceptual and communication issues, etc.) (Kaufman).

Public Law 94-142 guaranteed a legal right for students with special needs to receive a free and appropriate public education. The Individuals with Disabilities Education Act (1997) (IDEA) helped to further integrate special needs students into schools. IDEA also required that students with disabilities be included in accountability assessments (Tindal, Heath, Hollenbeck, Almond & Harniss, 1998) and mandated the use of “alternate assessments” to measure the achievement and growth of students with special needs (Elliot & Roach, 2002). The 1997 version of IDEA mandated Individualized Education Program (IEP) teams to consider assistive technology as a special education intervention (Cook & Hussey, 2002; IDEA, 1997).

No Child Left Behind

The passage and reauthorization of NCLB has set even higher standards for the education for all students, including those with special needs (Abedi, 2004). As a result of NCLB, every

state has been required to develop a method for demonstrating Adequate Yearly Progress (AYP) for public education students. NCLB directs states to develop standards for determining AYP by considering a variety of factors including scores on accountability assessments and indicators such as graduation and drop-out rate. Although NCLB standards apply to all students, states are specifically charged with the responsibility of measuring and reporting AYP for several subgroups, including students with disabilities (Abedi, 2004).

The results of standardized accountability assessment are now directly tied to federal funding and poor scores can result in dramatic punitive action for administrators and staff at schools that fail to demonstrate AYP. “With the passage of NCLB, the stakes associated with testing and assessment have never been higher” (Kubiszyn & Borich, 2007, p. iii). Never before have administrators, educators and students, had to spend as much time and energy preparing for, and participating in, high-stakes standardized assessment. These changes directly affect special education students and their educators. Although many special needs students are still omitted from participation in accountability assessments, legislative reform is attempting to close the loop holes that allowed special education students to pass through school without legitimate attempts to measure their progress. “With the passage of NCLB, the federal government squarely recognized that school systems must be accountable for the learning progress of students with disabilities” (Allbritten, Mainzer & Zeigler, 2004, p. 1). Students who had been exempted from taking tests, let alone standardized assessments, are now required to participate in broad-based assessments. NCLB mandated that the effectiveness of special education programs be evaluated and that the administrators and educators running those programs be held accountable. In addition, Davis (2004) claimed that NCLB specifically recognized “technology’s role in helping students meet higher standards for academic performance. States must ensure that all students – including those with disabilities—have access to and can use the technology” (p. 1). NCLB also provides funding to states earmarked for professional development specifically on the subject of integrating technology into instruction (Cradler & Cradler, 2002). Griffen (2004) touted assistive technology as a means for helping students with disabilities, help their schools to meet the stringent performance standards set by NCLB.

The purpose of this research is not to critique or evaluate NCLB. Instead, the researcher sees NCLB regulations and resulting programs as part of the educational landscape that special educators must navigate. It is, however, almost impossible to review the effects of NCLB

without acknowledging some of the related controversies surrounding this legislation and the impacts that it has had on public education. As one might expect, government reviews of NCLB are positive. In December of 2006, the United States Department of Education (USDE) posted a press release summarizing several positive policies that have been enacted as a result of the legislation:

- All children are counted under NCLB, and schools are responsible for making sure every child is learning.
- Parents are given unprecedented information and new options for their children, which may include free tutoring.
- Teachers utilize assessment data and scientifically based teaching methods to improve classroom instruction.
- Schools identified as being in need of improvement receive extra help and resources to raise student achievement (United States Department of Education, 2006).

The press release then cited specific gains that have been made by students in the areas of reading, math, writing and science. The USDE also announced new regulations that claim positively impact students with disabilities. According to the press release, recent additions to NCLB allowed a greater percentage of special education students to participate in “alternate assessments” to measure AYP. These changes “allow states to count 2.0 percent of proficient and advanced scores on alternate assessment when measuring yearly progress” (United States Department of Education, 2007, ¶ 2). The change in policy will not change the number of students who can take an alternate assessment, but it allows twice as many scores from students who take alternate assessments to be counted toward meeting AYP standards. This change should make the performance of special education students on alternative assessments even more significant to teachers and administrators. According to Secretary of Education Margaret Spellings, “Through *No Child Left Behind*, we’re continuing to raise the bar and improve the way we educate and assess students with disabilities” (USDE, ¶ 4). Spellings continued:

These students are capable of achieving high academic standards, and now states and schools can be better attuned to their needs. No Child Left Behind has put the needs of the students with disabilities front and center, and this regulation helps continue to drive the field forward in developing better tests for students with disabilities. (¶4)

Critics of NCLB may point out that Secretary Spelling's statement promises "better tests" for students with disabilities instead of "better education".

Shortly after being signed into law, critics claimed that NCLB was not delivering on its promises (Mathis, 2003). A recent meeting of The National Governors Association gave NCLB mixed reviews. Governors were critical of the "highly qualified teachers" provision and called for more flexibility at the state level with accountability assessments (Klein, 2007). Others are critical of NCLB's failure to recognize significant progress in low achieving schools that barely miss strict AYP standards (Hoff, 2007). Even with recently passed reforms, some critics argue that NCLB regulations do not account for the unique demographics of states and school districts (Bansal, 2007). For example, setting an arbitrary cap of 2% for the number of alternative assessments that can be included in state reporting does not allow for differences in the percentages of special education students between districts. One of the most common criticisms of federal mandates has also been voiced about NCLB. State and local administrations charge that NCLB amounts to an "unfunded mandate" and does not provide the financial support needed to achieve substantial educational reform (National Education Association, 2008a).

The accomplishments of NCLB have also been called into question. Critics claim that gains in test scores that President Bush recently attributed to NCLB are actually part of a "long-term trend" that preceded NCLB. Hoff and Manzo (2007) stated that data cited by President Bush, "show modest improvements that can't be attributed to the 6-year old law. Instead, progress in achievement is more likely "a continuation of trends that predate the law" (p. 1). The same authors claim that, "The administration appears to ignore other data that suggest the law has had little or no positive effect on achievement" (Hoff & Manzo, p. 3). Regardless of the effectiveness of NCLB, states are faced with the task of implementing reform resulting from NCLB and recent reauthorization of components of the legislation implies that accountability assessments will be part of the educational landscape in all states for years to come.

Even though NCLB is federal legislation, the procedures for accountability assessments and related legislation can vary dramatically from state to state (Thurlow & Ysseldyke, 2002). In addition, educational reform is ever changing. In the spring of 2008 Congress was debating reforms to NCLB. More changes in the legislation are imminent as the program is considered for reauthorization (Zuckerbrod, 2007; National Education Association, 2008b). According to the National Education Association (NEA), more than 130 bills have been introduced to modify

NCLB during efforts to reauthorize the program (National Education Association, 2008a). Because states are given significant autonomy with regard to how they implement aspects of NCLB, policies and procedures resulting from the legislation can vary significantly from state to state. For purposes of this project the researcher has focused on policies in the state of Colorado where he lives and works. The Colorado Student Assessment Program (CSAP) is the accountability assessment that has been developed in response to state and federal legislation and CSAP assessments are the primary method for measuring student ability and progress in state public schools (Unit of Student Assessment, 2006).

Accommodations

The World Health Organization (WHO) defined a disability as “any restriction or lack of ability to perform an activity in a manner or within the range considered normal for a human being” (WHO, 1980, p. 143). Although this definition is not specific to an educational context, it offers an appropriate framework for introducing the concept of accommodation as a special education intervention. Special education students receive unique educational supports because they are unable to perform academic tasks at age appropriate levels as the result of an identified disability. When a disability affects a person’s ability to perform an age appropriate task, then it can be described as a handicapping condition. The WHO defined a handicap as “a disadvantage for a given individual, resulting from an impairment or disability, that limits or prevents the fulfillment of a role that is normal for that individual” (p. 183).

One approach to addressing the unique learning needs of special education students is remediation of the student’s disability. When employing a “remedial” approach in special education, the educator attempts to change specific cognitive or physical abilities through educational and therapeutic interventions (Quintana, 1995). A second approach to addressing the education of individuals with disabilities can be described as an “adaptive” approach. In contrast to remedial interventions, adaptive interventions attempt to negate a performance deficit by teaching compensatory strategies, changing the environment or providing individuals with cognitive or tangible tools to improve task performance (Quintana). Accommodations are more aligned with the principles of adaptation than remediation. It should also be noted that an educational team can use both remedial and adaptive approaches for educating students with special needs.

Edyburn (2004) has written extensively on using assistive technology as an accommodation in instructional and test settings. He has chastised policy makers and educators for not accommodating the unique needs of students with reading difficulties. Edyburn's frustration arises from educational decisions regarding students who demonstrate disabilities that prevent them from reading efficiently. Edyburn posited:

What happens when a student fails to learn to read? Historically, educators search for different instructional methods or materials. Seldom do they raise the question: Are there other ways of performing the task? Routine failure to attain appropriate levels of academic performance should trigger assistive technology consideration. (p. 3)

Edyburn described this method of using assistive technology with a student as "compensation." With a compensatory approach an educator adapts the educational task or provides the student with access to educational tools that enable them to perform a task. Edyburn argued that with adaptation and simple accommodations, students with disabilities can learn more efficiently and perform at higher educational levels.

Accommodations are provisions provided to a student with special needs that allow the student to perform a task with the benefit of supports, tools or modifications to the environment where the task is performed. State and federal guidelines allow students with special needs to use accommodations to perform daily academic tasks (NCLB, 2002; Unit of Student Assessment, 2006). Some students are also provided with modified tasks or curriculum to better fit their learning needs. Such changes are referred to as modifications. An example of a modification for a student who struggles with spelling may result in a different word list than same age peers, or a fewer number of assigned vocabulary words. Accommodations and modifications are both used to change the way special needs students perform work. Although the two terms are often paired, and sometimes interchanged, this project focuses exclusively on accommodations.

The availability and types of accommodations that are made available to students have increased over time (Thurlow et al., 2003). Elliot & Roach (2002) categorized types of test accommodations into five basic groupings:

- changes in setting
- changes in time limits
- changes in schedule

- changes in presentation of test materials
- changes in allowed methods of response.

To this list Elliot et al. (1999) add the use of aids or tools. Another way to categorize and address accommodations is according to the educational setting in which they are used.

A student who uses a wheelchair instead of traditional ambulation is using an accommodation to access tasks of daily living and to navigate their educational environment. A student who uses an electronic keyboard to augment writing performance is using an accommodation to perform classroom academic tasks. A student who has been allowed to take the CSAP in a quiet room with limited distractions has been granted a test accommodation for an accountability assessment. Legislation, policy and research sometimes draw a distinction between the environments where accommodations are used. The most common division in domains where accommodations are documented in special education appears to be determined by the type of work that a student is doing. Instructional accommodations refer to accommodations afforded to a student during the performance of daily academic tasks. Test accommodations refer to accommodations allowed to support a student while taking classroom, school, district, state or national exams.

Thurlow and Ysseldyke (2002) pointed out that legislation and resulting regulations address issues related to accommodations for instruction and testing, but in some instances it appears as though mandates present directives without direction. For example, the authors claimed that regulations demand that an IEP must identify accommodations for instruction and for accountability assessments, but offer very little guidance on how to determine, document or implement accommodations. As a result of vague federal guidelines, policies on accommodations can vary dramatically from state to state (Thurlow, Scott & Ysseldyke, 1995).

Elliot et al. (1999) reported that a majority of states have specific guidelines on the subject of accommodations and a significant number of states specifically link instructional and test accommodations. Thurlow et al. (2003) argued that implementing accommodations during instruction is essential for knowing whether or not they will be appropriate for use during assessment. Thurlow and colleagues stated:

The key is to gather as much information as necessary to determine that decisions to provide instructional accommodations are warranted. Once instructional accommodations are in place, and written in a student's IEP, continue the discussion for

assessment accommodations. What does the student need to be able to show what he or she knows? (2003, p. 163)

Some states have designed policies that use instructional accommodations as a necessary first step for the use of accommodations on accountability assessments. In Colorado, students who wish to use an accommodation on the CSAP must have used that accommodation for classroom instruction for at least three months prior to participating in the assessment (Unit of Student Assessment, 2006). In several states, including Colorado, even students who do not receive special education services are eligible to use accommodations on accountability assessments if they have used them consistently in instructional settings (Elliot & Roach, 2002).

Although state and federal agencies have not set specific standards regarding how to select and implement accommodations, several research projects and position papers have addressed this subject. The IEP team is obviously key to selecting and implementing appropriate accommodations for special education students (Elliot et al., 1999; Elliot & Roach, 2002; Thurlow & Ysseldyke, 2002). There are also numerous research articles that have suggested that using a structured process for selecting accommodations for students is appropriate (McKevitt & Elliot, 2001; Elliot et al., 1999; Phillips, 1994; Thurlow et al., 2003).

Thurlow and Ysseldyke (2002) developed a four step process that begins with identifying a need for instructional accommodations, then determining if instructional accommodations are also appropriate for test situations. The third step they suggested is addressing the need for accommodations with the IEP team. The final step is helping students who can benefit from using accommodations develop awareness and self advocacy skills.

Elliot, Kratochwill and Schulte (1999) developed and evaluated a protocol called the Assessment Accommodations Checklist (AAC) which was designed to guide IEP teams through the process of making good decisions about choosing appropriate accommodations for students. Their research suggested that special education teams found using the AAC to be helpful in selecting accommodations.

Phillips (1994) developed a simple set of questions for selecting accommodations that seems more focused on insuring test validity than selecting accommodations that will benefit a student. Phillips presented five questions that should be asked before a student is allowed to use an accommodation on a standardized assessment:

- 1) Will changes in test conditions change the skills being measured?
- 2) Will scores of accommodated students have a different meaning than scores of students who take the test under standard conditions?
- 3) Will students without special needs benefit from the same accommodations?
- 4) Can the student perform the test without the accommodation?
- 5) Is the policy that allows the accommodation invalid?

According to Phillips, an answer of “yes” to any of the questions is an indication that an accommodation is not appropriate for use during an assessment. As Phillips implied, the broad impact of test accommodations is not always positive. Researchers claim that test accommodations can have a negative impact on test validity, teachers and the students who use them. Elliot, McKevitt and Kettler (2002) reported that many students use accommodations that are approved by state and local policies, but these accommodations have unknown impact on test validity. The same researchers claimed that accommodations can create confusion for teachers and schools. McKevitt and Elliot (2001) pointed out that, “using accommodations takes time and resources that may impact teachers in negative ways. The effects of providing accommodations on teachers’ perceptions of and attitudes about testing deserves further consideration” (p. 11). Using accommodations appropriately also places demands on governing agencies to appropriately educate staff. Thurlow, Elliot & Ysseldyke, (2003) claimed that “virtually no preservice or inservice training is provided on selecting and implementing instructional accommodations” (p. 33). The same authors argued that students must be taught how to use accommodations if they hope to benefit from this intervention. They also warned that when students are not prepared to use accommodations, the presence of assistive technology can actually interfere with student performance.

For each of the potential downfalls of using accommodations, there are at least as many potential benefits, even on the issue of test validity. McKevitt and Elliot (2001) used language of experimental research to explain the goal of using accommodations on standardized assessments. The authors reported, “the desired effect from accommodations is to have differential benefit, with the accommodations helping only those students who need them, thus creating an interaction effect” (p. 6). The authors further explained that an interaction effect implies that an accommodation benefits students with special needs uniquely, instead of benefiting all students equally. Elliot and Roach (2002) asserted that when accommodations are used correctly they can

“reduce variation in score caused by a disability” (p. 10), essentially allowing the student performance to better reflect student ability and “increasing the validity of the inferences one makes from the test scores of students with disabilities” (p. 17). Thurlow, Elliot & Ysseldyke (2003) claimed that:

Accommodations are provided to students with disabilities “level the playing field” when they take an assessment. Without accommodations for their disabilities, an assessment may not accurately measure what the students know and are able to do. The measure will reflect the disability rather than the students’ knowledge and skills. (p. 30)

Elliot, McKevitt and Kettler, (2002) implied that conclusions drawn from accountability assessments will be valid only when students with special needs are included in the assessments and their test scores are considered in a manner consistent with their regular education peers and their test scores. Elliot, Kratochwill and Schulte (1998) argued that when special education students are excluded from accountability assessments the result is “unrepresentative mean scores and norm distributions” (p. 7). The authors continued their argument for inclusion, with the assertion that excluding students from accountability assessments “reinforces beliefs that students with disabilities cannot do challenging work, and may undermine inclusion efforts for many students” (p. 7).

When implemented appropriately, accommodations have the potential to allow special education students to participate in assessments that they would otherwise not have been able to complete (Elliot et al., 2002; Elliot & Roach, 2002; Thurlow et al., 2003). Research also indicated that accommodations can have a positive impact on the test scores of students with special needs (Elliot & Roach; McKevitt & Elliot, 2001). In addition to impacting student performance, McKevitt and Elliot (2001) reported that special education students who took standardized tests with accommodations felt better about their performance and participation in the assessment. This is significant because some teachers and parents cite test anxiety and fear as reasons for excluding special education students from accountability assessments (Thurlow & Ysseldyke, 2002; Zuckerbrod, 2007).

Mathews (2003) cited assistive technology as an effective resource for accommodating students with special needs. Assistive technology is specifically listed in the Colorado Procedures manual as an accommodation that could benefit special education students (Unit of Student Assessment, 2006). There is a perception in the field of special education that assistive

technology is an important accommodation for some students in classrooms and during the performance of accountability assessments. The next section of this proposal provides background on assistive technology and considers the role that assistive technology plays as an accommodation for accountability assessments.

Assistive Technology

Assistive technology has tremendous potential to improve educational performance of students with disabilities (Curtis, 2005). Assistive technology ranges in complexity from state-of-the-art communication devices costing thousands of dollars, to the inexpensive adaptations made for simple tools of everyday use (Bain, 1993). In recent years, assistive technology has evolved into a commonly used and powerful intervention and accommodation in educational settings. Although assistive technology is described in the Assistive Technology Act of 1998 as technology used by “individuals with disabilities”, it should be noted that some “assistive technology” has also become part of the everyday lives of many people without disabilities. Calculators, remote control devices, voice recognition features in automobiles, the electric toothbrush and even light switches are working testimonies of how people use assistive technology to simplify the performance of daily tasks in ways that were once unimaginable.

Legislation has also affected the role that assistive technology plays in public education. Individuals with Disabilities Education Act (IDEA) required school based professionals to consider a student’s assistive technology needs along with other educational needs (Armstrong & Jones, 1994), thus securing a place for assistive technology in special education as a related service. IDEA has also been used as a legal precedent by families advocating for assistive technology funding from school districts (Inge & Shepherd, 1995).

While legislation served to unlock the doors of public schools for students with disabilities and accompanying assistive technology interventions, the place of assistive technology in schools was really secured by the effectiveness of the intervention and the success of students who use assistive technology (Church & Glennen, 1992; Cook & Hussey, 2002; Franklin, 1991). Assistive technology has been shown to increase the productivity and independence of students with disabilities who attend public schools (Angelo, 1997; Flippo et al., 1995; Male, 1994; Rudnick, 1997; Todis, 1996).

The computer has become a platform for many school-based assistive technology interventions. Computers have affected the way we live, possibly more than any other single piece of technology developed in recent history. Computers have impacted the way people teach and learn across the spectrum from institutions of higher education to preschool classrooms (Butler, 1995; Davis & Shade, 1994; Safford, 1989; Trawick-Smith, 1994). Davis and Shade described the computer as a pervasive educational device with the power “to cut across traditional subjects as a practical and useful tool” (p. 2). Trawick-Smith suggested that computers can be used as a tool which enables students to complete assignments and participate in play activities which encourage creativity and enhance problem solving abilities. The presence of computers in a classroom, however, does not always indicate that the technology is being used to its full extent or as part of assistive technology interventions. The prevalence of computers in classrooms does indicate the potential for computers to be used as part of assistive technology services (Cook & Hussey, 2002; Okoye, 1993). Computers, software and hardware have been specifically designed and adapted to fit the abilities of students with identified disabilities. Such assistive technology can aid in the educational development of students. A classroom computer can easily be utilized as an assistive technology device or transformed into a device which contributes to the inclusion and success of students with disabilities in general education environments.

The potential value of computers and other assistive technology in educational settings is promising, but educators who use assistive technology in schools should follow specific principles of practice to ensure effective intervention. The student, their capacities and the tasks they need to perform should be at the center of all assistive technology services. The physical and cognitive capabilities of students should be identified before any assistive technology intervention is prescribed. In addition, information about the capacities of students should be assessed in the context of meaningful school tasks with which they experiencing performance difficulties. Joy Zabala (1995) identified these critical areas of consideration using the SETT Framework. Zabala developed the acronym SETT to encourage educators to consider:

- The Student and their abilities
- The Environment where the student works
- The Task that the student needs to perform

- The Tools that the student needs to perform the task.

Zabala's framework emphasized initiating assistive technology service with a team approach to assessing the strengths and challenges of a student.

After assessing a student's capacities, the IEP or intervention team should assess the student's ability to use specific devices or assistive technologies (Angelo 1997; Inge & Shepherd, 1995). The cost, size, maintenance, durability, appearance, method of access and the flexibility of assistive technology should be considered. The environment in which assistive technology is used offers specific affordances and challenges which cannot be anticipated by simply considering a student's capacities and the features of specific assistive technology. As a result, assistive technology assessments should be focused on the settings in which the technology will be used and the tasks the student will perform (Angelo, 1997; Flippo et al., 1995; Inge & Shepherd, 1995). Students seldom utilize assistive technology in only one functional setting. The student must function in a variety of environments, moving to and from classrooms, restrooms, lunchrooms, gymnasiums, playgrounds as well as getting to and from school. Using assistive technology to help perform standardized accountability assessments also provides unique challenges to students and staff. In addition, much of the assistance technology used in a school setting is also used by a student at home and in the community. Although school-based assistive technology services should focus primarily on use in instructional settings, the feasibility of using assistive technology in other settings should also be considered (Armstrong & Jones, 1994).

Many researchers have suggested that assistive technology services are best when they are provided by a multidisciplinary team (Angelo, 1997; Bain, 1993; Flippo et al.; Inge & Shepherd 1995; Rudnick, 1997; York, 1999). Assistive technology is a special service which transcends the boundaries of educational disciplines. It is important for IEP team members to consider the student's skills, abilities and capacities, which they are uniquely qualified to assess. In addition, IEP team members must be able to share relevant information, including appropriate assistive technology supports, with other members of a student's IEP team. Like other educational interventions, assistive technology services should not be permitted to stagnate once the technology has been provided to the student. IEP teams must consider issues of educating and preparing the user, the family, and other educational staff on issues related to the operation

and maintenance of technology (Cooke & Hussey, 2002; Sower, 1995). Adequately preparing a student to use assistive technology on accountability assessments is also critical. If a student's functional performance is not improved by the presence of assistive technology, team members must reconsider how, where and why the student is using technology.

Assistive technology can play a key role in improving integration of students with special needs and allowing them to participate and succeed in a variety of educational settings (Browder, et al., 2003; Scherer, 2004). Decisions regarding the use of assistive technology as an accommodation for standardized testing can have significant effects on student performance. Students with disabilities who use accommodations have been shown to improve their test scores (McKevitt & Elliot, 2001). Zhang (2000) conducted research that concluded that technology provides special needs students with the opportunity to greatly improve writing skills and performance. Russell and Plati (2002) focused specifically on using assistive technology to support writing performance on standardized assessments. Their research indicated that simply allowing students to keyboard compositions instead of handwriting work improved their test performance significantly.

In addition to directly improving academic performance, Beukelman and Mirenda (1998) reported that when assistive technology is used appropriately it can lead to improved inclusion for special education students. This is significant because improved access to general curriculum will provide students with special needs more exposure to content specifically covered in accountability assessments and could improve the performance of special education students. Elliot and Roach (2002) claimed that one reason why special education students perform poorly on accountability assessments is because they are not exposed to the same educational content and test preparation as their typically developing peers. Increasing inclusion in regular education setting could help to address this issue.

Although assistive technology has been lauded as a tool with tremendous educational potential, Scherer (2003) warned that it is not a panacea. It should also be noted that assistive technology is sometimes assumed to be an effective accommodation without the support of evidence. McNary, Glasgow and Hicks (2005) provided the following caution: "Frequently, assistive technology devices and programs are touted as highly effective with little research to prove the claim" (p. 95). More research on the subject of assistive technology is needed.

Teacher Attitudes and Knowledge

It should come as no surprise that educators with positive attitudes have been shown to produce superior results in terms of the educational outcomes of their students (Migliorino & Maiden, 2004). In addition to attitudes, Maushak, Kelley & Blodgett (2001) argued that educators must possess adequate knowledge and training to implement effective assistive technology interventions.

Beukelman and Miranda (1998) developed the Participation Model, a theoretical guide for providing students with assistive technology services. The Participation Model suggested that students who use assistive technology will be better integrated into regular education experiences if an IEP team considers five issues that typically affect inclusion. Policies must be changed to support inclusion. IEP teams must possess adequate knowledge, skills and appropriate attitudes. Finally, common methods of practice employed by educators must change. This research project has collected and analyzed data from members of IEP teams on each of the five areas outlined in the Participation Model, while focusing primarily on teacher knowledge and attitudes related to using assistive technology as an accommodation on accountability assessments. If assistive technology can benefit special needs student performance on accountability assessments, identifying barriers to the successful use of assistive technology accommodations is critical.

Although state and local policies have been changed to allow special education students better access to assistive technology as an accommodation on accountability assessments, other barriers appear to be impeding the use of technology in these circumstances. Following the structure of the *Participation Model*, existing barriers to effective use of assistive technology by special education students can be grouped into four additional categories:

- Knowledge
- Attitudes
- Skills
- Practice

McKevitt and Elliot (2001) conducted research that found some (but not all) teachers recognize the importance of including special education students in accountability assessments. The same group of teachers recognized that accommodations could play an important role in supporting the participation of special education students in these assessments. Teachers

however, also had reservations about whether or not it was appropriate to use accommodations on standardized assessments. Some teachers voiced concern that allowing special education students to use accommodations was not fair to other students. In addition, some teachers were concerned that using accommodations would invalidate test scores. Thurlow, Elliot and Ysseldyke (2003) reported that educators were more understanding and accepting of certain kinds of accommodations than they were of others. The researchers stated:

Little controversy surrounds accommodations for sensory and physical disabilities. In part, this is due to the visibility of these disabilities. The public can easily see that these disabilities exist and that without some adjustments, those with sensory and physical disabilities will not be able to participate in the assessment at all, or if they can participate, it is likely to be less meaningful without accommodations than with them. (...) The controversy generally arises for those accommodations that are used with less visible disabilities, such as learning disabilities and emotional disabilities. Because these disabilities may be directly related to the content or procedures of assessments, their use becomes controversial. For example, a reading disability is directly related to the content of reading tests and tests that rely on reading skills to test other content areas. (p. 32)

Many special education students receive services for “learning disabilities,” which may be less obvious to the general educators than “physical disabilities”. Thurlow, Elliot and Ysseldyke (2003) implied that educators are more likely to have a positive attitude about using accommodations with students, when they can easily recognize the student’s disability. Gajria, Salend, and Hemrick (1994) reported that general education teachers have conflicting attitudes about including students with special needs in “mainstream” testing. Siskind (1993) reported that general education teachers struggle with choosing appropriate accommodations and modifications for testing students with special needs.

Although many attitudes concerning the abilities of special education students can be detrimental to their education, the attitude that probably warrants the most scrutiny is that of low expectations (Thurlow et al., 2003). It is difficult for special education students to achieve at optimum levels if they are not given the opportunity to learn with their typical peers and demonstrate what they know.

In terms of skills, many members of IEP teams do not possess adequate training on how to use technology with special needs students (Alper & Raharinirina, 2006; Burgstahler 2003;

York, 1999). According to Bargerhuff and Turner (2006) inadequate teacher training is an issue that must be addressed to achieve effective assistive technology use. In addition to the skills necessary to operate equipment, IEP teams must possess the skills necessary to assess the needs and support the performance of special education students who use assistive technology (Cook & Hussey, 2002; Youness, 2004).

On the related subject of knowledge, Thurlow, Elliot and Ysseldyke (2003) warned against assuming that even the diverse members of an IEP team possess all of the knowledge necessary to make good decisions about accommodations for special education students. The researchers cautioned, “do not assume that IEP teams understand and embrace inclusive assessment, accountability and issues for students with disabilities” (p. 146). Once they have acquired adequate knowledge on the subject of accommodation, members of IEP teams must make sure to share this knowledge with educational staff throughout the school. “Classroom teachers and other personnel need to understand why it is important for students with disabilities to participate in district and state assessments. They also need to understand accommodations and their appropriateness” (Thurlow, et al., p. 159).

In terms of changing practice, research suggests that there are specific steps that IEP teams can take to improve their work with special education students on issues of accommodations and participation in accountability assessments. Demonstrating the success of special education students in general education environments is essential and assistive technology is one intervention that can showcase the abilities and knowledge of special education student in general education settings (Kent-Walsh & Light, 2003; Rudnik, 1997; Sonnenmeir, McSheehan, & Jorgenson (2005). Special education students must also be given the opportunity to participate in accountability assessments (Elliot et al., 1998; McKevitt & Elliot, 2001). Even in situations where an IEP team has reservations concerning the inclusions of a special needs student in accountability assessments, Thurlow, Elliot and Ysseldyke (2003) offered this advice:

When in doubt, include and accommodate students. For these and many other reasons, you, the IEP team and your district must be prepared to educate those you work with on the purpose of specific assessment accommodations and inclusive accountability systems. (p. 166)

The same authors encouraged IEP teams to prepare special education students for assessments by providing them with experience and guidance on taking tests. Elliot, Thomas and Schulte (1998) suggested that IEP teams adopt methods of “systematic consideration of accommodations from the beginning of the student’s educational career (best), or from the onset of IEP services” (p. 34). Encouraging students to develop an awareness of their own needs in terms of accommodations and assistive technology use is also essential. Thurlow et al. (2003) recommended that IEP teams train special education students to be their own advocates in terms of articulating their special needs and requesting accommodations. Thurlow and his colleagues observed, “it is important to work with older students so that they can begin to identify their own needs related to assessments. When they enter postsecondary training institutions or employment, they will need to advocate for themselves” (p.166). Fostering the development of self-advocacy in special education students is not an easy task. Gaining a better understanding of what educators know and believe about this and other processes related to assistive technology, accommodations and accountability assessments is critical.

Some new teachers have attended schools rich with educational technology. Many more experienced teachers attended school and earned their degrees in an age before the advent of computer-based technology in schools. Although newer teachers may have the benefit of life-long exposure to technology, research indicates that more experienced teachers can be successful integrating technology in their classrooms (Fletcher, 2006). Research by Russell, Bebell, O’Dwyer and O’Connor (2003) concluded that there are significant differences between the attitudes and abilities of younger and older teachers on the subject of using technology, but the differences include strengths and challenges for both demographics. The researchers reported that, “Although new teachers reported higher levels of comfort with technology and use it more for preparation, more experienced teachers report using technology more often in the classroom when delivering instruction or having students engage in learning activities” (p. 297). Analyzing differences between the attitudes of newer and more experienced educators is justified. The researcher has chosen to use, pentadic analysis, a communication theory

developed by Kenneth Burke (1945) to analyze qualitative data in order to gain a better understanding of special educators' knowledge and attitudes².

Theoretical Approach to the Research: Burke's Pentad

In *A Grammar of Motives*, Kenneth Burke (1945) introduced his theory of Dramatism. In short, Dramatism is a method of communication analysis that uses terminology derived from the language of "drama" to describe and analyze human motivation. According to Foss, (2002) "*Dramatism* is the label Burke gave to the study of human motivation through terms derived from the study of drama," (p. 455). Burke believed that *Dramatism* provided a theoretical language that helped him identify and analyze, "what is involved when we say what people are doing and why they are doing it" (1945, p. xv). Burke offered a more detailed description of Dramatism, in *On Symbols and Society* (1989).

Dramatism is a method of analysis and corresponding critique of terminology designed to show that the most direct route to the study of human relations and human motives is via a methodical inquiry into cycles or clusters of terms and their functions. (p. 135)

Burke developed the pentad as a sub-theory of Dramatism and a method for identifying significant "clusters of terms". With the development of the pentad, Burke identified specific components in a communication event that he considered to be especially relevant. These five basic elements of a communication event are *act*, *scene*, *agent*, *agency* and *purpose*. In *On Symbols in Society* (1989) editor Joseph Gusfield described each of the elements of the pentad as follows:

- *Act*: What has taken place?
- *Scene*: What was the context in which the event occurred?
- *Agent*: Who was involved in the performance of the act?
- *Agency*: How was the act performed?
- *Purpose*: Why was the act performed?

Burke suggested that these terms provide an appropriate focus for study of the language that is used to describe these elements. Upon analyzing a communication event, a theorist who uses pentadic analysis identifies and describes each of the analytical units (e.g., *act*, *agent*, *agency*,

² The researcher has designed specific constructs to represent "knowledge" and "attitudes". These constructs will be described in detail in Chapter 3.

scene and *purpose*). Identifying and describing the elements of the pentad is in itself an analytical act, but Burke suggested at least two other investigative steps to better understand a person's motivation for behavior. After identifying the elements, the second step in the analysis involves identifying a dominant term in the language of the person's communication which is being studied (Foss, 2002). The researcher identified a dominant element using methods such as the frequency of references to that element of the pentad and the status of the element evident in the language of the interview participant. For example, if an interview participant repeatedly refers to the reason behind the actions they are describing, then *purpose* would most likely be the dominant element in that communication event. Identifying the dominant element sheds light on what research participants value and provides the researcher with a focus if they wish to effect change in the thinking or actions of the participants.

In addition to identifying and exploring the dominant term, Burke also recommended a comparative analysis of terms he called "ratios". Foss (2002) described ratios as, "the pairing of two elements in the pentad in order to discover the relationship between them and the effect that each has on the other" (p. 460). Burke suggested that ratios can help to determine a dominant element in the pentad. For example, if an interview participant does not appear to understand the *purpose* of using accommodations, the researcher conducting analysis may employ *ratios* in an attempt to identify the source of this misunderstanding. If the researcher notices that interview participant consistently fails to identify key IEP team members as *agents* when describing this event, then the researcher could postulate that the source of the misconception could be due to an understaffed IEP team (e.g., the absence of a team member who is knowledgeable about accommodations).

It should be noted that although Burke was a communication theorist and the pentad typically is used to analyze communication. Burke believed that the language people use to describe behavior and related decision making is significant. Burke assumed that, "language use constitutes action, not motion" (Foss, 2002, p. 455). In other words, the language that individuals use to describe their actions and decisions is complex and symbolic. The language that special educators use to describe the use of assistive technology as an accommodation on accountability assessments reflects the way that they conceptualize and make sense of this process. Their descriptions also provide insight into educator attitudes, knowledge and related actions on this complex subject.

In addition to the five traditional elements of the pentad, Burke sometimes included a sixth element in communication events that he referred to as “attitude”. Foss (2002) explained that “attitude”, in this case, designates the manner in which particular means are employed” (p. 457). Burke chose not to modify his original pentad, “but saw attitude as part of agent” (Foss, p. 457). Although Burke proposed the pentad as providing units of analysis, he obviously found value in considering other elements that are uncovered during communication analysis.

Burke outlined a clear process for performing Dramatistic analysis using the pentad. Foss described this process as first creating research questions, second, selecting units of analysis, third analyzing the communication and finally writing a critical essay or analysis. Foss reported that a critical essay includes five major components:

- (1) an introduction in which the research question, its contribution to rhetorical theory, and its significance are discussed; (2) description of the artifact and its context; (3) description of the unit of analysis, the pentadic terms; (4) report of the findings of the analysis, in which the critic identifies the five pentadic terms and suggests which one is dominant; and (5) discussion of the contribution the analysis makes to answering the research question. (p. 462)

Burke and his pentad are well respected. Robert Wess (1996) described Burke as one of the most important communication theorists of the twentieth century. Sonja Foss (2002) claimed that the work and thinking of Burke has made “significant contributions to how and why human beings use rhetoric and to what effect” (p. 455). In recognition of Burke’s academic contributions, Southwell (1987) asserted “Most of what has occurred in the explosive development of critical theory in recent decades has been anticipated and often quite fully developed in the work of one man, Kenneth Burke” (p.1). Murray (2002) proclaimed that “Kenneth Burke’s contribution to rhetorical theory and criticism is undeniably profound and arguably the most significant since Aristotle first systematized the discipline more than two millennia ago” (p. 1).

Although Burke is frequently described as a rhetorical theorist, Kennedy (1998) argued that Burke’s theories are relevant in a variety of contexts. Crusius (1999) also supports the interdisciplinary ubiquity of Burke, “His influence on most fields in the humanities and social sciences is a matter of record” (p. 1). In the introduction to *On Symbols in Society*, Joseph Gusfield claimed that “Burke necessarily disdains the conventional fences that bound one

discipline from another and the humanities from the social sciences” (p. 2). Burke’s methods of analysis are frequently used to conduct research in the field of education. In addition, Burke published in educational journals and wrote extensively on the subject of education (Wess, 1996).

Burke’s pentad seems especially well suited for the analysis of communication related to the use of assistive technology on accountability assessments. The American Educational Research Association (AERA) described a method of categorizing or coding data that is remarkably similar to the structure of Burke’s pentad. The AERA (2006) suggested that classifying data by person, action, activity, event and time period can, “help the researcher identify patterns within the data” (p. 37). The similarity between the AERA suggestions and the elements of Burke’s pentad are unmistakable.

AERA guidelines also speak to the issue of selecting appropriate analytical tools for qualitative research. Foremost, the AERA guidelines deemphasize a need for standards that preclude specific approaches to research, choosing instead to emphasize “transparency” of process and a focus on the merits of the resulting research (AERA, 2006). There is an intense emphasis in the field of education to improve the quality of formal and informal research. NCLB (2002) has set new standards for data driven decision making in the field of education. Although value of qualitative research is typically not judged using empirical methods, the researcher was able to find a meta-analysis of research that employed Burke’s Dramatism in applied communication research. Cragan and Shields (1995) “provided a review of more than 70 BDT-base [Burke’s Dramatism Theory] applied communication studies” (p. 233). The researchers reported that they were able to “refute major criticisms” and reaffirmed the effectiveness and legitimacy of using Dramatism and pentadic analysis as a method of qualitative research.

Although his work pre-dates the Internet and the advent of the personal computer, Burke recognized the significant role that technology plays in society. In, *On Symbols in Society* Burke made several statements about technology that demonstrated his contemplation of this broad topic. Burke said,

It is in its becoming that technology most fully represents the human agent, since his inventing of it is an *act*. In its state of being (or perhaps we might better say its state of having become) it can change from a purpose into a problem. And surely much of the

anguish in the modern world derives from the paradoxical fact that machinery, as the embodiment of rationality in its most rational moments, has in effect translated rationality itself from the realm of ideal aims to the realm of material requirements. (p. 169)

Assistive technology is used in public schools to provide educators and students a powerful tool for improving the efficiency and effectiveness of task performance, but this research project is born out of the dilemma identified by Burke: the “material requirements” involved with how to best use this technology tool can be perplexing.

Burke highlighted an issue that is an ongoing dilemma concerning the question of who will be charged with administering new developments in technology as they arise. Burke was not referring specifically to assistive technology in the following statement, but this educational intervention which conveniently and notoriously belongs to no specific special education discipline appears to sit in the middle of Burkes’ pronouncement. Burke observed,

that the constantly changing methods of technology are continually making new cuts into the bias across traditional classifications, so that it would be hard for anyone to say for a certainty whether a certain new material should be applied by masons, plasterers, and so with a great number of products and processes. (p. 170)

We should not be surprised that there is ambiguity in the elements of the pentad related to decisions related to using assistive technology as an accommodation on accountability assessments. In *On Symbols in Society*, Editor Joseph Gusfield pointed out that the goal of content analysis, according to Burke, is not discovery of a singular reality. Instead when employing Burke’s principles, “We must recognize that no one designation, no one solution, no one answer is final, encompassing, or alternate. The dialogue of all voices is itself the answer and not a road to a consensus of voices around a unifying conclusion,” (p. 27).

This process of “dialogue” is intricate, but can be better understood using the five elements of pentadic analysis. State and federal regulations essentially offer policy directives intended to guide the decision making and process of determining when and how a student will use assistive technology on accountability assessments. These regulations also describe how educators should make decisions on this subject. CSAP and special education procedures outlined by the state of Colorado specifically address assistive technology accommodations (*act*) or process, where the process should occur (*scene*), who should participate in the process (*agent(s)*), the method for performing the actions (*agency*) and the reason why assistive

technology should be used as an accommodation (*purpose*). The *Procedures Manual* for The Colorado Student Assessment Program identified the elements of their pentad on the subject of using assistive technology as an accommodation on accountability assessments in the section on accommodations. According to the manual, the *act*, is an extension of a student’s “educational plan, which will guide the decisions the team then makes regarding accommodations allowed during CSAP administration” (Unit of Student Assessment 2006, p.45). For special education students, this plan is an IEP. For general education students who use accommodations, the plan is a “504 plan, ILP (Individual Literacy Plan), English Language Acquisition Plan or other district/school developed plan that guides student instruction and assessments” (p. 46). The *agent*, according to the CDE is “the educational team, including the teacher who is primarily responsible for delivering instruction in the content area being assessed” (p. 45). The *scene*, or where the decision to use assistive technology is made, is not overtly stated in the manual, but references to the role of the IEP and other educational plans makes it clear that the decision for accommodations is officially made at these respective meetings. Specific sections on student IEPs require the team to address and document these decisions at IEP meetings. The *agency*, or the means for implementing the decision to use assistive technology as an accommodation on accountability assessments should be outlined in the student’s educational plan. According to the manual, “any accommodation must be adequately documented in a student’s individual education plan – IEP, 504, ILP or Advanced Learning Plan,” (p.45). Later in the manual, several alternative methods of documenting accommodations are mentioned, but the aforementioned methods are primary. The *purpose* of using accommodations is described as providing “a student with access to comprehensible information and an equal opportunity to demonstrate knowledge and skills” (p. 44). Table 2.1 summarizes the elements of Burke’s pentad according to CDE regulations and guidelines:

Table 2.1 Pentadic Elements According to CDE Manual

	Act- Process	Agent- Who	Scene- Where	Agency- Means	Purpose- Why
Pentadic Elements According to CDE Manual	Educational Plan (IEP, 504, ILP)	Educational Team	Educational Team Meeting	Education Plan Documentation	Equal access opportunity, demonstrate knowledge

This set of elements represents a standard of knowledge and procedure which the researcher has used to compare the respective sets of elements from interview participants in this project. The goal of publishing a procedural manual is to set a standard for practice and foster compliance. Comparing CDE standards to the pentadic elements resulting from participant interviews provides a unique opportunity to compare contrast motives of CDE and educators working in the field.

Summary of Literature Review

Legislation has had a dramatic impact on special education. Most recently NCLB has resulted in an increased focus on accountability measures for all students in all public schools. Including students with special needs in accountability assessments is one focus of NCLB. One way to increase the meaningful participation of special education students in accountability assessments is to provide them with appropriate accommodations. Assistive technology is an accommodation that has potential to impact the performance of special education students on accountability assessments. Gaining a better understanding of the attitudes and knowledge of special educators is one way to determine how and why assistive technology is or is not being used in this capacity. Using pentadic analysis along with basic statistical analysis to compare the knowledge and attitude of special educators has the potential to provide insight into the complex relationship between accountability assessments, assistive technology and the education of special needs students. Chapter Three describes the specific methodology that was used for conducting this research.

CHAPTER 3 - Research Methods

This study used methods of qualitative and quantitative inquiry. A brief review of educational research journals provides evidence that both qualitative and quantitative research methods are employed to explore issues in the field of education. To illustrate this claim, an issue of *The Journal of Research on Technology in Education*, 37(4), chosen randomly from the author's collection of educational journals featured two articles that used primarily quantitative methods and five journal articles that used qualitative methods of inquiry. Using a combination of qualitative and quantitative methods in educational research is also common practice.

Gliner and Morgan (1996) stated that using a combination of qualitative and quantitative methods is legitimate and encouraged in social science research. The authors asserted "Often the two approaches to research are used together in one research article" (p. 12). Gliner and Morgan illustrate how the use of qualitative and quantitative methods can be complimentary. The authors referenced research in which quantitative information gathered from survey participants was used to select appropriate participants for in-depth interviews.

Although their research into the effects of accommodations on reading test scores was primarily quantitative in nature, McKevitt and Elliot (2001) asserted that qualitative research can generate useful data on the subject of using accommodations on standardized tests. Some view quantitative methods as a more legitimate form of academic research, but Creswell (1998) stated that "qualitative inquiry represents a legitimate mode of social and human science exploration" (p. 9). In addition, Creswell reported that qualitative methods of inquiry are well suited for researchers who wish to gather information in a natural setting. Qualitative methods are well suited for gaining a better understanding of the environment and actors where he or she works. Creswell's endorsement of qualitative research methods comes with conditions. Creswell stated, "Those conducting qualitative studies need to consider the differences among approaches to qualitative research. When comparisons and distinctions among qualitative approaches are made clear, researchers can design more rigorous and sophisticated studies," (p. 4).

Research Questions

Quantitative methods were used to gather data and complete analysis in order answer the following questions:

- 1) Is there a significant difference in the knowledge possessed by less experienced and more experienced educators on the subject of assistive technology and accommodations on the CSAP assessments?**
- 2) Is there a significant difference in the attitudes possessed by less experienced and more experienced educators on the subject of assistive technology and accommodations on the CSAP assessments?**
- 3) Is there a significant difference in the knowledge possessed by special service providers and special education teachers on the subject of assistive technology and accommodations on the CSAP assessments?**
- 4) Is there a significant difference in the attitudes possessed by special service providers and special education teachers on the subject of assistive technology and accommodations on the CSAP assessments?**

Although the researcher's answers to the four quantitative questions result from statistical analysis of quantitative data, data and analysis from qualitative components of this research also contributed to these answers.

Qualitative methods were used to gather data and complete analysis in order answer the following question:

- 5) How do members of IEP teams describe the process of using assistive technology as an accommodation on accountability assessments?**

Although the researcher relied primarily on qualitative data and analysis to answer this question, simple descriptive statistical analysis of quantitative data contributes to elements of this answer.

Quantitative Design

The initial phase of this research involved data collection using a 20 question Likert scale, followed by several short answer questions related to demographic data (see Appendix A). Likert scales are well respected and commonly used in survey research. According to Rea and Parker (1997), “the Likert scale works particularly well in the context of a series of questions that seek to elicit attitudinal information,” (p. 60). This survey was distributed to all certified employees of the South Central Board of Cooperative Educational Services (BOCES) (32 individuals) and special education staff from school districts which receive services from the South Central BOCES (57 individuals). The researcher only included individuals who worked directly with special education students who are required to participate in Colorado State Assessment Program (CSAP) testing. Special education teachers and administrators who work exclusively with students who do not participate in CSAP testing were not included in this survey. Because the total population of special educators and therapists linked to the South Central BOCES who met this criterion was relatively small, no sampling was required.

Eighty-nine surveys were distributed in all. Of the thirty-two surveys that were distributed to BOCES employees, thirty-one surveys (96.8%) were returned. Twenty-six of the surveys distributed to BOCES staff were hand delivered by the researcher and returned via post with the self-addressed stamped envelop that was included with the survey. Six of the surveys distributed to BOCES employees were sent and returned through interoffice mail. In addition to the survey and the self addressed-stamped return envelop, each participant was provided with a brief letter describing the purpose of the project, contact information for the principal investigator and consent for participation in the project. Of the 57 surveys that were distributed to school district staff, 43 surveys (75.4%) were returned. The researcher used three methods for distributing surveys to district participants. Forty-one of the surveys were hand-delivered by the researcher at district schools where he works on a regular basis. Eleven of the surveys were hand delivered by a colleague, to participants working at schools in the Eastern Satellite of the BOCES where the researcher rarely works. Five surveys were distributed via the postal service to administrators and educators at schools in districts where the researcher rarely works. Individuals who returned a completed survey were included in a random drawing in which the researcher awarded five \$25 gift certificates to Barnes and Noble Book Store in a random drawing.

Data Collection and Database

The researcher began to distribute surveys at the end of September of 2007, after receiving approval from the Internal Review Board at Kansas State University (Appendix B). Due to the methods of survey distribution, it took several weeks for the researcher to distribute all surveys to prospective participants. Most surveys were returned promptly, but the researcher allowed four weeks before contacting participants who had not returned surveys using phone calls, written notes and e mail reminders. The researcher completed survey data collection on December 15, 2007 and began entering survey information into an EXCEL database at that time.

The researcher chose EXCEL as his database for reasons of convenience and compatibility with other programs used for statistical analysis. The researcher was also able to use EXCEL to conduct simple data analysis. The researcher identified participants in the EXCEL database by a code which was assigned to their initial survey. Later, the researcher recoded participants according to BOCES or district grouping. Some survey data had to be transposed according to the wording of questions in order to make all scores of “5” equivalent to “strong attitude or knowledge” scores and scores of “1” equivalent to “poor attitude or knowledge”. The data base also contains qualitative and demographic information about each participant that was used for qualitative and descriptive statistical analysis. The researcher will maintain this database in case additional analysis of data is requested or if he chooses to conduct additional analysis for academic publications.

Advantages and Disadvantages of Using Surveys

Surveys are common tool for data collection; however surveys pose advantages and disadvantages when compared to other methods of data collection. Gathering data with surveys provided the researcher with the following advantages:

- Surveys allowed the researcher to gather information from a large number of participants on a variety of subjects.
- Surveys produced data that were analyzed in terms of specific participants and in terms of groups which participants comprised.
- The surveys were designed to be completed in a short amount of time which encouraged a high rate of participation by respondents.

- Surveys are a common method of data collection and familiar to most respondents which encourages high rates of participation (Cresswell, 1998).

The researcher used surveys to gather data for several additional reasons. The South Central BOCES provides services to school districts that include approximately 10,000 square miles in area and hundreds of staff working in dozens of schools. Surveys allowed the researcher to gather information efficiently from a large number of participants who worked in large geographic region.

The researcher recognized that survey data have shortcomings. Research data gathered through surveys can be of limited use for several reasons including:

- Surveys can limit the depth and breadth of information gathered from respondents.
- Surveys rarely allow for unique answers from respondents, but instead require them to choose from a predetermined set of answers.
- Survey questions can be leading or confusing to respondents and rarely allow for clarification from the researcher.

The researcher determined that the benefits of using surveys outweighed the shortcomings. In addition, the qualitative methods of data collection (in-depth interviews) provided the researcher with a mechanism for increasing the depth and breadth of information gathered from participants and offset some disadvantages of using surveys.

Description of Survey Participants

The primary purpose of the surveys was to gather information about the attitudes and knowledge of participants related to the use of assistive technology as an accommodation on accountability assessments. The researcher also collected demographic information and participant factors that he considered to be relevant. Significant demographic information about participants is listed in subsequent tables. The researcher was interested in knowing how recently participants had taken a college course. When designing this survey, he had hoped that this information would have helped to designate groups for comparison. Based on literature reviewed for this project, the researcher posited that participants who had recently taken college courses may demonstrate better attitude and knowledge scores than their peers who had not

recently completed college courses. Eighty-one percent of participants reported that they had completed a college course in the last five years, making the creation groups based on this variable infeasible. Most of the individuals who had not recently taken a course were para professionals who typically have less education and training than teachers, administrators and service providers. Forming categorical groups based on this variable was abandoned but the data were still relevant. Table 3.1 summarizes data related to how recently participants had completed a college course.

Table 3.1 Date of Most Recent College Course

Question: When did you last take a college course?	Responses	Percentage of participants
2007	32	43.2%
2006	10	13.5%
2005	10	13.5%
2004	4	5.4%
2003	4	5.4%
2002	2	2.7%
2001	2	2.7%
2000	1	1.4%
1999	2	2.7%
Prior to 1999	7	9.5%
	n = 74	100%

Although the researcher did not formally analyze this variable, he collected information from participants concerning earned college degrees. This data highlighted similarities and differences in the education of participants based on the organization for which they worked. The school district employees had a higher percentage of employees with advanced degrees than the BOCES participants (67.4 % versus 54.8%), but a significant percentage of district participants had not earned a four year degree (18.6 %). Additional information on earned degrees can be found in Table 3.2.

Table 3.2 Highest Degree Earned by Participants

Degree Earned	District Number	Percentage	BOCES	Percentage	Total for All Participants
PhD	1	2.3 %	0	0	1
Masters	28	65.1 %	17	54.8 %	45
Bachelors	6	14.0 %	14	45.2 %	20
Associates	5	11.6 %	0	0	5
None	3	7.0 %	0	0	3

Survey participants were asked to list their “job title”. Responses were grouped into 15 categories. District employees were comprised primarily of special education teachers, administrators and paraeducators. Therapists comprised the largest percentage of BOCES participants. It should be noted that not all therapy disciplines receive training on working in educational settings as part of their degree program. For example, the researcher was not required to take a single course in education in order to complete his Masters of Science in occupational therapy. Special education teachers comprised the largest percentage of participants (31.1%) followed by administrators (14.9%) and paraeducators (10.8%). Additional information concerning the position of participants can be found in Table 3.3.

Table 3.3 Position of Participants

Position	Number of Participants	Percentage of total
Special Education Teacher	23	31.1 %
Administrator	11	14.9 %
Para Educator	8	10.8 %
Speech Therapist	7	9.5%
Speech Therapist Assistant	7	9.5 %
School Psychologist	5	6.9%
Physical Therapist	3	4.1 %
Social Worker	2	2.7 %
Occupational Therapist	2	2.7 %
General Education Teacher	1	1.4 %
Transition Coordinator	1	1.4 %
School Nurse	1	1.4 %
Vision Teacher	1	1.4 %
Early Childhood Specialist	1	1.4 %
School Counselor	1	1.4 %

The researcher asked survey participants to list their experience working as an educator with the question, “How many years have you been working in the field of education?” Participants listed experience ranging from one to 49 years of experience. On average, district employees, reported more years of experience working in the field of education (17.67 years for district employees versus 11.06 years for BOCES employees). Specific data gathered from this question are listed in the Table 3.4.

Table 3.4 Participant Work Experience

Groups	Mean years of Experience	Range of years of experience in sample
BOCES Employees	11.06 years	1-30 years
District Employees	17.67 years	4-49 years
All Participants	14.90 years	1-49 years

Data in the Table 3.4 indicated that school district employees have worked, on average more than six years longer in the field of education. To better understand how years of work experience is distributed among District and BOCES employees, the researcher has included Table 3.5 which offers a comparison of years of work experience between groups.

Table 3.5 Participant Work Experience Grouped in 5 year Intervals

Years of work experience (percentage)	0-5 years	6-10 years	11-15 years	16-20 years	21 years or more
BOCES Employees	13 (41.9 %)	5 (16.1 %)	1 (3.2 %)	6 (19.4 %)	6 (19.4 %)
District Employees	4 (9.3 %)	9 (20.9 %)	6 (14.0 %)	8 (18.6 %)	16 (37.2 %)
Total	17 (23.0 %)	14 (18.9 %)	7 (9.5 %)	14 (18.9 %)	22 (29.7 %)

Of significant interest to the researcher is the high percentage of BOCES employees who are new to the field of education. Almost 42 % of BOCES employees have worked five years or less in schools, while less than 10% of district employees fall into the same category of limited experience. On the other end of the experience spectrum, more than 55 % of district employees have worked more than 15 years in education while approximately 39% of BOCES employees have the same level of work experience in the field of education.

Quantitative Methods

Data from the surveys were analyzed using simple descriptive and analytical and statistical methods. The purpose of the primary analysis was to determine whether there were significant differences between groups in terms of attitude and knowledge on the subject of using assistive technology as an accommodation on accountability assessments. Fink and Kosecoff (1998) described several statistical methods suitable for identifying differences including the Mann-Whitney U, t-Tests and the analysis of variance (ANOVA). The Mann-Whitney U can be used to compare groups with relatively small populations, but is considered to be a “weaker” method of statistical analysis by some researchers (Keppel & Wickens, 2004). T-Tests are considered to be a “stronger” statistical analysis than a Mann-Whitney U, but require larger populations to insure the validity of analysis. An ANOVA is used to identify and measure sources of variation in sets of data (Kachigan, 1986).

The researcher initially chose to use t-Tests to compare the means scores of questions, however after consulting with three professors who teach statistical methods the researcher modified the quantitative methods. In addition to consulting with individual quantitative experts, the researcher used the Statistics Lab at Kansas State University for advice and to perform the actual data analysis.

The survey design included 10 items intended to measure the construct of assistive technology knowledge, and 10 items intended to measure the construct of attitude related to the use of assistive technology. The statistical experts advised, and the researcher was more interested in, considering each construct as a whole, rather than examining or comparing individual questions. When faced with the choice between running multiple t-tests comparing single questions on survey data between groups, Hopkins (2007) stated, “a more powerful approach is to analyze all the data in one go,” (T-test and One-Way ANOVA, ¶2). In addition,

t-Tests require “normal distribution” among populations to guarantee validity. Data generated from Likert scales are not likely to be normally distributed, especially with categorical grouping, therefore analysis using t-test statistics may not be valid (L. Murray, personal communication, 2-12-2008)

“Years of work experience” in the field of education is a continuous variable; a variable that represented “variation in amount” (Keppel & Wickens, 2004). Treating “years of experience” as a categorical variable by forming discrete groups would have resulted in an artificial dichotomy. (For example, if the researcher would have taken the mean years of experience for the entire population of participants (approximately 15 years) and created two groups for statistical comparison.) A “less experienced” group could have been comprised of participants with 0-15 years of experience and a group of “more experienced” participants could have been formed by participants with more than 15 years of experience. There is no reason, however, why a participant with 15 years of experience would have more in common with a member of their group with one year of experience than they would with a member from the “more experienced” group who reported 16 years of work experience.

In this study the groups were categorical in nature, BOCES and school district employees. The staff at the KSU statistics lab advised the researcher to develop a “dummy variable” for group affiliation and perform a backward elimination regression analysis. According to Kachigan (1986) a dummy variable, “is created by converting a given level of a qualitative variable into a binary variable; i.e., the presence (call it 1) or absence (call it 0) of the characteristic” (p. 21). Creating a dummy variable allowed the researcher to subject “qualitative variable to quantitative analyses” (Kachigan, p. 22). By creating a dummy variable the researcher essentially eliminated statistical groupings and was able to perform a backward elimination regression analysis. Regression analysis was used to determine if a relationship existed between group affiliation (BOCES vs. district), years of work experience and survey scores.

Kachigan (1986) reported that analysis of variance is an effective statistical method for describing the relationship between two variables, whereas regression analysis is used to describe the “nature” of relationships. Kachigan described analysis of variance as a relatively simple “curve fitting technique” used to determine the similarity between statistical models. In contrast, Kachigan described the object of regression analysis as four-fold:

- 1) Determine whether a relationship exists between variables
- 2) Describe the nature of the relationship
- 3) Assess the degree of accuracy of the description
- 4) Assess the relative importance of the variables in multiple step analyses

In addition, a backward elimination regression analysis considers all of the variables in first step of analysis, which can provide the researcher with information about how these variables combine to impact the dependent variable (test scores). In this instance, backward elimination regression analysis, treating group affiliation as a dummy variable was determined to be the most appropriate statistical design. The analysis started with a model that contained an intercept variable, the dummy variable for group affiliation, the predictor variable (X =years of experience) and the “dummy* X ” which represented the interaction of group by years of experience. Backward elimination regression was performed on that model.

The specific data analysis was conducted by a graduate student and supervising faculty in the department of Statistics at the Kansas State University Statistics Lab using a program called Statistical Analysis Software (SAS). The researcher provided the individuals at the KSU lab with a modified version of his EXCEL database and collaborated with lab staff at all stages of the analysis. The researcher chose this mechanism for data analysis for two reasons. The researcher has taken several statistics and quantitative research methods classes, but has never taken a course that required the use of a computer-based program for analysis. In addition, at the time that he was completing his project, the researcher was living and working in rural Colorado and did not have access to a program that would enable him to independently perform this method of quantitative analysis. It is the opinion of the researcher that collaborating with the Kansas State University Statistics lab has improved the quality of the statistical calculations and resulting analysis. Quantitative data and analysis are presented in Chapter 4.

Qualitative Design

Lindlof and Taylor (2002) claimed that in some instances qualitative methods are more suitable for social science research than quantitative methods. Specifically, qualitative methods should be utilized when the research is “inductive” inquiry intended to explore, rather than

confirm. Lindlof and Taylor also claimed that qualitative methods are appropriate for “natural inquiry”. These researchers reported that naturalistic inquiry can involve several methods of data collection including observation, interviews and artifact analysis. Lindlof and Taylor proposed that well designed qualitative research should combine “different techniques to compensate for the limitations of each individual technique” (2002, p. 15).

Creswell (1998) also recommended qualitative methods of inquiry when the researcher is working in the role of an “active learner” (p. 18) as opposed to an expert. The researcher better fits the description of an active learner on the issue of gathering information concerning educator attitudes and knowledge related to assistive technology and accommodations on accountability assessments. The researcher will utilize information gathered from both surveys and interviews to improve the quality of assistive technology services in the South Central BOCES, with specific focus on encouraging the use of assistive technology as an accommodation for the performance of class work and on standardized assessments when appropriate.

This qualitative design best fits the tradition of “case study”. Creswell (1998) emphasized that a case study is not limited to a single individual. He described a case study as, “an exploration of a ‘bounded system’ or a case (or multiple cases) over time through detailed, in-depth data collection involving multiple sources of information rich in context” (p. 61). Creswell added that case studies are often bound by time and/or place. This study attempted to identify participant knowledge and attitudes concerning a specific aspect (assistive technology accommodations) of a specific phenomenon (accountability assessments) in a specific region of Colorado (the South Central BOCES). Under the general heading of “case study”, the researcher has used a form of content analysis-pentadic analysis-developed by Kenneth Burke (1945) to analyze data collected during in-depth interviews.

Qualitative Methods

To complement data gathered from surveys, the researcher used in-depth interviews to gather data of greater breadth and depth. Forty-five of the seventy-three participants who completed the survey indicated that they would be willing to participate in the interview portion of this project. The researcher selected ten individuals for this portion of the project. Five of those chosen were employed with the South Central BOCES and five of the interview

participants were employed by local schools districts. Table 3.6 codes and designates information about interview participants.

The researcher used directed sampling to choose participants with the intent of recruiting interview subjects who reflected a broad range of experience in terms of job responsibilities, experience in the field, knowledge and attitudes related to using assistive technology as indicated by responses on surveys. Although the researcher did not ask survey participants to provide a reason for choosing not participate in the interview, several participants included explanations for their decision, citing time or lack of knowledge as the basis for disqualifying themselves from consideration.

I just don't have enough time to do an interview.

*I don't know enough about this subject to be helpful.*³

Some individuals who were not familiar with assistive technology apparently eliminated themselves from the interview process. Gathering information from people who admitted to not knowing much about the subject of using assistive technology was critical. The researcher therefore chose one interview participant who indicated that they had “no clue” about assistive technology. The researcher also recruited interview participants whose survey scores indicated strong knowledge and a positive attitude about using assistive technology as an accommodation on accountability assessments. The researcher was able to recruit the participant with the highest score in terms of knowledge (B-3). Two of the three participants who received the highest score on the attitude scale (B-4 and D-1) also agreed to participate in interviews. The researcher was able to recruit the participant with the lowest attitude and knowledge scores (D-3).

The researcher recruited interview participants that reflected the diversity of the South Central BOCES (e.g., participants from different regions, districts and disciplines). Lindlof and Taylor (2002) recommend selecting interview participants that reflect a specific set of beliefs. The researcher selected interview participants who use assistive technology and have experience including students with disabilities in accountability assessments, as well as participants who do not. A description of the work experience and job description of participants is listed in Table 3.6.

³ The author has chosen to include interview quotations as block quotations set off in italic print to add emphasis and improve readability.

Table 3.6 Interview Participants

Participant by Code	Position	Years of work experience in education	Raw Attitude Score (50 possible)	Raw Knowledge Score (50 possible)
B-1	Itinerant teacher of deaf and hard of hearing and autism consultant.	2	44	46
B-2	Speech Language Therapist	3	41	40
B-3	Speech Language Therapist	24	40	50 +
B-4	School Psychologist	3	48 +	42
B-5	Director of Special Education Services	17	43	38
D-1	Paraprofessional-Braille Transcriber	8	48 +	42
D-2	Secondary Special Education Teacher	49	47	45
D-3	English Teacher / Alternative Online High School Teacher	15	27 -	29 -
D-4	Elementary School Principal	25	42	40
D-5	Superintendent	16	32	42

+ = **denotes highest score in category for all participants**

- = **denotes lowest score in category for all participants.**

The researcher chose to include a short profile of each interview participant in Chapter 4 of this dissertation. The rationale in providing the participant profile in that section is to allow the reader to consider the characteristics of each participant in close proximity to the analysis of their interview responses.

Although the researcher would certainly have collected more data by including more participants in the interview portion of this project, Lindlof and Taylor (2002) recommended limiting the number of interviews to ensure that researcher spend a significant amount of time

gathering and analyzing information from each participant. Conducting in-depth interviews improved the quality of this research by:

- Providing the researcher the opportunity to explore “themes” in survey data through open-ended questions posed to a limited number of participants.
- Providing participants the opportunity to share information in greater depth and breadth than that collected with the surveys.
- Enabling the participants to use their own words to describe their knowledge and attitudes related to the subject of the research.

Additional Sources of Qualitative Data

Although surveys and interview data were the primary sources of information for this study, two additional sources of data were also used. The researcher was an active participant in the educational community and many of the related events that he studied. Relevant observations on the subjects of accountability assessments, student use of accommodations on assessments and assistive technology use in public schools contributed to information used in this research. The researcher took field notes on related subjects when appropriate and documented experiences and discussions related to assistive technology and accountability assessments. Additionally, the researcher gathered relevant information in the form of documents that articulated the policies and procedures of administrative agencies relevant to the broad subject of this study.

Development of Survey and Interview Questions

This survey was initially developed by the researcher and then modified based on recommendations of a focus group. The content of the survey questions were determined after a review of relevant literature. Questions on the survey were specifically designed to gather information about attitudes and knowledge that special education professionals have on assistive technology as an accommodation for accountability assessments. Surveys are an effective means for gathering information about the attitudes and knowledge of participants on specific subjects (Fowler, 1988).

Questions concerning knowledge about assistive technology and the role IEP teams should play in providing that service were included because attitudes and knowledge of IEP team

members affect the quality of assistive technology services (Andrich & Besio, 2002). In addition, research suggests that members of IEP teams do not possess adequate knowledge on these subjects (Edyburn, 2003). Questions concerning the effectiveness of assistive technology were included because there is substantial evidence to suggest that assistive technology can be an effective special education intervention (Baer, Flexer & McMahan, 2005; Cook & Hussey, 2002; Parette, Peterson-Karlan, Smith, Gray & Silver-Pacuilla, 2006; Weikle & Hadadian, 2003). Questions addressing fairness of using assistive technology accommodations and subsequent threats to test validity were included in the survey because these appear to be concerns of special education professionals (Parette, et al., 2006). Questions concerning training are included because inadequate training and education appear to impact the ability of special education staff to provide appropriate assistive technology services (Bargerhuff & Turner, 2006, Bruder, 1998; Bryan & Erin, 1998; Cook & Hussey, 2002).

The researcher developed 10 survey questions intended to measure a construct of “knowledge” based on the use assistive technology as an accommodation on accountability assessments. The survey questions were not designed, and do not reflect, a broad knowledge of using assistive technology. The construct of “knowledge” for this survey and related research represents a very limited definition of “knowledge” as it applies to the use of assistive technology on accountability assessments, with a special emphasis on Colorado Department of Education regulations. Most of the ten items designed to measure the construct of “knowledge” reference regulations about assistive technology and accommodations according to the Colorado Department of Education (Unit of Student Assessment, 2006). Each of the knowledge items has a “correct” answer according to state or district guidelines. For example, “Special education students can use assistive technology as an accommodation on CSAP tests.” According to state regulations, students can use assistive technology as an accommodation on CSAP tests (Unit of Student Assessment).

The researcher also developed 10 survey questions intended to measure a construct of “attitudes” related to the use of assistive technology, specifically as an accommodation on accountability assessments. The survey questions were not designed, and do not reflect, a broad construct of attitudes related to using assistive technology. The construct of “attitudes” for this survey and related research represents a very limited definition of “attitudes”. For example, “Using assistive technology, as an accommodation on CSAP testing, gives students an unfair advantage.”

The “attitude” construct includes several items which are not specific to accommodations and accountability assessments. For example, “Using assistive technology is not worth the time and effort it requires.” “Attitude” items were designed using “feeling” and “value” terms and have no “correct” answer according to CDE guidelines.

Appendix C lists the initial questions that were used in the in-depth interviews. The researcher developed additional questions based on the responses of interview participants. The content of the key interview questions were influenced by the method of analysis that was used to analyze the interview data; the pentad (Burke, 1945). Interview questions directed the participants to identify the *act*, *agent*, *agency*, *scene* and *purpose* regarding the decision process of whether or not assistive technology should be used by a special education student during CSAP testing. The researcher did not use the exact language of the pentad (e.g., *agent*), but instead described the terms operationally (e.g., “Who is responsible for determining whether or not a student should use assistive technology as an accommodation?” Refer to Appendix C for additional examples. The researcher’s dissertation committee suggested adding several questions to address the use of assistive technology as an instructional and testing accommodation and asked the participants to justify their answers.

After developing the surveys and interview questions, the researcher assembled a focus group to improve upon the design of these tools. The initial focus group was comprised of four individuals with credentials and work experience similar to those targeted for participation in this study (i.e., individuals who work in public education in the role of teacher, special service provider or administrator). None of the members of the focus group were included in the actual research sample for this project. Each of the members of the focus group had earned a degree in education, a field related to special education or had experience with survey research.

The researcher distributed copies of the survey and interview questions to members of the focus group. Members of the focus group were asked to complete the survey. All of the focus group members were able to complete the survey in less than 15 minutes. Group members were encouraged to provide feedback about the clarity and the content of survey questions. In response to suggestions from the focus group, the researcher changed the wording of several questions to improve clarity. The researcher also modified the design of questions intended to gather demographic information. The members of the focus group was also asked classified survey questions as relating to participant ‘knowledge’ or ‘attitude’ and did so with a high degree

of accuracy (90%). The members of the focus groups suggested several wording changes with interview questions, but did not express confusion over the content or purpose of questions. Only one member of the focus group responded to the interview questions. He provided narrative answers to the questions in less than fifteen minutes. The researcher did not ask additional questions to clarify or probe during this focus group. As a result, the researcher anticipated that actual interviews with participants would most likely be longer than fifteen minutes, depending on the depth and direction of the participants' answers.

A review of methods used to develop the survey and interview questions during the researcher's proposal meeting resulted in additional measures for modifying and developing tools for data collection. Upon advisement from his dissertation committee, the researcher distributed drafts of his surveys and interview questions to an additional group of individuals to solicit feedback. This expert panel was selected based on their knowledge of assistive technology, school-based assistive technology practice, qualitative research and/or survey design. The researcher provided each member of this panel with a description of his research project and an overview of the methods that he planned to use to analyze data. Each individual provided written feedback to the researcher that he in turn used to revise the structure of his survey and interview questions. As a result of this feedback, the researcher changed the wording on questions, the order of questions, and the statistical analysis that he had proposed for this study. The majority of the feedback was positive regarding the subject and general design of the study. A list of the names and credentials of the expert panel is included in Appendix D.

Interview Procedure and Preliminary Analysis

The researcher conducted face-to-face interviews with participants and used a digital recorder to capture interview data. The researcher transcribed the interviews and created text files for each participant. A sample of a transcribed interview is included in Appendix E. After transcription was completed, the researcher cross-checked transcription with existing files from the digital recorder.

During the transcription process, the researcher noted compelling themes in participant interviews. Formal data analysis began when the interviewer re-read completed transcripts and highlighted key phrases and terms for each participant interview. This procedure of simple

identification of compelling elements is described by Sandelowski (1995) as an important first step in analysis of text during qualitative analysis.

The researcher then formally analyzed the content of interviews using the pentad (Burke, 1945) following procedure described in the literature review. The researcher determined a dominant “element” based on interview data and compared the descriptions of the pentad elements offered by interview participants to one another, as well as state standards. After the researcher conducted data analysis, he met again with willing participants to conduct follow-up interviews to clarify discrepancies and discuss the conclusions that he had drawn from the interviews.

Using Pentadic Analysis

Most of the examples of pentadic analysis reviewed for this project focused on the communication of one person or one event. Under those circumstances, identifying elements (*act, agent, agency, scene* and *purpose*) is not complicated by multiple participants and perspectives. Because the researcher conducted interviews with 10 individuals, he determined identifying pentadic elements for each participant was appropriate. The researcher was also interested in determining whether or not members of each group who participated in interviews were consistent in their respective descriptions of *act, agent, agency, scene* and *purpose*. There was not complete consensus among interview participants concerning each of the elements of the pentad. To support this conclusion, the researcher briefly reviewed the content of each interview to determine the identity of elements according to each participant. He then identified patterns among and between groups, related to the identified elements. Because the researcher recruited individuals with dramatically different experience, education and professional responsibilities, variation in the characterizations of elements was expected.

After identifying pentadic elements for each of the participants based on interview data, the researcher identified a “dominant element” for each individual as well as each group as a whole. According to Foss (2002), “discovery of the dominant term provides insight into what dimension of the situation and the rhetor privileges or sees as most important” (pp. 461-2). When using methods of content analysis, like the pentad, Foss suggested that “significance of terms is determined on the basis of frequency or intensity of use. A term employed over and over again by a rhetor is likely to be a key term” (p. 65). In the introduction to *Symbols in*

Society, (Burke, 1989) Gusfield emphasized the importance of considering ratios (relationships between elements) when identifying dominant elements. In pentadic analysis, a ratio is the relationship between two elements of the pentad as depicted in the content of the communication event or artifact being studied. Gusfield effectively illustrated the concept of ratio when he referred to a scenario where an embarrassed adult is riding on a merry-go-round. The ratio that Gusfield considered is *scene: act*. The adult in this scenario performs a variety of behaviors (being silly, looking bored, riding backwards) to demonstrate that their behavior (*act*) is not controlled by a children's ride (*scene*). Considering these elements in tandem, helps to establish a dominant element as well as illustrate the influence between pentadic elements.

After identifying the elements for each participant, the researcher identified a dominant element based on frequency of use and ratios among elements. The researcher also addressed ratios of interest between dominant elements and other elements depicted in the participant interviews.

In addition to focusing on the five elements of the pentad, the researcher included brief references to questions concerning whether or not the individuals use assistive technology with students. He also asked each participant to identify the "biggest barrier" to successful assistive technology use. Asking participants to identify the "biggest barrier" to assistive technology use was an addition to the original interview questions based on the interview of B-1 (the first participant the researcher interviewed for this project). During answers to the original questions of the interview, B-1 referred repeatedly to barriers to the successful use of assistive technology. At the end of that initial interview, the researcher asked that participant to identify the biggest barrier to assistive technology use. The purpose of this addition was to determine if the interview participants identified a specific pentadic element as a "scapegoat" or the primary impediment for the successful use of assistive technology. Naming a "barrier" may also have helped the researcher to identify a dominant element in the participant's discourse. If a dysfunctional element has enough influence to impede the process of successful assistive technology use, then that element is significant. Identifying a barrier also demanded that participants speak directly to a ratio, or relationship, between *act* and the primary barrier (possibly another element) to the successful performance of the *act*.

Burke (1989) suggested that individuals can provide valuable information about their respective beliefs and perspectives by identifying a “scapegoat” or a barrier. According to Burke,

One may find himself hard put to define a policy purely on its own terms, but one can advocate it persuasively by an urgent assurance that it is decidedly against such-and-such other policy with which many people may be disgruntled. (p. 73)

Burke’s comment indicated that some individuals have a more difficult time describing the functional components of a policy or event than components that are dysfunctional. In addition to describing appropriate procedure and process, Burke implied that asking individuals to describe a problem or what is not working in a situation may provide rich data. Burke continued, “The use of antithesis helps deflect embarrassing criticism (as when rulers silence domestic controversy by turning public attention to animosity against some foreign country’s policies” (p. 73). In terms of educational policy, interview participants may have spoken more frankly about what is not working in a system because they were provided with an opportunity to attribute dysfunction to individuals or events outside of their control.

Issues of Trustworthiness

Pulkkinen (2003) equated trustworthiness in qualitative research to issues of validity and credibility. The American Educational Research Association (AERA, 2006) has proposed standards for guiding educational research. There is, however, no consensus between scholars and governing agencies on a single set of standards for guiding and evaluating the integrity of qualitative research. Lincoln (1995) described the lack of consensus on criteria for guiding and evaluating qualitative research as an appropriate subject for academic dialogue. Other researchers see an attempt to establish a single paradigm for assessing the trustworthiness of qualitative research as inappropriate (Rolfe, 2006). Freeman, deMarris, Preissle, Roulston, and St. Pierre (2007) described attempts to establish a consensus on preferred qualitative research methods as undesirable. Freeman and colleagues argued, “our premise is that it is neither desirable nor possible to reach consensus about or prescribe standards of evidence in this diverse field” (p. 25). The same researchers explained their opposition to strict guidelines as follows, “qualitative research is open and supple, and one of its strengths is that it incorporates philosophies, theories, and research designs and methods as diverse as postpositivists multi-

methods approaches and postmodernist social critique” (p.25). Instead of a “prescriptive” set of guidelines, Freeman and colleagues believed that issues of trustworthiness must be considered on a case-by-case basis in academic research to allow for creativity and freedom in qualitative research. The authors referenced criteria by Lincoln (2002) and Wilson (1994) that they deemed valuable for establishing trustworthiness in qualitative research.

Lietz, Langer and Furman (2006) conducted research to determine which issues related to trustworthiness had the greatest impact on the quality of a study. They concluded that “reflexivity” and “member checking” were strategies that had the most significant positive impact on the quality of a qualitative study. Pulkkinen (2006) described reflexivity as a researcher’s awareness of their own biases and beliefs. AERA (2006) described member checking as the process by which a researcher asks participants to comment on the accuracy of conclusions that the researcher has postulated based on data provided by the participants. Member checking was conducted in follow-up interviews with willing interview participants. During these interviews the researcher shared the conclusions that he drew from interview data using pentadic analysis (Burke, 1945). The researcher asked each willing participant to comment on the descriptions of each element (*act, agent, agency, scene and purpose*) and reported whether or not the participants agreed with the analysis of the researcher. In addition the researcher asked the interview participants if they agreed with the “dominant element” as determined by the researcher. Discrepancies between the conclusions of the researcher and the opinions of the interview participants are reported and further analyzed.

The researcher worded survey questions clearly (Fowler, 1988). Fink (1998) suggested that a written survey can be completed in less than 30 minutes. (A guideline met by the researcher according to feedback from the focus group.) The researcher wrote questions specifically for the purpose of checking “reliability” of responses. Rea and Parker (1997) suggest including questions that pose “virtually the same question in a somewhat different manner at a different place within the survey instrument” (p. 40). Similar answers on the paired questions support the reliability of the survey design. Questions #1 and question #19 both addressed the availability of assistive technology services for students. The mean score for question #1 was 4.08 and the mean score for question #19 was 4.22, which indicated a high degree of correlation between answers on the paired questions.

Triangulation

Lindlof and Taylor (2002) explained that triangulation “involves the comparison of two or more forms of evidence with respect to an object of research interest” (p. 240). Triangulation improves the quality of data samples and the validity of research conclusions drawn from collected data. The primary methods the researcher used to gather information were divergent, a fact which provided the researcher the opportunity to triangulate data. In addition to using both qualitative and quantitative methods, the researcher collected data from numerous data sources through both subjective and objective means. Surveys included numerical data, categorical data and written responses from participants. Surveys began with a set of standard questions that were expanded during the interview process and complimented when necessary by follow-up interviews. These formal methods of data collection were enhanced by the researcher’s informal observations and experiences garnered and recorded working with many of the respondents on the subjects of assistive technology and accountability assessments.

Role of Researcher

Creswell (1998) also recommended qualitative methods of inquiry when the researcher is working in the role of an “active learner” as opposed to an expert (p. 18). The researcher better fits the description of an “active learner” on the issue of gathering information concerning educator attitudes and knowledge related to assistive technology and accommodations on accountability assessments. The researcher intends to use information gathered from surveys and interviews to improve the quality of assistive technology services in the South Central BOCES with specific focus on encouraging the use of assistive technology as an accommodation for the performance of class work and on standardized assessments when appropriate.

Lincoln and Guba (1985) stated that when investigators spend a significant amount of time in the field among research participants, their research can be more relevant and purposeful. It should be noted that the researcher was not an unbiased or completely objective investigator. During completion of this study, the researcher was employed by the South Central BOCES and is responsible for helping to develop an appropriate assistive technology program. The researcher developed the idea for this research project over many years, but the specific research questions have been inspired by his experience working with special educators and special service providers in his current position. The researcher had worked for the BOCES for two

years when he began data collection. He knew many of the individuals well who participated in the surveys and interviews and worked closely with some participants on a daily basis. It is the opinion of the researcher that his familiarity with the educational environments and staff improved the quality of this study. The researcher was invested in gathering reliable data, drawing valid conclusions based on that data and using information gained from this research to improve assistive technology services in the South Central BOCES.

Although the researcher designed questions that simply attempted to identify attitudes and knowledge, qualitative observations and results identified specific patterns in data. For example, during his work in the BOCES the researcher has witnessed very little use of assistive technology as an accommodation during instructional tasks or with accountability assessments. The researcher believed that educators did not use assistive technology because they were unfamiliar with state and federal regulations governing its use. Prior to this study, the researcher also held the belief that newer graduates possessed more favorable attitudes and more knowledge related to the use of assistive technology than their more experienced counterparts. Building on that premise, the researcher was not as interested in reinforcing his beliefs as he was interested in obtaining accurate information about the attitudes and knowledge of his work colleagues. Gaining an accurate understanding of the attitudes and knowledge that special educators and service providers hold on the subjects of assistive technology, accommodations and accountability assessments is a critical first step to affecting positive change in these areas.

Issues of Compliance

The researcher followed ethical research practices as set forth by Kansas State University, in addition to the respective school districts of participants and the South Central BOCES. The researcher disclosed the subject and purpose of the research to each participant and secured written permission from each participant. A copy of the researcher's IRB approval, letter of introduction and the informed consent letter are included as appendices B, F and G respectively.

Summary

The researcher conducted a study with both quantitative and qualitative components. The quantitative methods included design of a twenty question Likert style survey that was distributed to individuals who work in the South Central Board of Cooperative Educational

Services (BOCES) or the school districts that the BOCES serves. The content of the surveys included ten questions designed to measure attitudes of participants related to the use of assistive technology as an accommodation on accountability assessments and ten questions designed to measure the knowledge of participants on the same subject. The survey included additional questions to gather other qualitative and demographic information. Data from these surveys were analyzed using simple descriptive and analytical methods to identify potential differences in attitude and knowledge between BOCES and District participants. In addition, “years of experience” was analyzed as a continuous variable for the population as a whole.

Based on survey data the researcher selected ten educators to participate in the qualitative portion of this project. In depth interviews were designed to solicit information from participants that would enable the researcher to identify the *act*, *agent*, *agency*, *scene* and *purpose* related to the subject of using assistive technology as an accommodation on accountability assessments. The researcher analyzed interviews using pentadic analysis (Burke, 1945) and used this information to describe how participants depict the process of deciding whether or not to use assistive technology with students as an accommodation. Specific observations and analyses are contained in Chapters 4 and 5.

CHAPTER 4 - Quantitative Observations and Results

Review of Analysis

The researcher designed the quantitative portion of this project to meet two primary goals:

1. Identify whether or not significant differences exist between the “knowledge” scores of participants according to group affiliation (BOCES vs. District employees) and identify whether or not significant differences exist between the “attitude” scores according to the same group affiliation.
2. Analyze the relationship that exists between survey scores and the “years of experience” of survey participants.

Results of this analysis are interpreted in Chapter 6 in order to answer the four quantitative research questions that were listed in Chapter 1. The data used for this analysis was gathered from Likert Scale surveys that were designed to measure the knowledge and attitudes of educators on the subject of using assistive technology as an accommodation on accountability assessments. The participants were divided into two naturally occurring groups for this analysis: group 1 denotes educators who work for school districts ($n_1 = 43$), while group 2 denotes educators who work for the South Central BOCES ($n_2 = 31$).

The researcher used backward elimination regression analysis that incorporated a dummy variable to analyze survey data. The dummy variable was established to represent the two groups of participants; as a result categorical data was treated as an additional variable which made it possible to perform a regression analysis. The advantage of performing a regression analysis instead of a two factor factorial ANOVA is that the researcher was able to analyze the effect that all variables had on the population as a whole, then adjust the model to identify and analyze the variables that had the most significant effects on the population. In order to establish the dummy variable, the numerical value of 0 was assigned to individuals from group 1 (district

employees) and the numerical value of 1 was assigned to individuals from group 2 (BOCES employees).

After establishing the dummy variable the researcher had four statistical variables involved in this analysis: intercept, years of experience, the dummy variable (group affiliation) and the interaction of years of experience and dummy variable (which is referred to later in this chapter as “slope”). The “intercept” variable requires some explanation. The intercept represents the average score for participants based on a model that estimates what a survey score would be for a participant with zero years of work experience. The intercept variable can be thought of as the baseline attitude and/or knowledge score for an employee with no prior work experience in the field of education.

The researcher conducted backward elimination regression analysis to remove the least significant variable from the model at each step of the analysis, until the most significant variables were identified. The steps in this analysis were repeated, first to assess the relationship between the variables and “attitude scores” and then the relationship between the variables and the “knowledge scores.”

Attitude Analysis

The construct of “attitude” was comprised of ten questions designed to measure the attitude of respondents in two primary areas, general use of assistive technology: (e.g., “Assistive technology is not worth the time and effort it requires.”) and attitudes related to the use of accommodations on accountability assessments: (e.g., “Using accommodations on CSAP tests threatens the validity of the assessment.”) Attitude scores for each participant were summed and means were calculated. Participant scores were paired with “years of experience” and organized by group.

First Step

All of the variables were included in the first step of this analysis, which is also called the “full model”). Results of the first step of this analysis are represented in Table 4.1.

Table 4.1 First Step Attitude Analysis (Full Model)

Significance Test: Description: Different intercepts and different slopes for the two groups. Attitude of group1= intercept_1+slope_1*years Attitude of group2= intercept_2+slope_2*years				
Parameter	Testing Ho	Type II SS	F Value	Pr > F
Intercept	Intercept 1=0	153.43953	604.63	.0001
Years	Slope 1=0	0.04629	0.18	0.6706
Dummy	Intercept 2 = Intercept 1	0.00543	0.02	0.8841
Years Dummy	Slope 2 = Slope 1	0.36234	1.43	0.2362

In the first step of the regression analysis, the effect of the dummy variable (district and BOCES group affiliation) was the most non-significant, determined by the size of the p value ($p = 0.8841 > 0.05$ significance). The researcher therefore accepted the null-hypothesis for that variable and concluded that the two intercepts (dummy variable and attitude scores) were essentially equal. Because the attitude scores of the BOCES and district employees had equal intercepts, there was essentially no difference in the mean scores between groups on the “attitude” scale when controlled for “years of experience.” In simple terms, this step of the analysis indicated that a district employee with zero years of work experience would have the same score on the attitude portion of the survey as a BOCES employee with zero years of work experience.

Second Step

For the second step the researcher removed the “dummy variable” from the model as determined by the elimination criterion for “backward” regression analysis. The revised model was constructed with same intercepts, but different slopes for the two groups as indicated in the heading of Table 4.2.

Table 4.2 Second Step Attitude Analysis

Step 2 Significance Test: Description: Different intercepts and different slopes for the two groups. Attitude of group1= intercept_0+slope_1*years Attitude of group2= intercept_0+slope_2*years				
Parameter	Testing Ho	Type II SS	F Value	Pr > F
Intercept	Intercept 0=0	342.65106	1369.08	< .0001
Years	Slope 1=0	0.04792	0.19	0.6630
Years Dummy	Slope 2 = Slope 1	1.21282	4.85	0.0310

According to test results the effect of the variable “years,” was the most non-significant as determined by the largest p value ($p = 0.6630 > 0.05$). This means that the researcher accepted the null hypothesis for that variable and conclude that slope of group 1 was equal to zero. A slope of zero indicated that years of experience has no measurable effect on the attitude scores for group1. In simple terms, attitude scores did not significantly increase for district employees with more years of work experience, when compared to their less experienced colleagues.

In the second step of the regression analysis, the effect of the “years” variable (years of work experience) was the most non-significant as determined by the size of the p value. Therefore the researcher accepted the null-hypothesis and concluded that the intercepts for group 1 and group 2 (representing and attitude scores at zero years of experience) were essentially equal. According to this analysis, “years of experience” had the most non-significant effect and was therefore removed from the model for step 3 of the backwards regression analysis.

Third Step

For this step a revised model was constructed without the variable “years of experience,” with the same intercepts as previously used and the same slope for group 1 (slope = 0 for group 1). The results of this analysis are listed in Table 4.3.

Table 4.3 Third Step Attitude Analysis

Step 3 Significance Test: Description: Different intercepts and different slopes for the two groups. Attitude of group1= intercept_0+(0)*years=intercept_0 Attitude of group2= intercept_0+slope_2*years				
Parameter	Testing Ho	Type II SS	F Value	Pr > F
Intercept	Intercept 0=0	826.96245	3341.70	< .0001**
Years Dummy	Slope 2 = Slope 0	1.39325	5.63	0.0203**

(** indicates significant values)

Final Model Attitude Analysis

In this step of the analysis both remaining variables are significant with values when $p < .05$. The researcher therefore concluded that for educators without any years of work experience, their attitude scores are not 0, therefore, the null-hypothesis for that variable was rejected. In addition, because slope (attitude scores plotted against years of experience) of group 2 was not 0, therefore the null hypothesis for that variable was rejected. The variable “years of experience” has a significant effect on the mean attitude scores of educators from group 2 (BOCES employees). The multiple steps in this analysis led to the design of the final model, represented in the Table 4.4.

Table 4.4 Final Model Attitude Analysis

Description Attitude of group1= intercept_0 Attitude of group2= intercept_0+slope_2*years Estimates for the common intercept_0 and slope for group2 are	
Parameter	
Variable	Estimate
Intercept	3.84500
Years Dummy	0.01628

Based on this analysis the “attitude” score at the intercept for group 1 = 3.845, while the mean “attitude” score at the intercept for group 2 = $3.845 + 0.01682$ (for every additional year of work experience). In other words the model suggested that a district employee with ten years of

experience would most likely have a survey score on the attitude scale of 3.845, while a BOCES employee would most likely have a survey score of 4.0132 or $(3.845 + (.01682 \times 10))$. The results of the analysis based on the final model are listed in Table 4.5.

Table 4.5 Results of Final Model Attitude Analysis

Source	Degrees of Freedom	Squares	Square	F Value	Pr > F
Model	1	1.39325	1.39325	5.63	0.0203**

(** indicates significant values)

The researcher then checked the “normality assumption” of residual error, using a battery of four commonly used tests of normality. Normality indicates whether or not a population (in this case as represented by attitude scores) follows a “normal distribution”. The results are listed in Table 4.6

Table 4.6 Tests for Normality

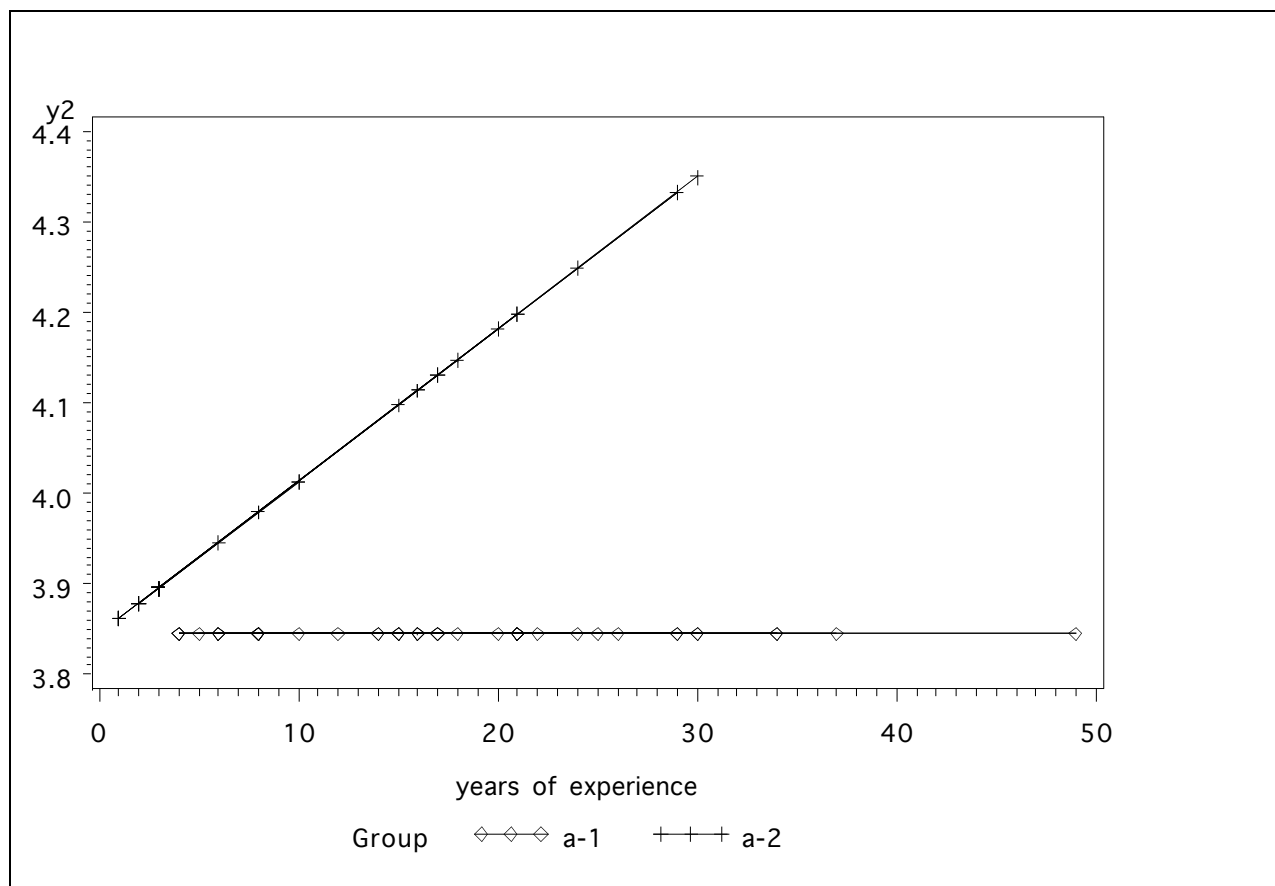
Test	Statistic	P Value
Shapiro-Wilk	W 0.984309	Pr < W 0.4909
Kilmogorov-Smirnov	D 0.049891	Pr > D > 0.1500
Cramer-von Mises	W-Sq 0.026904	Pr > W-Sq > 0.2500
Anderson-Darling	A-Sq 0.234068	Pr > A-Sq > 0.2500

All p-values generated by each of the four normality tests were statistically significant, which indicated “normality.” Although Likert scales frequently produce scores that violate underlying normality assumptions (Nanna & Sawilowsky, 1998), no such violations occurred in this analysis. Based on these results, the researcher concluded that the normality assumption was not violated and all F-Tests are valid.

Plot of Fitted Values for Attitude Scores

The plot of the fitted values represents the mean scores of participants on the 10 items designed to measure attitude. Scores are plotted against “years of experience” for participants from the two groups. The results are illustrated in Figure 4.1.

Figure 4.1 Plot of Fitted Value for Attitude Scores



Summary of Attitude Analysis

The two lines represented in the plot (Figure 4.1) are of the same intercept, but have different slopes. The equivalent intercepts indicate that when “years of experience” equal zero, the mean attitude scores are the same between the two groups. As years of experience increases, however, the mean attitude scores of group 2 (BOCES employees) also increases while the mean scores for group 1 (district employees) equals zero.

The results of this analysis led to the following analytical conclusion. For educators with the least amount of work experience, the mean of scores designed to measure their attitudes

related to using assistive technology as an accommodation on accountability assessments are approximately the same (3.845 on a scale of 5.0) regardless of group affiliation. When the researcher focused on individuals with more experience, differences between groups in terms of attitude scores became apparent. For district educators with more years of experience, attitude scores demonstrated minimal change in comparison to their less experienced peers. Attitude scores for more experienced BOCES employees demonstrated a statistically significant increase over their less experienced counterparts at a rate of 0.01682 points per year.

Knowledge Analysis

The construct of “knowledge” was comprised of ten questions designed to measure the knowledge of respondents in two primary areas, general use of assistive technology: (e.g., Assistive technology services should be considered for use with every special education student,) and knowledge related to the use of accommodations on accountability assessments: (e.g., Special education students can use assistive technology as an accommodation on CSAP tests). Knowledge scores for each participant were summed and means were calculated. Participant scores were paired with “years of experience” and organized by group.

First step

The researcher repeated the same steps of statistical analysis for the mean scores of participants generated from the ten survey questions that were designed to measure “knowledge.” All of the variables (intercept, years of experience, dummy variable (group affiliation) and the interaction of years of experience and dummy variable, were included in the first step of this analysis. Results of the first step of this analysis of knowledge items are represented in Table 4.7

Table 4.7 First Step Knowledge Analysis (Full Model)

Significance Test Description: Different intercepts and different slopes for the two groups. Knowledge of group1= intercept_1+slope_1*years Knowledge of group2= intercept_2+slope_2*years				
Parameter	Testing Ho	Type II SS	F Value	Pr > F
Intercept	Intercept 1=0	159.14221	867.63	< .0001
Years	Slope 1=0	0.15203	0.83	0.3657
Dummy	Intercept 2 = Intercept 1	0.00471	0.03	0.8732
Years Dummy	Slope 2 = Slope 1	0.20557	1.12	0.2934

In the first step of the “knowledge” portion of the regression analysis, the effect of the dummy variable (district and BOCES group affiliation) was the most non-significant, determined by the size of the p value ($0.8732 > 0.05$). Therefore the researcher accepted the null-hypothesis for that variable and concluded that the two intercepts (dummy variable and knowledge scores) were essentially equal. Because the knowledge scores of the BOCES and district employees had equal intercepts, there was essential no difference in the mean scores between groups on the “knowledge” scale.

Second Step

For the second step the researcher removed the dummy variable from the model as determined by the elimination criterion for backward regression analysis. The revised model was constructed with same intercepts, but different slopes for the two groups as indicated in the heading of Table 4.8.

Table 4.8 Second Step Knowledge Analysis

Step 2 Significance Test: Description: Different intercepts and different slopes for the two groups. Knowledge of group1= intercept_0+slope_1*years Knowledge of group2= intercept_0+slope_2*years				
Parameter	Testing Ho	Type II SS	F Value	Pr > F
Intercept	Intercept 0=0	349.44366	1931.64	< .0001
Years	Slope 1=0	0.32045	1.77	0.1875
Years Dummy	Slope 2 = Slope 1	0.44100	2.44	0.1229

In the second step of the regression analysis, the effect of the “years” variable (years of work experience) was the most non-significant, determined by the size of the p value ($0.1875 > 0.05$). The researcher, therefore, accepted the null-hypothesis for that variable and concluded that the two intercepts (“years of experience” and knowledge scores) were essentially equal. According to this analysis “years of experience” had the most non-significant effect and therefore was removed from the model for step 3 of the backwards regression analysis.

Third step

For this step of the analysis a revised model was constructed omitting the variable, “years of experience”, using the same intercepts as previously used (slope = 0 for group1). The results of this analysis are listed in Table 4.9.

Table 4.9 Third Step Knowledge Analysis

Step 3 Significance Test: Description: Different intercepts and different slopes for the two groups. Knowledge of group1= intercept_0+(0)*years=intercept_0 Knowledge of group2= intercept_0+slope_2*years				
Parameter	Testing Ho	Type II SS	F Value	Pr > F
Intercept	Intercept 0=0	866.97861	4741.65	< .0001**
Years Dummy	Slope 2 = Slope 0	0.65866	3.60	0.0617*

Final Model Knowledge Analysis

Results from this model indicated that the “intercept” variable was significant at a value less than $p < .05$. The researcher, therefore, concluded that for educators “without any experience”, their knowledge scores did not equal zero. In terms of the “years dummy” interaction variable, these results were not significant when $p < 0.05$. It should be noted that “years dummy” would have been significant if p had been set at a value of 0.10. In other words, “years dummy” had an effect on “knowledge” scores, but it was not a significant effect at the p value set for this analysis. The researcher, therefore concluded that that the slope of group 2 (BOCES employees) could equal zero. As a result, the researcher determined that “years of experience” did not have a significant effect on “knowledge scores” of educators from group 2.

The multiple steps in this analysis led to the design of the final model, represented in the Table 4.10.

Table 4.10 Final Model Knowledge Analysis

Knowledge of group1= intercept_0	
Knowledge of group2= intercept_0+slope_2*years	
Estimates for the common intercept_0 and slope for group2	
Parameter	
Variable	Estimate
Intercept	3.93693
Years Dummy	0.01157

Based on this analysis the “knowledge” score at the intercept for group 1 = 3.93693, while the mean “knowledge” score at the intercept for group 2 = 3.845 + 0.01682 (for every additional year of work experience). In other words the model suggested that a district employee with ten years of experience would most likely have a survey score on the knowledge scale of 3.93693, while a BOCES employee would most likely have a survey score of 4.0484 or (3.93693 + (.011157 x 10)). The overall F statistic for the final model is listed in Table 4.11.

Table 4.11 Results of Final Model Knowledge Analysis

Source	Degrees of Freedom	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	0.65866	0.65866	3.60	0.0617

The researcher then checked the “normality assumption” of residuals from this model using a battery of four commonly used tests of reliability. Normality tests indicate whether or not a population (in this case as represented by knowledge scores) follows a “normal distribution”. The results of normality tests are listed in Table 4.12.

Table 4.12 Tests for Normality

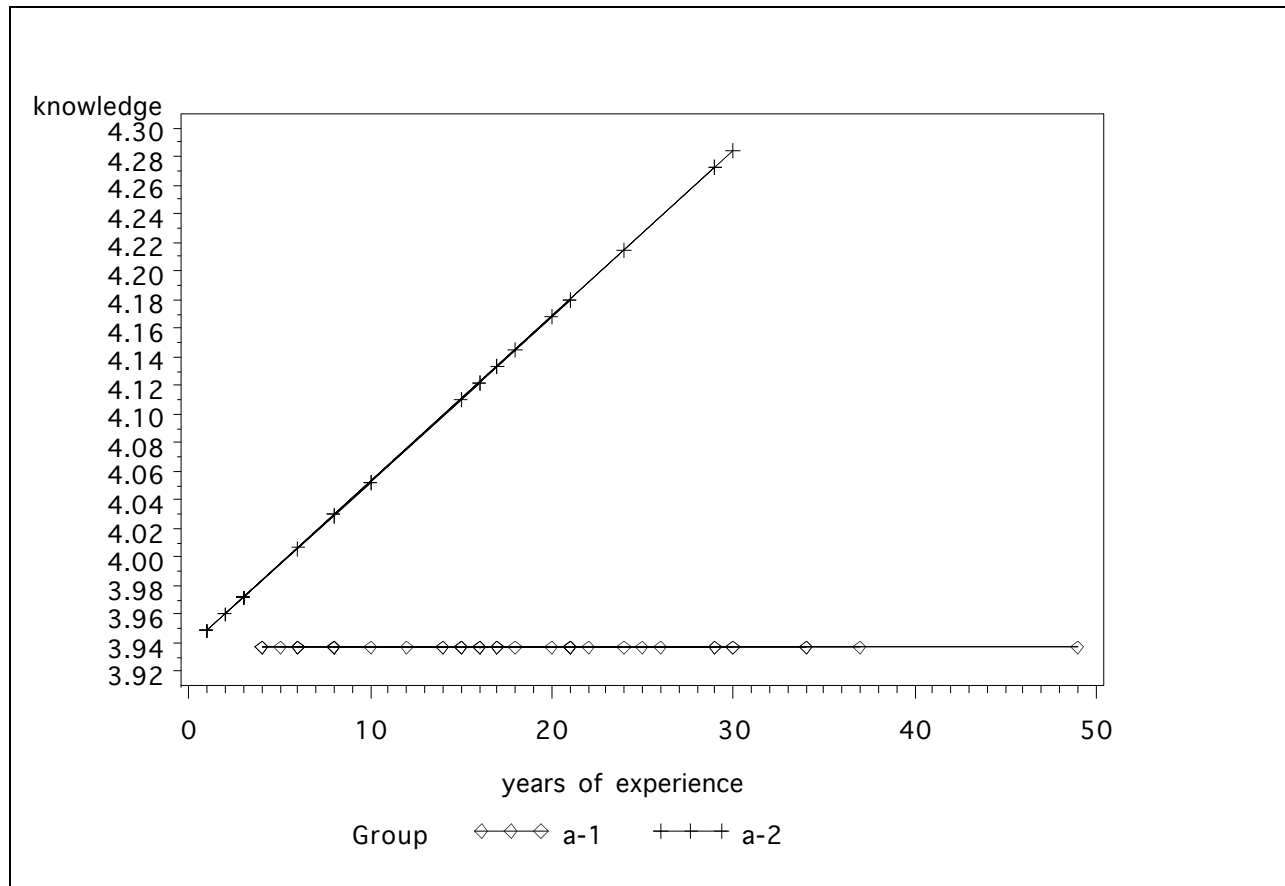
Test	Statistic	P Value
Shapiro-Wilk	W 0.978547	Pr < W 0.2404
Kilmogorov-Smirnov	D 0.099576	Pr > D >0.0695
Cramer-von Mises	W-Sq 0.114289	Pr > W-Sq > 0.0749
Anderson-Darling	A-Sq 0.617439	Pr > A-Sq > 0.1050

All p-values generated by each of the four normality tests were statistically significant, which indicated “normality”. Based on these results, the researcher concluded that the normality assumption is not violated and all F-Tests are valid.

Plot of Fitted Values for Knowledge Scores

The plot of the fitted values represents the mean scores of participants on the 10 items designed to measure knowledge. Scores are plotted against “years of experience” for participants from the each group. The results are illustrated in Figure 4.2.

Figure 4.2 Plot of Fitted Values Knowledge



The plotted lines share the same intercept, but have different slopes. The slope of the first group (district employees) equals zero. This indicated that when years of experience equals zero, the mean knowledge scores were same between the two groups. As years of experience increased, however, the mean knowledge scores of group 2 (BOCES employees) also increased while the mean scores for group 1 remained constant. The results of this knowledge analysis led to the following analytical conclusion.

For educators with the least amount of work experience, the mean of scores designed to measure their knowledge related to using assistive technology as an accommodation on accountability assessments were approximately the same (3.93693 on a scale of 5.0) regardless of the group for whom they work. When the researcher focused on individuals with more experience, differences between groups in terms of knowledge scores became more apparent. For district educators with more years of experience, knowledge scores demonstrated minimal change in comparison to their less experienced peers. Knowledge scores of more experienced

BOCES participants were consistently higher than their district counterparts at a rate of 0.01157 points per year. The p value was set at < 0.05 and although “years of experience” appeared to have an effect on knowledge scores, it is at a level that is not statistically significant.

For the final step of the analysis the researcher removed the interaction variable from the previous step and reduced the model to the simplest form: knowledge = intercept 0 for both groups. Refer to table 4.13 for specific results.

Table 4.13 Final Step Knowledge Analysis

Variable	Testing Ho	DF	Estimate	Error	t Value	Pr > t
Intercept	Intercept 0=0	1	3.99054	0.05059	78.89	$< .0001^{**}$

Summary of Knowledge Analysis

Based on these results, the “intercept variable” was determined to be statistically significant. The intercept value did not equal zero; therefore, the null hypothesis for this variable was rejected. The estimate for the intercept was 3.99054. Since the intercept was the only parameter in the model, the overall model test yielded the same test statistic, with p value < 0.0001 . Results from the final model indicated that the intercept value for knowledge = 3.99054 for both groups. In other words, knowledge scores had not relationship with either “group affiliation” (dummy variable) or “years of experience”. There was essentially no difference between the mean knowledge scores between groups. In addition, the knowledge scores of educators did not appear to be associated with the variable “years of experience” at a level that was statistically significant.

Preliminary Quantitative Conclusions

Based on the results of this regression analysis the researcher has drawn the following preliminary conclusions:

- 1) There is no statistical difference in the mean of attitude scores between groups of participants.

- 2) There is no statistical difference in the mean of knowledge scores between groups of participants.
- 3) Less experienced BOCES and district employees have mean attitude scores that are statistically similar, but as these groups of employees gain years of experience, BOCES employees demonstrate higher attitude scores than district employees.
- 4) Less experienced BOCES and district employees have mean knowledge scores that are statistically similar, but as these groups of employees gain years of experience, BOCES employees demonstrate higher knowledge scores than district employees, however, not at a level that demonstrates statistical significance.

In Chapter 6, the researcher will analyze and explain these preliminary conclusions resulting from the quantitative analysis and use this information to answer each of the research questions. The researcher will also analyze and explain the preliminary conclusions resulting from the qualitative analysis and use that data to analyze the qualitative research question.

CHAPTER 5 - Qualitative Observations and Interpretations

The qualitative portion of this research project was based on interview data collected in face-to-face interviews that were recorded and transcribed by the researcher. Observations and analysis were supported with excerpts from interview transcripts from each of the respective participants. The complete transcribed interview for the participant B-1, the itinerant teacher, is included in Appendix C. The researcher chose to include excerpts from transcripts in italics as block quotations to improve readability and highlight the significance of each quotation. Single word and shorter quotations are included in paragraphs using traditional formatting.

In this chapter the researcher first reviews the structure of the interview questions presented to participants. Second, the researcher offers a brief description explaining how participants are coded for reference. Third, the researcher presents a profile of each district participant before analyzing the content of their respective interviews and drawing conclusions. Fourth, the researcher presents a profile of each participant from the Board of Cooperative Educational Services (BOCES) before analyzing content of their interview and drawing conclusions. Fifth, the researcher creates a “composite” for the district and BOCES groups basing constructed composites on individual interviews. Sixth, the researcher describes additional qualitative data and analysis and reviews “member checking” for B-1, D-1 and B-4. Seventh, the researcher compares composites of pentadic elements between groups and the Colorado Department of Education. Finally, the researcher examines ratios evident in interview data and summarizes the observations and analysis made in this chapter.

Interview Questions

The researcher designed interview questions four through seven to correlate with the specific elements of the pentad (Burke, 1945). The rationale behind designing questions in this manner was to prompt participants to respond to key elements related to the process of determining whether or not a student should use assistive technology as an accommodation on accountability assessments. The elements and correlating questions are listed in Table 5.1. A complete list of interview questions is included in Appendix C.

Table 5.1 Pentadic Elements and Correlating Interview Questions

Elements of Burke's Pentad	Correlating Interview Question
<i>Act:</i> The event taking place.	Please describe the process of determining whether or not a student can use assistive technology as an accommodation.
<i>Agent:</i> Who is involved in the performance of the <i>act</i> ?	Who is responsible for determining whether or not a student can use assistive technology as an accommodation?
<i>Agency:</i> How is the <i>act</i> performed?	Where and when is the decision documented concerning whether or not a student can use assistive technology as an accommodation?
<i>Scene:</i> The context in which the <i>act</i> occurs.	Where and when is the decision made concerning whether or not a student can use assistive technology as an accommodation?
<i>Purpose:</i> Why is the <i>act</i> performed?	What is the purpose of allowing students use assistive technology as an accommodation during CSAP testing?

Coding

To maintain the confidentiality of subjects, the researcher has coded interview participants with a letter and a number that were used throughout the analysis and discussion of data. The researcher has also referred to participants by their job titles, because their work responsibilities have an impact on how they view the subject of the interviews and may help readers gain a better understanding of data. For example, administrators may comment on budgets and the performance of their employees, whereas teachers may focus comments more on their interaction with students and work in the classroom.

In the description of each participant, the researcher comments on the “knowledge” and “attitudes” related to using assistive technology based on survey results for that individual. Individual’s knowledge and attitude scores described as being “above average”, indicates survey scores higher than the mean score for all survey participants. A description of “below average”

indicates that a participant's survey scores were lower than average of all participants. These labels do not reflect statistical significance.

District Participants and their Pentads

A brief profile of each interview participant precedes the analysis of their interview data. In terms of coding, "D" indicates that the subject was an employee of a local school district. "B" indicates that the subject was an employee of the South Central BOCES. Numbers, one through five, identify each of the participants in the respective groups.

Participant Profile and Analysis: D-1

D-1 is a Braille transcriber, classified by her district as a paraeducator or paraprofessional. Her district is one of the largest in the region. The elementary school where she works educates students in 2nd through 5th grade. This school made AYP for 2006-2007, but the district of which this school is a part, did not. D-1 has taken college courses, but has not earned a degree. She has recently completed courses and earned certification as a Braille transcriber. D-1 reported eight years of experience working with special education students. This participant's survey scores are above average in terms of knowledge and attitude related to using assistive technology. She reported that she uses assistive technology with students as an accommodation in instructional and testing situations. She also clarified that her experience was largely defined by her work as a "Braille" for a single student with a vision deficit.

In terms of describing *act*, D-1 admitted that she was not familiar with the process of determining whether or not a student should use assistive technology. She stated,

I personally don't know the process.

The participant followed this comment with scenarios of how the student with whom she works has used assistive technology in instructional settings. These statements implied that the process of determining the appropriate use of assistive technology is determined by what the student "needs" to do to perform work at school. For example, with the use of assistive technology, D-1 stated,

She will be able to type her own term papers.

The *agent* depicted by this educator is the student's case manager: the Teacher of the Visual Impaired (VI teacher.) D-1 also included herself and the visually impaired student in her

description of “who” is responsible for determining whether or not assistive technology is appropriate, however she describes the VI teacher as the decision-maker when she said,

It is usually the VI teacher that has the final decision, but it is a kind of a joint venture when we try it.

D-1 did, however, emphasize the role that she and the student play in instructional situations when she said,

In my situation, what I have observed about the student is her accomplishments and what she is doing.

On the element of *scene*, D-1 referred again to classroom work and gathering data to support decisions. She stated,

I will have to back up that support to make sure she is using it correctly, to make sure that it is really working, to make sure that it is not wasting anyone’s time and that the outcome is positive.

For D-1, the *scene* is the classroom. In response to this question, she also referred to collaboration between herself, the VI teacher and the student.

D-1 casts the vision teacher in the role of “expert”. In reference to the VI Teacher, she said,

She is the one with the access and knowledge in academics and has access to equipment and AT.

Naming an “expert” and emphasizing their role in the process is a theme that other interview participants echo, when they reported referring to, deferring to, or relying upon “experts” on the subject of assistive technology to help guide the process.

On the question related to *agency*, D-1 referred to the process of instructional trials and basing decisions evidence of student performance with the technology. She stated,

We try it and see if it doesn’t work or if it does.

She did not refer to specific methods of documentation or places where she documented this evidence.

On the question of *purpose*, D-1 referred almost exclusively to the student and her abilities. D-1 emphasized the concepts of equal opportunity and equal expectations. The paraprofessional explained,

She is a Braille reader, so as long as it [instructional materials] is provided to her in the Braille, there is no reason whatsoever, that anyone should have to orally dictate that test for her.

D-1 identified “knowledge”, specifically her knowledge as the student’s primary educational support, as the biggest barrier to optimal assistive technology use. She also referenced limited time and resources as primary obstacles to her ability to obtain more knowledge. In reference to continuing education related to assistive technology, D-1 stated,

I just wish I had more time for that.

D-1 referred to how her job has been impacted positively by the incorporation of assistive technology. In reference to assistive technology, D-1 stated,

It saved me. It is a help for her and for me.

This comment implied that some of her enthusiasm for assistive technology comes from the fact that it has helped D-1 to perform her job more efficiently and effectively.

Based on frequency of use and intensity of descriptive language, the most dominant element of the pentad based on this interview is *agent*, (the VI Teacher) and the *act*, the instructional trials and documentation. These two subjects are mentioned in most of D-1’s responses and she frequently referred to these elements when commenting about other elements in the pentad. When ratios were considered, the VI teacher was cast in a position of power.

The narrative of D-1’s interview defined the following elements:

- *Act: “Don’t know”, but described trials during instructional use.*
- *Agent: The vision instructor (case manager) along with the Braille transcriber and student.*
- *Scene: Trials and related documentation in the classroom.*
- *Agency: Trials and related documentation in the classroom and the case manager.*
- *Purpose: Refers to the student’s ability and the student’s special needs.*
- *Barrier: Lack of knowledge on the part of the Braille transcriber.*
- *Dominant element: Agent (vision teacher, in conjunction with Braille transcriber and student, Act (trials with instruction).*

Participant Profile and Analysis: D-2

D-2 is a special education teacher who works primarily with middle school and high school students. She has earned a masters degree and has 49 years of experience teaching (the most of any participant). She demonstrated above average scores on knowledge and was one of three participants who scored highest on the attitude portion of the survey. Although she is currently employed as a special education teacher, D-2 reported that her master's degree was in the field of "computers". She works for a very small district in a secondary school that met AYP for 2006-2007. This teacher reported that she does not use assistive technology with students at present, but has used it as an accommodation for instructional work and testing in the past.

D-2 described the *act* of determining whether or not a student should use assistive technology with students as beginning with informal assessment. She explained,

We first determine the need.

She then referred to the "criteria" that she follows for special education referrals and interventions. D-2 implied that determination related to assistive technology interventions follow the same procedures as other special education interventions. Most interview participants referred to this process as the "IEP", "504", "Child Study Team" or "RTI" process.

D-2 referred to the "team" as the *agent* responsible for making decisions concerning the use of assistive technology. She specifically said,

Everyone on the team including the general education teacher, parents, everybody is called together and we study the student and we come to a consensus.

This special education teacher named the "case manager" as the primary *agent* involved in this process. This teacher serves as a "case manager" for many of the students with whom she works.

On the element of *scene*, D-2 referred to the "earliest time" that is appropriate as "when" a decision about the use of assistive technology with students should be made. In a "follow-up" question, the researcher reframed the inquiry and asked "when during the year" should this decision be made. D-2 emphasized that this decision would occur at the "IEP review," but she added that this decision was an ongoing process, that meetings could happen at any time and said that,

The needs of the student drive what we do.

In terms of *agency*, D-2's answer was specific to the IEP and related materials as the place where assistive technology services or interventions are documented. She mentioned that assistive technology may be specifically addressed in sections referring to "accommodations" and "modifications" in the IEP documents, demonstrating a good knowledge of documentation.

On the element of *purpose* the teacher used the phrase, "We want to know what the student knows," on three occasions. She also referred to documentation on the student's "IEP" to legitimize the use of assistive technology.

This teacher also referred to "lack of knowledge" as the primary barrier to the successful use of assistive technology. Instead of identifying herself as lacking knowledge, she specifically mentioned the "general education teacher" as commonly "not aware," of assistive technology. In addition, she described the BOCES as the gate-keeper of this knowledge when she stated,

They [BOCES staff] communicate with us about what they have, but you have to go see it, try it look at it, try to match it to your student.

She referred to having information provided to her by unnamed others, but intimated that these experts are BOCES staff, when she said,

I would like it to come from the other side and say 'this is out there, this is out there and this is out there,' and then we can plan a little bit better.

The teacher mentioned "cost" and lack of time as additional barriers to optimal assistive technology use.

Finally, this teacher discussed an issue that was commonly referenced among participants on the subject of general technology. D-2 referred to a "lack of knowledge of what is coming 'new' on the market all of the time." Concern of falling behind, in terms of keeping up with "what's new", is a common issue with many professionals who use technology.

It should be noted that this teacher referred to "keeping us [district staff] informed" as critical, as opposed to the acquisition of specific knowledge and skills by educators, related to using assistive technology equipment.

Based on analysis of the interview transcripts the researcher defined the elements for D-2 as:

- *Act: IEP team process, Child Study team process.*
- *Agent: IEP team (special emphasis on case manager).*
- *Scene: IEP meetings.*

- *Agency: IEP documentation.*
- *Purpose: To find out “what the student knows”.*
- *Barrier: Knowledge, time, cost, outside support.*
- *Dominant Element: Act-The IEP Team process. The teacher referred frequently to the IEP, “a continuing process” and “team” action and decisions.*

Participant Profile and Analysis: D-3

D-3 is an English teacher who works with “at risk” middle and high school students. She has also worked for the district’s “alternative school” for students, many of whom were not succeeding in the district’s “brick and mortar” secondary school. She has earned a bachelors degree, is currently working on a master’s degree and reported approximately 15 years of experience teaching. D-3 has worked with numerous "special education" and “at risk” students, but she is officially classified as a general education teacher. This teacher’s survey scores were below average in terms of knowledge and attitude related to using assistive technology. In fact, her scores on both subjects were the lowest of all survey participants.

This teacher asked for a definition of assistive technology to be read to her before the interview, an offer that was declined by most participants. She reported that she did not use assistive technology during instruction and that she was not allowed to use it as an accommodation on standardized assessment. She stated,

I would love to be able to do that with CSAP, but they won’t let you. As far as I know, we have never been able to get that as an accommodation.

D-3 seemed to base many of her answers on subject of “accommodations” as opposed to “assistive technology” as an accommodation. Neither the district nor the schools where she works made AYP in 2006-2007

In terms of *act*, the teacher reported,

I really don’t know what the whole process would be.

D-3 went on to explain that if she thought a student could benefit from using assistive technology she would let them “use it,” then “document it somewhere” and consult with the special education teacher or “case worker” concerning the student and the intervention.

Responding to the question intended to identify *agent*, the teacher initially answered, “I don’t know,” but then identified herself as the primary *agent* of action. She said,

I may be taking too much credit. I feel like it is my job to find whatever they need to learn. A lot of teachers don't feel that way, but that is how I feel.

The teacher again referred to collaborating with the special education teacher and added that the technology team and Student Improvement Team could contribute to this decision. The researcher is aware of no “technology team” at the schools where the teacher works.

Concerning the element of *scene*, the teacher said she, “didn’t know” where and when decisions to use assistive technology was made. She implied that a decision to recommend the use of assistive technology was dependent upon approval for funding when she remarked,

I don't know, because if you start getting into things that you have to purchase for school, then I don't know where or when that takes place.

In terms of *agency*, the teacher answered, “Again, I don’t know.” She then referred to her responsibility as a teacher and her method of documenting interventions.

D-3’s answer to the question that elicited a description of the *purpose*, of using assistive technology as an accommodation on standardized assessments indicated the mistaken belief that students are not allowed use assistive technology as an accommodation on accountability assessments. She stated,

I think it would be great if we could do that. I don't see that we get to do that. If we could, it could eliminate a lot of problems.

Later in this comment, the teacher referred to the importance of having continuity between the tools and supports that a student can use in class, and those that they can use on tests. She also stated that some of her colleagues have the attitude that it is not “fair” that only special needs students get accommodations. This statement also demonstrates misunderstanding of CDE regulations.

The teacher articulated her displeasure with excessive testing when she said,
I feel like they [students] are stressed, they are struggling already in a testing situation. If we can do something to help them improve, to let us know what they know, then we ought to be able to do it.

This statement is critical of accountability assessments and emphasized her belief that the purpose of tests is to allow students to demonstrate knowledge.

In terms of identifying a “barrier”, the teacher listed money and teacher attitudes related to “fairness”, as hindering effective assistive technology use. Both of these barriers are echoed by other district and BOCES interview participants.

Based on the analysis of the interview transcripts of D-3, the researcher defined her elements as:

- *Act: “Don’t know”. The content of her answer implied classroom trials using devices.*
- *Agent: “Don’t know”. The content of her answer implied, the classroom teacher.*
- *Scene: “Don’t know”. The content of her answer implied, in the classroom and through collaboration with colleagues.*
- *Agency: Don’t know. The content of her answer implied teacher documentation.*
- *Purpose: To know what students know, continuity between instruction and testing.*
- *Barrier: Cost of equipment, teacher attitudes.*
- *Dominant Element: Agent (the teacher is responsible and should do anything they can to help their students).*

Participant Profile and Analysis: D-4

D-4 is an elementary principal at a very small, rural school. The district and school where she works made AYP for 2006-2007. She has earned multiple degrees, including two master’s degrees and reported a total of 25 years of teaching and administrative experience. Her survey scores were average in terms of knowledge and below average in terms of attitude, related to using assistive technology.

D-4 reported that she uses assistive technology with students as an instructional accommodation and as an accommodation on standardized assessments when appropriate. The principal explained her justification for using assistive technology as a test accommodation with the following statement,

They [students] would use that [assistive technology] in the class. What they are using when they learn, different applications, so if that assists them in the learning situation, then whenever they are doing the assessment piece then it is a part of their total program.

The researcher interpreted this statement to reflect the principal’s belief that there should be continuity between the tools students use to learn in instructional settings and tools that they are

allowed to use in testing situations. This is a position advocated by several other interview participants.

The principal described the *act* of deciding whether or not a student should use assistive technology as determined by the individual needs of the student. She stated that this process is initiated “if a child reaches a learning block.” In other sections of the interview she reported that this determination and subsequent intervention is directed by one of several teams.

In terms of *agent* the principal mentioned the student improvement team (SIT), the assessment team and then specifically mentions the ESL teacher, special education teacher, Title 1 teacher, principal and classroom teacher. At this school, the “team” that performs assessment is an IEP team.

Responding to the question intended to elicit a description of *scene*, the principal reported,

That decision is made with the team, when we meet at one of our meetings, on a regular basis, and we are reviewing and talking about that particular special needs student.

In answer to a follow-up question, D-4 clarified that she was referring to a “SIT team”, “IEP team” or “parent team” meeting.

On the subject of *agency*, D-4 referred again to the “SIT team”, but the principal added that the decision and resulting plan to use assistive technology, “is also documented on our student’s IEP or their literacy plan.” D-4 described a literacy plan as an individualized intervention required by No Child Left Behind, for students who are reading below grade level.

When she described the *purpose* of using assistive technology as an accommodation on accountability assessments the principal stated,

The purpose is to equalize the playing basis for all students no matter what special needs they have, the playing field is equitable, so that they can perform to the best of their ability.

The principal named a lack of resources and specifically a lack of federal support as the biggest barriers to effective assistive technology use. She also emphasized a lack of knowledge on the part of district staff, “just knowing what is out there,” and a lack of “professional training on those devices” as impediments to successful assistive technology use. This principal implied that this issue uniquely affects small, rural schools when she said,

Rural schools run into the need that we would have financially to put all of those assistive technology devices in place.

Based on analysis of the interview transcripts for D-4, the researcher defined the pentadic elements as:

- *Act: Assisting students with learning. In other sections of the interview she refers repeatedly to a “team” approach to this.*
- *Agent: IEP teams (special emphasis on school staff).*
- *Scene: IEP meetings (also SIT team, Parent team meetings.)*
- *Agency: IEP documentation, SIT team, Literacy plan.*
- *Purpose: “Level the playing field”.*
- *Barrier: Outside support, funding, knowledge, staff training.*
- *Dominant Element: Act- Assisting students with learning. Assistive technology “assists them in their learning and helps proceed toward longitudinal growth.”*

Participant Profile and Analysis: D-5

D-5 is the superintendent of a small rural school district. His district did not make AYP for 2006-2007. The superintendent has a master’s degree and reported completing additional coursework toward a PhD. He has 16 years of combined teaching and administrative experience. His survey scores are below average in terms of knowledge and attitude related to using assistive technology. The researcher has had worked directly with this administrator on issues of assistive technology, and therefore knew that by D-5’s first answers in which he stated that students at his school do not use assistive technology in instructional settings or on assessments, were not accurate. In terms of using assistive technology during instruction, the researcher has discussed using adapted word processing programs, a scanner (coupled with a screen reader) and audio books with special education students in this district. The principal also said that his students did not use assistive technology as an accommodation on assessments, but listed “calculators” and “Franklin spell checkers” as items which his students use during assessments. Both devices are widely considered to be assistive technology. When the researcher raised this issue, the superintendent acknowledged that these items may be considered to be assistive technology, but then referred to augmentative communication devices as the type of assistive technology he had used at previous schools.

The superintendent described *act* as the “IEP Team Process.” He asserted that,
Teachers should be free to try assistive technology.

He then added that they should be required to follow procedures specific to the “IEP” or “504” process. The principal said that it is not appropriate for a student to use assistive technology simply, “because the teacher ‘feels’ that it’s right.”

The superintendent named the special education teacher in conjunction with the IEP team as the primary *agent* for determining whether or not a student should use assistive technology. He clarified,

For non-disabled children or 504-plan students, it should be the SIT and classroom teachers along with the SIT coordinator; the guidance counselor in our district.

The superintendent emphasized the importance of teachers training when he said,

Teachers should also be educated on assistive technology and be permitted to use those devices and methods.

The administrator identified the IEP, 504 and SIT processes as the *scene* or the place where these decisions should be made. D-5 listed IEP and SIT team documentation as primary method or *agency*, for describing, tracking and guaranteeing, “interventions, accommodations, modifications, etcetera.” D-5 said that the *purpose* of using assistive technology accommodations was, “to give these students the opportunity to have as level of a playing field as possible,” during instructional and assessment activities.

The superintendent listed “funding” as the biggest barrier to effective use, but also mentioned awareness, training, availability and knowledge as impediments to effective use. He stated that his district is, “lacking in knowledge and use of assistive technology.”

Based on analysis of the interview transcripts for D-5, the researcher defined the elements as:

- *Act: IEP and 504 process.*
- *Agent: IEP team (with emphasis on special education teacher and 504 coordinator and teacher using the equipment.)*
- *Scene: IEP meetings (also SIT team meetings).*
- *Agency: IEP documentation, SIT team process.*
- *Purpose: “Level the playing field”.*
- *Barrier: Outside support, funding, knowledge, and training.*

- *Dominant Element: Agent-The IEP/SIT. “We could use more training and awareness.”*

BOCES Participants and their Pentads

Participant Profile and Analysis: B-1

B-1 described herself as an “itinerant teacher” responsible for providing services to deaf and hard-of-hearing students as well as students with autism. She has a bachelor’s degree, is currently enrolled in a masters program in speech therapy and reported two years of experience working in the field of education. Her survey scores are above average in terms of knowledge and attitude related to using assistive technology.

B-1 reported using assistive technology with students as an instructional accommodation, but initially answered that she did not use assistive technology as a testing accommodation. She explained,

I haven’t personally administered any tests to the students that I work with. That is usually their building teachers.

The teacher changed her answer to “yes” when the researcher mentioned that FM systems and hearing-aids are often considered to be assistive technology devices and asked if she had ever recommend the use of these items by students in test situations. She seemed to have the same impression as D-5, that assistive technology referred to more complicated devices.

She cited “continuity” between tools used during instruction and testing as the primary reason why assistive technology would be appropriate. She stated,

It is only appropriate when it gets to be carried over to the testing situation if they have been using AT all year.

She also asserted that technology helps the team to test students “on what they know and how they get it done.”

This teacher described the *act* of determining whether or not to use assistive technology as based in “personal judgment” on her part as a teacher. “I look at goals.” She said that she considers whether or not the technology can help a student accomplish goals.

The teacher described the *agent* for implementing this intervention as the team. She emphasized the importance of having “the whole team” involved in the decision-making, implementation and determining whether or not the intervention was a success. She asserted,

Everyone needs to have a hand in helping to determine that.

On the question used to identify *scene*, the teacher initially answered, “I don’t know,” to the question, where and when the decision is made concerning whether or not to use assistive technology. She then elaborated, “Personally I make it whenever it becomes appropriate.” It became clear that she believes that this decision occurs for her in the classroom based on observations related to assistive technology use. The teacher said,

It is one thing to sit in a meeting and say ‘hey we are going to try this device,’ but then the student might reject it.

The teacher reported that she had not considered where assistive technology interventions for a student would be documented. She identified the *agency* for this intervention as “progress monitoring” related to student goals. The interviewer asked if there was anywhere else this intervention should be documented to insure student access to assistive technology and the teacher answered, “No.”

The teacher repeated two themes when she described the *purpose*, of using assistive technology: continuity between tools used in instruction and during assessment and helping students to demonstrate knowledge. In response to the question soliciting a description of *purpose*, B-1 said:

If they have been using it all year, and that is how we have been teaching them the skills that we feel like they need through out the year, then when we start looking at the CSAP testing, if we don’t let them use that accommodation again on the testing, then that is not really showing what they know.

She mentioned the concept of testing as serving the purpose of showing what students “know” on two other occasions in this answer.

The teacher identified the attitudes of special and general education teachers as being the primary “barrier” to effective assistive technology use. She stated,

Teachers don’t take the time to let their students use it [assistive technology].

When asked if she had anything to add to her interview, B-1 emphasized the need to teach students how to use technology and not treat technology as “a magic wand” that will “fix” everything about the student. She also reemphasized “continuity” between classroom and testing situations and addressed the misconception held by some educators, “that it [assistive technology accommodations] gives them [special needs students] an unfair advantage.”

Based on analysis of the interview transcripts for B-1, the researcher defined the elements as:

- *Act: Personal judgment on the part of herself and the team.*
- *Agent: IEP team (with emphasis on herself as an itinerant teacher and teachers who use technology with students.)*
- *Scene: The classroom where the technology is used.*
- *Agency: IEP goals and related progress monitoring.*
- *Purpose: Help students to demonstrate knowledge.*
- *Barrier: Teacher attitudes.*
- *Dominant Element: Agent-educators who work directly with students.*

Participant Profile and Analysis: B-2

B-2 is a speech-language therapist. She has a master's degree and approximately three years of experience working as a therapist in the field of education. Her survey scores were above average in terms of knowledge and average in terms of attitude related to using assistive technology.

This therapist initially reported that she did not use assistive technology with students, in instructional settings or in testing situations. The interviewer reminded B-2 of a student with whom she works, who uses switches to access toys, simple communications devices and computer activities. She then acknowledged that she used assistive technology with students in instructional settings. As was the case with participants D-5 and B-1, this therapist seemed to associate assistive technology with more complex equipment, specifically augmentative communication devices.

On several occasions interview participants reported not using assistive technology. The interviewer was aware of several recent instances where the therapist had used assistive technology with students. The therapist's "no" answer could again indicate a narrow definition of assistive technology. For example, this speech therapist frequently referred to communication devices when discussing assistive technology, which are of special importance to her discipline. The student that this therapist overlooked primarily uses simple assistive technology to activate toys or computer-based activities.

B-2 shared two reasons why students did not use assistive technology as part of her answer on this section of the interview. She said, “Students refuse to use it,” and that issues related to “money” sometimes preclude assistive technology use.

The therapist reported that she had not used assistive technology as an accommodation for testing, but seemed to limit her involvement with this process to her therapeutic discipline responding, “No, not for speech language.” This statement also suggested that B-2’s views on assistive technology might be limited specifically to her discipline. This echoes the comment by B-1 when she said,

I haven’t personally administered any tests to the students that I work with. That is usually their building teachers.

These BOCES employees do not consider their advisory role as members of IEP teams as central to the process of making accommodation decisions. B-2 added a comment that supported “continuity” between tools that students use in the classroom and tools that they are allowed to use during testing. She said,

If they use it in instruction, they should use it on the assessment.

B-2 equated the *act* of determining whether or not a student should use assistive technology with “the IEP team”. She did, however, suggest that each professional may play a greater or lesser role in the process dependent upon the needs of the student. To illustrate her point, she said,

If it was for speech therapy, a speech language type of device, then a speech therapist might lead and bring ideas.

The therapist also mentioned the importance of involving parents, using the assistive technology device on a daily basis and soliciting help from a “specialist”.

In terms of *agent* the therapist referred to the “IEP team”. The team should include all of the individuals that the therapist mentioned in her comments on *act*. B-2 identified the IEP meeting as the *scene* or the place where decisions are made, but then added,

Well actually it might depend on the level of technology.

The therapist pointed out that for simple interventions (i.e., “a pencil grip”) the decision might be made “on the spot”, but for more complicated interventions a “team decision” may be more appropriate and it may “involve a lot more evaluation.” The therapist expressed some frustration with the IEP process when she stated,

You have to call an IEP meeting for everything; so nothing without the team. God forbid!

This participant's reference to "simple interventions" is of special interest to the researcher because the therapist cited a "pencil grip" as an example of assistive technology. Pencil grips are commonly used in schools, but this therapist's initial answer to whether or not she used assistive technology with students was "no".

The therapist listed "the IEP team," as the *agency* for insuring assistive technology interventions are appropriately documented. She explained,

It could be an annual review or a special meeting called to decide if this is something that the student needs.

B-2 echoed a previous statement when asked to describe the element of *purpose*. She emphasized the importance of "continuity" between what tools the student uses in the classroom and what they are allowed to use during assessment. She said,

Well if they have been using it all along, then it would be to give them the same advantage, so that they could be successful, that they have had in the classroom all of the time.

She expanded this thought and asserted that it is unfair to allow students to use assistive technology to "demonstrate what they know on a daily basis, and then take it away," in testing situations. She also emphasized the concepts of "equal" and "independent" access to the curriculum, and the opportunity for students to, "demonstrate their own knowledge."

In terms of the most significant "barrier" to assistive technology use, the therapist pointed to a lack of "knowledge of variety of products" specifically on behalf of "teachers". She also mentioned the important role that a "specialist" plays related to educating members of the IEP team.

When asked to add any additional thoughts, B-2 emphasized the importance of assistive technology and recounted a story of a previous client who used assistive technology to communicate effectively in public. At the end of the interview she added,

Assistive technology got me into speech therapy.

Based on interview responses, the researcher determined the elements for B-2 to be:

- *Act: The IEP team process.*
- *Agent: IEP team (with emphasis on specific professionals dependent upon need.)*

- *Scene: The IEP meeting or the classroom, dependent upon complexity.*
- *Agency: IEP documentation.*
- *Purpose: Continuity between class and testing, access and helping students to demonstrate knowledge.*
- *Barrier: Teacher knowledge.*
- *Dominant Element: Act: The IEP team Process “nothing without the team.”*

Participant Profile and Analysis: B-3

B-3 is also a speech-language therapist. She has a master’s degree and 24 years of experience working in the field of education. This participant’s survey scores are above average in terms of knowledge and attitude related to using assistive technology. She obtained the highest score possible on the “knowledge” portion of the survey. B-3 was the assistive technology coordinator for the BOCES until 2006.

This participant reported that she had used assistive technology as an accommodation for instructional work and assessments. She provided numerous examples of technology that she had used with students. When she explained her rationale for using technology in these situations, she stated that assistive technology helps students with “accessing their general curriculum” in instructional settings and helped to “level the playing field” with assessments. She also stated that assistive technology accommodations allow “you” to test “their knowledge instead of their disability.”

B-3 described the *act* of determining whether or not a student should use assistive technology as a team-decision resulting in a referral for an evaluation. She explained,

First we refer them to the assistive technology coordinator and have an assistive technology evaluation performed.

This therapist places the initial intervention in the hands of an “expert”. Her description of the process contrasts state guidelines that encourages educators to first support a student with simple changes in educational strategies, tracking student response to those interventions, prior to referring students to special education staff for formal assessment. The therapist acknowledged that assistive technology intervention is an ongoing process when she explained that there is, “a lot of trial and error” and that the team should, “try something on a daily basis before you would

ever write that in as an accommodation, especially for testing.” In a follow up question, the therapist confirmed that in the eyes of B-3, the process of evaluation was critical.

The therapist described the *agent* in this situation as “the staffing team” and “the IEP team”. B-3 gave special emphasis to the “assistive technology coordinator” in the role of the “expert.”

The therapist described the *scene* where these decisions occur in context of the IEP process. She stated,

It [the decision to use assistive technology] is determined at the IEP meetings.

She also described the *agency* clearly when she reported,

It is documented on the IEP forms under the heading, ‘Was AT considered?’ and then in the accommodation portion of the IEP it would also be documented.

B-3 added that assistive technology interventions could be documented elsewhere.

It could be documented in goals. Like a report; progress reports.

The therapist echoed her previously cited statements when she described the *purpose* of using assistive technology as an accommodation on accountability assessments. She explained that using assistive technology helps to insure that you are, “testing the child’s knowledge instead of how they can access the test,” and that you are “not penalizing the [the child for their] disability, but you are actually testing then their knowledge-base.”

The therapist suggested that the biggest barrier to effective assistive technology use is convincing individuals to use assistive technology on a daily basis. She drew a distinction between “teachers, paraprofessionals and parents” and special service staff (BOCES employees). She asserted,

A lot of time it is used when the support staff or related service providers are there, or in the special education room, but not in the general education, and then we find it in closets.

Because this participant was previously the assistive technology coordinator for the BOCES, the researcher chose to ask her why she decided to step down as assistive technology coordinator. She cited “lack of time,” and “a real frustration about people using it [assistive technology] correctly or them wanting things without wanting to go through the process of evaluation.” She also invoked the analogy of “magic” (a descriptor also used by B-1) when B-3 said that some people think that,

It [assistive technology] is a magic cure. If they can just have this piece of equipment the kid will be fine, and it's not that.

Based upon analysis of her interview, the researcher defined B-3's elements as:

- *Act: The evaluation by the AT coordinator.*
- *Agent: IEP team (with emphasis on the AT coordinator)*
- *Scene: The IEP meeting.*
- *Agency: IEP documentation*
- *Purpose: Helping students to demonstrate knowledge and equal access.*
- *Barrier: Teacher, paraprofessional and parent follow through and knowledge.*
- *Dominant Element: Act: The evaluation by the AT coordinator.*

Participant Profile and Analysis: B-4

B-4 is a school psychologist. She has a master's degree and approximately three years of experience working in the field of education. This participant's survey scores were above average in terms of knowledge and attitude related to using assistive technology. She reported that she had recommended assistive technology use as an instructional accommodation, but could not remember an occasion when she had recommended the use of assistive technology as a testing accommodation. She said that she had used assistive technology with students as part of "best practice", a phrase which describes adhering to the "best" methods of intervention and services for a student. B-4 asserted that assistive technology accommodations can lead to student "success" during testing and instruction and helps with "meeting their needs."

The psychologist described the *act* as first determining "what disability the student has," and explained that,

You would have to go through the evaluation process that is completed by the child study team.

She described this as the critical first step in the IEP. B-4 also referred to monitoring and documenting the goodness-of-fit between student needs and the intervention. She stated,

Well I think you would need to look at their goals and see if AT fits into their goals or if it is an accommodation for their everyday school.

She also mentioned the importance of relying on the Child Study Team especially for problem solving with general education students.

B-4 described the *agent* as the “IEP team” and the “Child Study Team” with special emphasis on the assistive technology coordinator who she said helps to “evaluate” need and determine “eligibility.” Several other participants emphasized the need for an “expert” to participate in the process.

The psychologist described the *scene*, where decisions related to assistive technology service occur, as the “IEP meetings”, but B-4 indicated that this process is ongoing and linked to other processes including Child Study Team meetings and classroom interventions. She emphasized a need to,

Gather information before the meeting so that you can hopefully make the decision about an accommodation.

She described the *agency* as IEP documentation, but added that interventions related to assistive technology might be included in a “504 plan, you could document it there.” B-4 also mentioned that documentation may occur during the Child Study Team process.

Her description of the *purpose* for using assistive technology emphasized “student success” and her belief that when appropriate accommodations are employed,

You are not really testing the student’s disability. You want to test the student’s ability. She also emphasized the importance of providing equal “opportunity” for special needs students.

B-4 identified “teacher attitudes” as the biggest barrier to successful assistive technology use. She claimed that some teachers, “don’t feel that assistive technology should be used in schools,” and that they feel as though it provides special needs students with “an advantage over some of their students who might not be able to use AT”.

Based on B-4's interview responses, the researcher determined elements to be:

- *Act: The IEP team process, including Child Study and 504 processes for general education students, with special emphasis on evaluation.*
- *Agent: IEP, Child Study and 504 teams (with emphasis on evaluation).*
- *Scene: The IEP, Child Study and 504 meeting (with prior data gathering).*
- *Agency: IEP, Child Study and 504 documentation.*
- *Purpose: Insuring student success, testing student ability and providing equal opportunity.*
- *Barrier: Teacher attitudes about "fairness".*
- *Dominant Element: Act: The IEP, Child Study and 504 team processes.*

Participant Profile and Analysis: B-5

B-5 is the Director of Special Education for the South Central BOCES. She has a master's degree and approximately 17 years of teaching and administrative experience in the field of education. This participant's scores were slightly below average in terms of knowledge and attitude related to using assistive technology. This interview participant provided answers that went into greater depth than other participants. Her interview transcript was more than twice as long as that of any other participant. She frequently referred to state and federal legislation and commented on issues in sections of the interview that exceeded the intended scope of the interview question.

B-5 reported that she uses assistive technology as an accommodation for instructional work and in testing situations. To support this claim, she referred to her decisions related to staffing as the director of special education. She explained that the BOCES facilitates, AT services through the IEP process and through the allocation of an FTE." The BOCES budget includes release time for two therapists, equal to one full-time equivalent (FTE), or one salaried position. B-5 reported that there is some confusion about how to include "assistive technology" in a student's IEP in terms of whether to include it simply as an accommodation or whether to include it as a "related service" which includes IEP goals and designated times of service delivery.

Based on her interview, the special education director described the *act* as "an IEP process." She presented scenarios where students used a variety of technology as part of special education intervention. She emphasized the importance of "data" related to student performance

while using assistive technology to determine whether or not assistive technology is a good “modality” for learning. She also suggested that,

Interviewing kids is a good form of data. Otherwise it is something that you are thrusting upon me [the student] and I may or may not use [the assistive technology].

The director also pointed out that this process is not perfect and that some,

IEP teams do not have a process as to why we should do this [assistive technology interventions] and why we should invest in that equipment, and as a result we have a lot of equipment that doesn't get used.

Although the following statement was made in response to another section in the interview, the special education director referred to federal and state regulations that influence the *act* of providing assistive technology accommodations for students on assessments. She explained,

CSAP accommodations are outlined by the state of Colorado under NCLB. For kids taking the ACT in their junior year, it doesn't even matter what is on the IEP because they are just standard accommodations that are allowable on that assessment according to that testing agency.

She is the only interview participant who pointed out that independent testing agencies may have regulations concerning the use of accommodations, that are independent of special education regulations and beyond the scope of the IEP process.

B-5 described the *agent* for guiding assistive technology intervention as the “IEP team” for special education students and the “Child Study Team” for students who are not designated as “special education” students. She asserted the following belief:

I want assistive technology to be available, not only to special education kids.

She added that special education students should have priority to that equipment if there is a waiting list, because,

All of this equipment is bought with federal funds that they generate.

The director also emphasized the importance of involving “the assistive technology” coordinator, especially with evaluation and decisions related to assistive technology services.

B-5 described the *scene* where decisions where assistive technology are made as “IEP” and “Child Study meetings.” She said,

Where and when is at the annual, tri or initial IEP and or in the context of a special request which goes back to the process, if you notice that some issues are happening with my handwriting or even my mobility or something like that then those things should be brought to a Child Study Team and there should be contact made to an assistive technology coordinator.

This statement emphasized that there are several *scenes* in which decision to use assistive technology may be made. Like B-3, the Special Education Director also mentioned involving an “expert” (the assistive technology coordinator) on the subject.

When she was asked about the *purpose* of providing assistive technology interventions, the director listed several examples that illustrated when assistive technology use as an accommodation would be appropriate. She emphasized the important contribution that assistive technology can make in terms of helping students to “access” their education, display knowledge, demonstrate what they “know” and demonstrate “proficiency” in specific subject areas. B-5 also stated that assistive technology interventions can be an effective intervention because,

Individuals learn and process information at different rates, and also use different modalities.

B-5 emphasized the importance of continuity between the availability of instructional tools in testing environments. She asserted that educators have the responsibility to know when a student can and should use assistive technology and be able document related facts appropriately. B-5 explained:

We are in charge of adhering to, and knowing, those regulations. So when that testing situation comes up, we don't set a kid up for failure who thinks, 'I am going to go in here and show everybody that I can write like the wind,' and then all of the sudden I say to you, 'your on your own'.

The director shared an instance where a school allowed students to use accommodations inappropriately and was penalized for their action.

The director identified the primary “barrier” to assistive technology use as deficient educator “knowledge” and “attitudes”. She suggested that a gap exists between the knowledge and attitudes of older and younger generations of educators. The director said:

You have an upper group of teachers now who have been around for twenty, twenty-five years and they are afraid of technology and they don't incorporate it in their instruction at all. And then you come in there and say, 'Well you can probably just do a couple of things. I need you to flip that switch and charge it every night and whatever,' and immediately a barrier goes up because there is fear of the unknown, despite how simple or complex it is, it still goes up because we are in two different generations.

This comment reinforces one of the quantitative research questions posited as part of this study: Is there a difference in the attitudes and knowledge of recently graduated teachers and their more experienced colleagues?

This participant took full advantage of her opportunity to “add anything” to the interview and shared her personal belief that is important to include in its entirety. The director stated:

I would like to see us catch up to the population that we are serving. These are kids as a generation in our schools, and I think we are almost on our second generation of kids in our schools, you know they were born in a technology age. They are used to technology changing every day. They spend hours using technology whether it be on the computer, their I-Pod, a video game, whatever. This is an appealing modality for these generations of learners and I would like to see us catch up to that in public education. I really would.

I think that we would be more engaging with kids if we would use a format that they seem to really pick up information from and that they are almost totally dependent on, completely, in their own personal lives. In our house, everybody has their own personal computer. When I was sixteen I had never even been on a computer. You know, but now a high school student, even a Jr. High student can't function without their own personal computer or access to one in the public school.

Again, I think it is an issue where we are using textbooks to teach kids and the way that they absorb information is through just the information age. They are about the web, they are about freedom of information all around them and they are used to getting it wherever they want to get it and a text book is not how they do that anymore. So

looking things up in the dictionary is inappropriate to them when you can get on Wikipedia and get a whole autobiography or biography of this event or person or machine or whatever. So I think that's what I would like to see is us catch up to what kids are doing and where they are in their life as learners.

These comments imply that there is a “generation” gap between students who been exposed to a variety of technologies since birth and some of their teachers, who grew up and were educated without computers and other technologies, but now find that they are expected to incorporate technology into all aspects of their practice.

Based on interview answers the researcher designated the elements for B-5 as:

- *Act: The IEP team process with special emphasis on becoming aware of, and adhering to state and federal regulation related to assistive technology use in schools.*
- *Agent: The IEP team for special education students, the child study team for general education students with emphasis on an “expert” the assistive technology coordinator.*
- *Scene: The IEP meeting or Child Study Meetings.*
- *Agency: The IEP with emphasis on state, federal and testing agency guidelines.*
- *Purpose: To adhere to state and federal mandates related to assistive technology, in addition to helping students demonstrate knowledge and proficiency on assessments.*
- *Barrier: Teacher knowledge and attitudes*
- *Dominant Element: Act: The IEP team process as described by state and federal regulations.*

Creating Composite Pentads

In this section of the qualitative data analysis, the researcher will review the elements of the pentad for each of the interview participants to determine if identifiable patterns are evident in each group. The researcher then compares and contrasts the identified elements between groups.

Composite for District and BOCES Participants

The educators who work directly for school districts presented descriptions of *act*, *agent*, *agency*, *scene* and *purpose* that varied, but some similarities in responses are evident. In the following section, the researcher selects and describes a dominate description for each element gleaned from the interview data of participants.

Act-District

Two of the district employees stated that they “didn’t know” the process for determining whether or not a student should use assistive technology as an accommodation. Two participants described “the IEP process” as the *purpose* and one individual used language that established that the *act* is “assisting students with learning.” Later in their interview, that participant named team problem-solving as the source of this assistance and specifically referred to the “IEP” and “Child Study” process. The two individuals who answered “I don’t know” are not necessarily full and active participants in the IEP process. One participant is a para-educator and the other is a general education teacher; positions that are part of the IEP by definition, but in practice are not always included in IEP meetings. After their initial responses, both of these individuals referred to trials involving the use of assistive technology as a part of the process. These answers are not at odds with the “IEP process” which includes pre-referral interventions that include targeted interventions and documentation specific to a student’s response to that intervention. Perhaps these two educators know the appropriate protocol, but are not familiar with “official” terminology and procedures.

- **Interview data support the identification of “the IEP process” as the composite *act* for the district employees.**

Act-BOCES

Three of the BOCES employees named the “IEP process” as the *act*. The former assistive technology coordinator named “evaluation by the assistive technology” coordinator as the *act*. Other aspects of B-3’s interview implied that she sees an “expert” as critical for guiding the process of determining whether or not students should use assistive technology as an accommodation. B-3 expressed frustration with individuals who want “things without wanting to go through the process of evaluation.” Some of her frustration appeared to result from her belief that some individuals mistakenly believed that assistive technology, “was going to cure the

child.” Involving an “expert” on assistive technology can be part of an IEP process, but this participant placed more emphasis on the role of the expert in the process than other participants and more emphasis on the role of an “expert” than do Colorado Department of Education guidelines (Unit of Student Assessment, 2006). The BOCES employee (B-1) who identified “personal judgment” on the part of “herself” also mentioned that IEP teams play a role in the process, but also indicated that she does not always trust the judgment of the team. B-1 emphasized the importance of “looking at the goal” for a student, which is part of the IEP process.

- **Interview data support the identification of “the IEP process” as the composite *act* for the BOCES employees.**

Agent-District

Three of the district employees identified the “IEP team” as the *agent* responsible for determining whether or not a student can use assistive technology as an accommodation. These responses are in line with guidelines from the Colorado Department of Education (Unit of Student Assessment, 2006). The general education teacher and para-educator identified *agents* that are part of the “IEP team”, but they did not specifically name the IEP team in their answers. The paraeducator identified the student’s “VI teacher” as the *agent*. The VI teacher is the case manager for the student with whom the paraeducator works and is a very strong advocate for this student. The general education teacher identified herself as the *agent* of action, but later in comments acknowledged that she would work with “the principal, the technology team, probably SIT, RTI intervention team and the special ed department.” All of these actors should be a part of “IEP team” if needed.

- **Interview data support the identification of “the IEP team” as the composite *agent* for the district employees.**

Agent-BOCES

All of the BOCES employees identified the “IEP team” as the *agent* in the pentad. Participants emphasized the role of specific IEP team members. Four of the individuals referred to the role of an “expert” or assistive technology coordinator. The itinerant teacher emphasized her role as an *agent* who works directly with students.

- **Interview data support the identification of “the IEP team” as the composite agent for the BOCES employees.**

Scene-District

Three of the district employees identified “IEP meetings” as the *scene* where the decision occurs whether or not to use assistive technology as an accommodation with students. Again the paraeducator and the general education teacher did not identify the same *scene* as their colleagues. The paraeducator referred to instructional trials in her response to the question related to *scene*, but in another section of her interview, credited the VI teacher as the person who makes the ultimate decision related to the use of technology. D-1 made no reference to an “IEP meeting” in her answer. The general education teacher’s answer focused on funding as preceding educational recommendations related to assistive technology. D-3 did not refer to any aspect of “IEP meetings” in her answer.

- **Interview data support the identification of “the IEP meeting” as the composite scene for the district employees.**

Scene-BOCES

Four of the BOCES employees identified “IEP meetings” as the *scene* where decisions related to assistive technology accommodations are made. The itinerant teacher identified the “student classroom” as the primary *scene* where decisions are made. She acknowledged that an IEP meeting is a place where decisions are often made, but emphasized the classroom as the place where decisions are operationalized. B-1 stated,

It is one thing to sit in a meeting and say ‘hey we are going to use this device.’

It should be noted that trials with interventions and using data to accept or reject interventions is a critical part of data that should be considered at “IEP meetings” according to CDE guidelines (Unit of Student Assessment, 2006).

- **Interview data support the identification of “the IEP meeting” as the composite scene for the BOCES employees.**

Agency-District

Three district employees identified “IEP documentation” as the *agency* where decisions to use assistive technology as an accommodation on accountability assessments are documented

or guaranteed. The paraeducator and the general education teacher referred to intervention trials and related data as the critical method for documenting on this subject. Again, these participants did not name “IEP documentation” specifically, but data from classroom trials should be included in “IEP documentation” on assistive technology use and can have a dramatic impact on the IEP process.

- **Interview data support the identification of “IEP documentation” as the composite *agency* for the district employees.**

Agency-BOCES

All BOCES employees described “IEP documentation” as the *agency* for guaranteeing assistive technology accommodations. It should be noted that individuals differed on exactly where and what kind of IEP documentation is appropriate. For example, the itinerant teacher referred specifically to “goals” and “progress monitoring” as the places in the IEP where documentation would occur, while the director and former assistive technology coordinator referred to specific sections of IEP documents that solicit information on the role that assistive technology should play in a student’s education.

- **Interview data support the identification of “IEP documentation” as the composite *agency* for the BOCES employees.**

Purpose-District

On the question of *purpose*, district employees provided a variety of warrants for using assistive technology as an accommodation on accountability assessments. Both administrators use a version of the metaphor “leveling the playing-field” as the *purpose* for accommodations on assessments. The two special education teachers referred to the *purpose* of using assistive technology as enabling a student to demonstrate what they know, in spite of disabilities or deficits. The paraeducator spoke specifically about the student with whom she works on this question. She implied that assistive technology enables the student to be a more active and independent learner, and that is the best way for all students to learn. D-1’s answer emphasized that Braille and related technology are part of “who” this student is. D1 stated,

She is a Braille reader, so as long as it is provided to her in Braille, there is no reason whatsoever that anyone should have to orally dictate that test.

All of the responses on the subject of *purpose* relate this element to supporting students and allowing them to demonstrate their knowledge, although the examples and language that they use to describe *purpose* varied.

- **Interview data support the identification of “student empowerment” as the composite *purpose* for the district employees.**

Purpose-BOCES

All of the BOCES employees used language that referred to assistive technology assisting students with “demonstrating knowledge” or showing their true “ability.” Several of the BOCES participants made reference to other *purposes* including “improving test success,” complying with state and federal regulations and providing “equal access” for students to their education.

- **Interview data support the identification of “demonstrating knowledge” as an appropriate composite *purpose* for the BOCES employees.**

Barriers-District

District employees listed a variety of “barriers” as preventing optimal use of assistive technology. Three employees specifically referred to barriers outside of their control. The two administrators and the special education teacher referred to a lack of “outside support”. The administrators referred to issues of “funding” as primary barriers. The superintendent also mentioned deficits in teacher knowledge and training. The special education teacher referred to lack of knowledge on the part of general education teachers and the need for more support from the BOCES. The general education teacher cited negative attitudes that other teachers possess toward special students receiving accommodations. Only the paraeducator identified the “biggest barrier” as related directly to her. She identified her lack of knowledge on the subject of assistive technology and general lack of time to participate in continuing education.

For district employees the composite for “barrier” to effective assistive technology use is resource limitations outside of their control. It is of interest that this barrier is not an element of the pentad for any district participants.

- **Interview data support the identification of colleagues’ attitudes and knowledge related to assistive technology as the primary barrier.**

Barriers-BOCES

BOCES employees pointed a collective finger at “teachers” as the primary barrier to optimal assistive technology use. Two individuals cited poor “attitudes” about using technology, two cited poor teacher “knowledge” on the subject, while the administrator cited poor attitudes and knowledge as the primary “barrier” but included all educators in this category.

According to state and federal regulations, teachers are part of the IEP Team. The element of *agent* therefore is indirectly indicted as the primary barrier to successful assistive technology use. It should be noted however, that teachers, especially general educators, often play a lesser role in the IEP process. Although inclusion and integrated services are becoming more common, interventions such as assistive technology are frequently introduced in a resource room or during a therapy session and sometimes do not make their way into a general classroom. The researcher provides some additional comments on the way participants characterize barriers in the section on ratios at the end of this chapter.

- **Interview data support the identification of deficits in district teachers’ attitudes and knowledge related to assistive technology as the primary barrier.**

Dominant Element-District

Identifying a dominant pentadic element for district employees was difficult given the frequency of “don’t know” answers by two of the participants. Based on direct answers from other participants, *act* was the most dominant element. Several of the participants frequently mentioned the “IEP process” (the composite element for *act*) as the mechanism for addressing all issues related to assistive technology use. The paraeducator and the general education teacher, however, did not refer to the IEP process. Instead, they referred to elements of the IEP process specific to their jobs. An argument could be made that the most dominant element in the discourse of the district employees should be *scene*, because two of the participants appeared to be excluded, either in process or in an actual physical participation, from IEP meetings where discussion, decisions and documentation occurs. Both of these educators, however, referred specifically to their role as problem-solvers, documenters and advocates for their students. In that respect, *act* can be justified as the dominant element for these individuals who see the process of determining whether or not to use assistive technology as an accommodation as an in-class process of instructional interventions.

- **Interview data support the identification of *act* is the most dominant element in the pentad for district employees, but the description of *act* varied among participants.**

Dominant Element-BOCES

The researcher identified *act* as the dominant element for four of the BOCES employees. For three of those employees, *act* was identified as “the IEP team process”. For the itinerant teacher, *act* was identified as “personal judgment” on the part of the educator resulting from her direct work with a student. The fifth BOCES employee, the former assistive technology coordinator, emphasized the role of *agent* above all other elements, and cited the role played by the assistive technology coordinator in the process. She described the AT coordinator as the “first step” and the “last word” in the intervention process. Given the fact that the “assistive technology coordinator” and the “itinerant teacher working directly with students” are also part of the IEP process, it is appropriate to conclude that interviews from BOCES employees identify *act* (represented by the IEP process) as the dominant element of the pentad.

- **Interview data support the identification of *act* (represented by the IEP process) as the most dominant element in the pentad for district employees.**

Table 5.2 is a summary of individual pentads and the barrier for each district interview participants. Of specific interest on the subject of barrier, is that all but one district employee cites their colleagues (outside sources) as the primary barrier to optimal assistive technology use. In addition, Table 5.2 includes the composite pentads for district participants.

Figure 5.2 Composite Pentads for District Participants

District Participants	Act-Process	Agent-Who	Scene-Where	Agency-Means	Purpose-Why	Barrier
D-1 Paraeducator	“Don’t Know”	VI teacher	Class room trials	Data from Trials	Student’s ability	Her knowledge
D-2 SPED teacher	IEP process	IEP team	IEP meetings	IEP documents	Find out what student knows	Knowledge Time Cost Support
D-3 General Ed Teacher	“Don’t know”	“Don’t know”	“Don’t know”	“Don’t know”	Find out what student knows	General Ed teacher attitudes
D-4 Principal	Assisting Students with Learning	IEP Team	IEP meetings	IEP documents	Level the playing field	Funding Knowledge
D-5 Superintendent	IEP process	IEP Team	IEP meetings	IEP documents	Level the playing field	Knowledge among teachers
Composite for District Employees	IEP process	IEP Team	IEP Meetings	IEP documents	Find out what student knows	Knowledge and attitudes of colleagues

Table 5.3 is a summary of individual pentads and the barrier for each BOCES interview participants. Of specific interest on the subject of barrier, is that all BOCES employees cited their district colleagues (outside sources) as the primary barrier to optimal assistive technology use. In addition, Table 5.3 includes the composite pentads for BOCES participants.

Table 5.3 Composite Pentad for BOCES Participants

BOCES Participants	Act-Process	Agent-Who	Scene-Where	Agency-Means	Purpose-Why	Barrier
B-1 Itinerant Teacher	Personal judgment	IEP Team	Class room Trials	IEP goals	Help students show knowledge	Teacher attitudes
B-2 Speech Therapist	IEP Process	IEP Team	IEP Meeting	IEP documents	Continuity between instruction and testing	Teacher knowledge
B-3 Speech Therapist Former AT Coordinator	Evaluation by AT coordinator	IEP Team	IEP Meeting	IEP documents	Insure student success	Teacher attitudes
B-4 School Psychologist	IEP Process	IEP Team	IEP meeting	IEP documents	Help students show knowledge	Teacher behavior
B-5 SPED Director	IEP Process	IEP Team	IEP meeting	IEP documents	Follow state and federal regulations	Teacher knowledge and attitudes
Composite for BOCES employees	IEP Process	IEP team	IEP meeting	IEP documents	Help students show knowledge	Teacher knowledge and attitudes

According to Rountree (1999), identifying the elements is essential to conducting pentadic analysis, but simply naming the elements is not sufficient. Additional analysis and comparisons are required to provide deeper insight into the motivation of individuals.

Additional Interview Data and Analysis

Although he recognized continuity in language and descriptions can provide insight into the motives of individuals, Burke (1945) expressed a special interest in "the strategic spots at which ambiguities necessarily arise" (xviii). Burke called for exploration of "ambiguity" discovered during communication analysis. Three of the interview participants demonstrated elements significantly different from their peers. Analysis of the interviews of B-1, D-1 and D-3

resulted in unique pentadic elements for those participants. As a result of discrepancies, and in order to check the accuracy of conclusions that the researcher made concerning the identification of elements for interview participants, the researcher conducted short follow-up interviews with each these participants. Before addressing the follow-up interviews, the researcher offers possible explanations for why these three participants presented unique interview data.

In the opinion of the researcher, the difference between D-3's interview responses and those of her peers are easily explained. This teacher admitted her lack of knowledge on the subject of assistive technology on several occasions. She was the only educator interviewed who was not a special education employee or administrator of special education staff. The difference between her attitude and knowledge and those of her peers is most likely due to a lack of exposure to special education training. What this teacher does demonstrate in interview data that should be encouraging to her special education colleagues is a willingness to collaborate and work with individuals who are trained in the areas of special education and assistive technology. Because the source of D-3's unique responses were most likely due to her unfamiliarity with assistive technology and related guidelines, the researcher chose not to perform a follow-up interview with this participant.

Member Checking-B-1

For B-1 the researcher suspected that differences in elements were due to the unique nature of these participant's respective positions. In order to test this supposition the researcher conducted follow-up interviews with these individuals to further explore these differences. B-1 is an itinerant teacher. She is one of the few BOCES employees responsible for providing services in all of the 13 school districts that the BOCES serves. She described her work as "consultative," but reported that she works directly with students and educators when she is able. At the start of the 2007-08 school year, the BOCES administration elected to have BOCES service providers travel, and when appropriate, work as teams to promote collaboration between disciplines and "integrated service" delivery. B-1 does not travel with a team. She collaborates with colleagues, but often works in isolation from other BOCES staff.

Comments made by B-1 provided an excellent opportunity to examine the ratio between *act* and *agent*. Burke (1989) suggested that researchers pay "special attention to the *act-agent* ratio" (p. 152), when analyzing relationships between elements of the pentad. The researcher

began the “follow-up” interview with B-1 by pointing out the itinerant teacher’s unique perspective compared to her BOCES colleagues, in that “personal judgment” and work in the classroom where the technology is used, appears to play a more significant role in her decision making than the “IEP process.” B-1 responded,

Humans are following the IEP, so just like any law, it is only going to keep honest people honest. So if they were not doing what was best for the student before, then they are not going to do what is best for a student just because you have it written down somewhere.

B-1 clearly described the actions of *agents* (e.g., service providers and educators) as not completely controlled by the constraints and program set forth in an IEP. This statement reinforced the researcher’s assertion that *agent* is the dominant element for this participant. The itinerant teacher further deconstructed the importance and influence of IEP meetings when she said,

Also there are lot of people that turn into ‘yes men’ at IEPs and then don’t follow through, because it might sound good when people are saying it. Or they don’t want to get into a discussion, if you only have half an hour, to decide what you are going to do with this student. Not everyone is going to follow everything that is on there. It doesn’t happen.

B-1 has accused IEP teams as being susceptible “group-think” especially given the constraints of the *scene*, which demands a need to reach consensus in a limited amount of time. She is also critical of the process of use

When the researcher asked B-1 where she would introduce the idea of a new intervention for a student her answer was clear:

In the classroom; I would never introduce an idea for a new intervention, in an IEP meeting, because, just to throw out a concept, people are going to say ‘yeah yeah, that sounds good,’ but unless you can get them to buy into it, in the classroom, working with a student, they are not going to do it.

Although B-1 implied that an *agent*’s behavior and decision making can be dramatically influenced by other elements of the pentad, she clearly articulated her opinion about the dominance of the *agent* when she said,

It is important to look at ourselves as professionals and not always think that everyone is on the same playing field. There is so much generalization now of people’s roles in the

student's education. It is important to still look at yourself as 'I know something that everyone else doesn't' and try it out. You don't know every answer, so before you introduce it to everyone else you have to test the idea yourself, before you have to get other people to buy into it.

Whereas CDE standards (Unit of Student Assessment, 2006) emphasize the importance of a “team” approach to making decisions and implementing assistive technology accommodations, B-1 recognizes the limitations of a “team” approach and attributes the ultimate success or failure of an intervention in the hands of the service providers and educators who work directly with the student.

Member Checking-D-1

D-1 is a paraeducator who is classified as a “special education” employee, but her job responsibilities and work experience are not typical of many paraeducators working in schools. She is a certified Braille transcriber and works exclusively with one special education student who is visually impaired. Unlike other district employees interviewed for this research, D-1 described elements focused on instructional trials with the student and collaboration with the student's case-manager, The Teacher of the Visually Impaired (VI teacher). The researcher supposed that this district employee may not have had experience participating directly in the IEP process. The researcher began the follow-up interview with the paraprofessional by asking her if she had “ever participated in an IEP meeting?” D-1 reported that she had participated in IEP meetings and stated,

I participate as a paraeducator who is kind of hands-on with the student, everyday throughout the week, compared to all of the different specialists who are coming for their one day, or one session. I am there to give my input on the strengths and needs of this particular child.

She also stated that she had participated in several IEP meetings as a Spanish language translator.

As a follow-up question, the researcher asked D-1 if she typically participated in IEP meetings as more of a “reporter” on student progress or a professional that makes “recommendations about this student's program?” Her answer follows:

Both. Her VI teacher is way over and above, but she accepts whatever input I have to give. For example, depending on how her Brailing is, I am able to give a handwriting

grade for her. That is how I am, 'in-between'; in between her, and not necessarily her regular classroom teacher, but her and her VI teacher.

This statement reiterated D-1's opinion that the *agent*, the student's VI teacher, is the dominant element in the pentad. She consistently referred to this individual with respect and as an authority, not only above herself, but also above all other members of the IEP team. These statements also indicate that D-1 does participate in IEP meetings.

Another possible explanation of the presence of unique pentadic elements, postulated by the researcher was that D-1, was the only "para-educator" included in the interviews. Para-educators are classified employees who can qualify for their positions without completing a college degree or earning a certificate of qualification. It is possible that D-1's education and training are the source of her unique pentadic elements. According to the CDE Website, NCLB (2001) set standards for "highly qualified" teachers and paraeducators, According to CDE (2007a),

paraprofessionals in Title 1 schools who provide instructional support, must meet certain academic requirements including at least an associate's degree or two years of college, or meet a rigorous standard of quality and demonstrate, through a formal State or local assessment, knowledge of, and the ability to assist in instruction in reading, writing, and mathematics, (or readiness) as appropriate. The requirement that special education instructional paraprofessionals will need to meet the same standards has not been mandated at the state or federal level and is currently under discussion at CDE.

Paraprofessionals who provide support that is not instructional in nature (*e.g.*, hall monitors, bus monitors) or those who provide personal care support (*e.g.*, toileting, health needs) are not subject to the requirements described above. (p. 2-3)

Although she has not earned a college degree, D-1 has met the standard for being "highly qualified" at two levels. She has completed an associates degree and passed a state assessment for paraprofessionals. She has also completed additional education and certification in the discipline of Braille transcription. Despite meeting "highly qualified" standards set by NCLB, D-1 reported that her continuing education on special education policy and procedures has been limited. She was the only participant in either group who identified her lack of knowledge as the primary barrier for optimal assistive technology usage.

When the researcher asked D-1 about whether or not she had received specific training on the subject of “what is supposed to happen at an IEP or Response to Intervention,” she answered:

I have; as much as I have been allowed to; as much as I have been involved in training. Up to this point it has been a coincidence, but really I was never instructed ‘this is what we do.’ I remember the very first staffing I attended was here in Trinidad and I thought, ‘what was that?’ And they said ‘everyone who works with this child gets together and there is usually some kind of a progress report, goals have been set, have they been met with education or life-skills depending on the handicap of the child. It was a little overview. ‘This is what the meeting is for. Don’t be afraid.’

This statement reflects an absence of formal training on the subject of the “IEP Process,” the element that was identified the *act* and the “dominant element” for most of her district peers. It should be of no surprise that the “IEP Process” would occupy a less significant role for an educator who has not received formal training on this subject.

In terms of the *act: agent* ratio, the *agents* (the VI teacher and herself) dominate the process and transform the CDE (Unit of Student Assessment, 2006) version of the *act* (an IEP, RTI or 504 team process) into a more limited and experience-based collaboration between the VI teacher, the paraprofessional and the student. B-1 recognized the existence of a special education team, but described her student and her student’s related special education experience as unique.

The unique nature of the situation in which D-1 works is another possible explanation for this participant’s unique perspective on elements related to using assistive technology with special education students. In the following statement, D-1 described the unique experience of her special education student:

Her files are kept by a special education teacher, a special education teacher attends every IEP meeting, but she is not in one special education class. So I think that she is very unique. Her accommodations are based on her ability to see. Her ability to learn and produce what is required of her, at her grade-level, is outstanding. The reason why..., I don’t want to say we don’t have a team because we do have a team, but besides her specialists, the rest of the team has their hands-up, saying ‘Well you guys know what you are doing, if there is anything you need from us? What could we possibly do for you?’

The paraprofessional depicted herself, her student and the VI teacher as an empowered unit separate from and playing a more significant role in designing and implementing the student's education than the "IEP team".

Member Checking-B-4

The final follow-up interview that the researcher conducted was conducted to address issues of the accuracy related to the researcher's conclusions that identified pentadic elements. The researcher checked the accuracy of element identification with five of the 10 participants. Four of the participants agreed with the researcher's identification of elements, barrier and dominant element, drawn from interview data. B-4 (the school psychologist) did not agree with some of the researcher's conclusions. The researcher arranged another interview with B-4 to explore this discontinuity. This follow up interview is best described as a "member check." A member check is a procedure by where the researcher allows a participant to scrutinize preliminary findings based on data provided by the participant. According to Lincoln and Guba (1985) member checks are "the most critical technique for establishing credibility" (p. 314) of research data and resulting conclusions.

The primary objection that the psychologist had to the elements identified by the researcher was related to the researcher's conclusion that "the IEP process" were primary to B-4's descriptions of *act*, *agent*, *scene*, and *agency*. B-4 asserted that other teams and processes besides the IEP team and process play a significant role in determining when a student should use assistive technology as an accommodation on accountability assessments. The researcher reviewed the interview transcript with B-4 and pointed out the frequency with which she referred to, and the influence that she attributed to the IEP process, but the psychologist was unconvinced.

In the follow-up interview the researcher asked B-4 why the IEP process was not the most significant mechanism for determining whether or not students would benefit from assistive technology. The psychologist stated,

I guess I feel as though you don't need to be on an IEP to receive assistive technology services. I feel that the RTI process and doing different levels of intervention encompasses more students than are on IEPs.

Although the psychologist had mentioned 504 and Child Study Teams in her initial interview, she had not mentioned Response to Intervention (RTI) in her original interview.

Writing on behalf of the National Center for Learning Disabilities, Cortiella (2006) described RTI as a process that can vary dramatically between states, districts, and schools. Cortiella stated:

While there is no single, thoroughly researched and widely practiced “model” of the RTI process, it is generally defined as a three-tier (or 3-step) model of school supports that uses research-based academic and/or behavior interventions. At all stages of the process, RTI should focus on discovering how to make the student more successful rather than focusing on the student’s lack of success. (p.2)

The Colorado Department of Education (2008) described RTI in the state of Colorado as an educational approach that,

utilizes instructional strategies such as universal screening and on-going data analysis to inform instructional interventions, flexible use of building personnel with students, as well as collaborative problem solving among staff and parents to enhance all students’ performance. (p.3)

The state of Colorado has recently adopted rules that require all students under consideration for the designation of having a Specific Learning Disability (SLD), to first go through the RTI process, prior formal assessment and potential identification. (CDE, 2008) As a result, there is a new emphasis on the RTI process state-wide.

The psychologist recently began working in a new school district that has an active RTI program in place. B-4 acknowledged that her change in work environment might have accounted for her change in perspective since the initial interview. Based on additional data from the follow-up interview, the research modified B-4’s elements to include RTI in every instance where she had initially made reference to a student’s IEP or 504 Plan.

Comparing Elements between Groups

A comparison of the “composite elements” between district and BOCES participants indicated significant similarities between the two pentads. Both groups identified the IEP process as the *act*, the IEP team (or other educational teams) as the *agent*, the IEP meeting (or other team meetings) as the *scene*, the IEP (or other official) documents as the *agency* and

enabling students to “demonstrate knowledge” as the *purpose*. Differences between the composite elements are also evident.

The most remarkable differences between elements are identified only when individual responses are considered. For example, D-3, the general education teacher, answered “I don’t know” when asked to describe each of the five elements of the pentad. Although her answers indicated that she follows some appropriate procedures and demonstrates some operational knowledge of the subject, her answers indicated a lack of comfort and familiarity on the subject of using assistive technology as an accommodation on accountability assessments. D-1, the Braille transcriber, demonstrated a similar lack of familiarity with the official protocol for determining whether or not a student should use assistive technology as an accommodation, when her answers were compared to CDE guidelines (Unit of Student Assessment, 2006).

What these participants have in common is limited exposure to segments the “special education process.” The general education teacher (D-3) works with special education students on a daily basis, but is not a “case manager” (i.e., the educator responsible for managing the students’ IEP), or special service provider for students. The paraeducator, works almost exclusively with a special education student, but only with a single student. As indicated in the follow-up interview, the paraeducator’s direct knowledge of the IEP process and special education support is based largely on her experience with a single student. The student requires Braille transcription and uses alternative methods for reading, writing and mobility, but requires no other special education interventions. As a paraeducator, D-3 is supervised by the student’s case manager, the Teacher of the Visually Impaired who is responsible for spearheading program design, determining appropriate modifications and accommodations and directing the IEP process for her students.

Comparison of Group Elements to CDE Elements

In Chapter 2 of this project the researcher identified the elements of the pentad according to CDE guidelines (Unit of Student Assessment, 2006). The pentadic elements according to CDE policy are remarkably similar to those of the educators interviewed for this research project. Table 5.4 illustrates the similarities between CDE, BOCES and district pentads.

Table 5.2 Comparison of Pentads

	Act- Process	Agent- Who	Scene- Where	Agency- Means	Purpose- Why
Pentadic Elements according to CDE manual	Educational Plan (IEP, 504, ILP, etc.)	Educational Team	Educational Team Meeting	Education Plan Documentation	Equal access opportunity, demonstrate knowledge
Pentadic Elements according to BOCES	IEP Process	IEP Team	IEP Meeting	IEP documents	Help students show knowledge
Pentadic Elements according to District	IEP Process	IEP Team	IEP Meeting	IEP documents	Find out what student knows

The most significant differences between the elements of the respective groups is evident in the breadth of CDE descriptions of elements. Whereas district and BOCES employees referred primarily to the “IEP”, team, meeting and documents, the CDE specifically listed other educational processes including 504 Plans and Individual Literacy Plans as mechanisms for determining accommodations for students. The focus on IEPs by district and BOCES participants is most likely due to their focus on special education. All but one of the interview participants were special education employees or administrators of special education staff. Their focus on the IEP as the primary mechanism for working with special needs students is understandable. It should be noted that participants made numerous references 504 Plans, Child Study Teams and other mechanisms for working with students with special needs; however, the IEP process was cited more frequently and received more emphasis than any other aspect of the educational process.

Ratios

Following the advice of Gusfield (Burke, 1989) the researcher paid special attention to the ratio or relationship between the *act* and *agent* as characterized in interviews. Although *act* was identified as the dominant element for both district and BOCES employees, comments from a variety of participants emphasized the interdependence between these two elements. In this

final section of observation and analysis, the researcher considers the relationship between *act* and *agent*.

B-1 (the itinerant teacher) emphasized that consensus in opinion and action among the IEP team (her *agent*) was a critical factor in the ultimate success or failure of the *act*. She explained,

Because, if it [assistive technology] isn't used across the whole team, every person working with that student, then it falters out and the student isn't successful because they are not generalizing it to every situation.

In this ratio, the dominant element of *act* is hobbled by other elements of the pentad (*agents* who do not work together and a lack of continuity between *scenes*.) In comments related to identifying a primary “barrier”, B-1 suggested that *agents* (teachers) have the ability to undermine the success of assistive technology use. She asserted,

The teachers do not take the time to let their students use it [assistive technology]. If it doesn't work immediately, then it is not going to work and it gets put away. The end!

B-3 (the former assistive technology coordinator) also depicted *agents* as having a special power over the ultimate success or failure of the *act*. Commenting on the question of “barriers” the speech therapist said,

In my opinion the biggest barrier is being able to convince either teachers or paras and even parents and then having that assistive technology used on a daily basis.

Again the dominant element of *act* appears to be at the mercy of dysfunctional *agents*.

The school psychologist and the Director of Special Education also comment on teachers' (*agents*') attitudes and knowledge as having the power to completely disrupt the dominant element of *act*. B-5 attributed the dysfunction of *agents* to a generational source and implied that there are a group of *agents* who will continue to inhibit the success of the *act*, due to fear and lack of knowledge. The Director of Special Education said,

You have an upper group of teachers now who have been around for 20, 25 years and they are afraid of technology and they don't incorporate it in their instruction at all...we are in two different generations.

Although B-5 does not state it directly, this administrator implied that the attitudes of older teachers are a barrier that is not going to be easily overcome and will continue to plague the effectiveness of the *act*.

A similar pattern in the ratio between *act* and *agent* is evident in the comments of district employees. D-3 (the special education teacher and the most experienced participant) identified *agents*, or more specifically their knowledge, as the primary barrier to success. She stated,

Sometimes the general education teacher is not aware of what could be used in the classroom.

But this teacher did not depict the influence of a single *agent* as an insurmountable barrier for other *agents* or elements of the process. When asked if she wished to add any additional comments, she said,

Only that you keep on keeping on and find out what is being developed out there and keep us informed as much as possible, because, I suppose..., I know, research is being done all of the time.

D-3's comment implies that the *act* is a gestalt, greater than the sum of its parts and capable of overcoming dysfunction of any single element through efforts of the "whole".

Statements from the two district administrators imply that *agents* can be dysfunctional elements that hinder the effectiveness of the *act*. Both administrators listed teacher (*agent*) knowledge as a barrier to the successful performance of the *act*. B-5 (the superintendent) stated that his district "is just lacking in knowledge," but then identified funding as "biggest barrier in education" in general terms.

A consistent theme is evident in the depictions that participants offered concerning barriers to performance of the *act*. Even though the *act* is the dominant element in the pentad of both groups, interview data confirms the presence of a widely held belief that success of the *act* is ultimately dependent on the influence of other elements, especially *agents*.

Summary

The analytical tool of the pentad (Burke, 1945) served as an effective mechanism for naming, organizing and comparing rhetorical themes drawn from the interviews of school district and BOCES employees. Pentadic analysis has enabled the researcher to compare the interviews of participants in a systematic manner and elucidate similarities and differences in the elements related to the issue of using assistive technology as an accommodation on accountability assessments. Based on analysis of interview data, the researcher proposes the following preliminary conclusions:

- Pentadic elements depicted by the Colorado Department of Education (Unit of Student Assessment, 2006), BOCES employees and district employees are similar.
- The most significant difference between CDE and participant elements is that BOCES and district employees focus on the IEP process as the mechanism for determining assistive technology services, whereas CDE lists other educational teams in addition to IEP teams.
- BOCES employees identified district employees as the primary barrier to successful assistive technology use.
- District employees described a lack of knowledge and support as the primary barrier to successful assistive technology use.
- Some educators and service providers were unaware or dismissed special education protocol and procedure.
- Some BOCES and district participants emphasized the importance of having an expert involved in initiating and implementing assistive technology services.
- At least one BOCES employee asserted that Individual Educational Programs do not translate into effective classroom interventions.

In Chapter 6, the researcher will discuss the impact of these conclusions, and other observations made in this Chapter 5. The researcher will use these observations related analysis to answer the qualitative research question. Data and analysis from Chapter 5 will also contribute to implications for practice and suggestions for further research.

CHAPTER 6 - Discussion

Summary of Study

The purpose of this research project was to gather information related to the attitudes and knowledge of educators and special service providers on the subject of using assistive technology as an accommodation to support special education student participation in accountability assessments. No Child Left Behind legislation (NCLB) has required public schools to increase efforts to measure and track student performance through accountability assessments (NCLB, 2002). Traditionally, students with special needs have been excluded from accountability assessments designed to measure student knowledge (Elliot, McKevitt & Kettler, 2002; Erickson, Thurlow & Thor, 1995; Thurlow, Lazarus, Thompson & Morse, 2005). It is essential for all students, including students with special needs, to be included in accountability assessments to help measure and track educational progress and compare the performance of schools, districts and states in terms of improving education (Elliot, McKevitt & Kettler, 2002; Erickson, Thurlow & Thor, 1995; Thurlow, Lazarus, Thompson & Morse, 2005). Federal legislation has mandated that states include special education students in large scale accountability assessments.

One method for including more special needs students in accountability assessments is to provide appropriate accommodations during testing. Assistive technology is an accommodation that is approved for use on accountability assessments in many states and has the potential to significantly impact the performance of special education students on accountability assessments. Positive teacher attitudes and sufficient knowledge are essential components of implementing effective educational interventions.

The educational community where the researcher conducted this study has several unique qualities. Special education services are provided to school districts through a cooperative organization called the South Central Board of Cooperative Educational Services (BOCES). The BOCES employs special service providers and provide some administrative supports, but the participating school districts employ special education teachers and paraprofessionals. These two groups of educators are charged with collaborating to provide special education students

with a free and appropriate public education. The thirteen school districts and dozens of populations served by the South Central BOCES are relatively poor, many of them are low-performing and most have a significant population of Hispanic students.

Assistive technology is specifically listed as an accommodation available for students with special needs who are required to take accountability assessments. Only a handful of students in the state of Colorado use assistive technology to complete their accountability assessments. Although many special education students in the BOCES use assistive technology to perform instructional work, very few use assistive technology to complete accountability assessments.

The researcher is responsible for implementing an effective assistive technology program for the South Central BOCES and the districts that the BOCES serves. Training educators is an essential component of building an effective educational program. Gaining a better understanding, as well as identifying existing differences between the attitudes that BOCES and District employees possess on the subject of using assistive technology as an accommodation on accountability assessments is an essential step in moving forward assistive technology services for schools in this region.

The researcher designed a short survey using a Likert scale format to measure the attitude and knowledge of educators on the topic. The attitude and knowledge scales were comprised of ten items on each subject. The survey was distributed to 89 special education employees affiliated with the South Central BOCES and the school districts that they serve. Seventy four surveys (83.1%) were returned to the researcher. Descriptive and analytical statistics were performed in order to generate a description of the population and identify comparative differences between the groups of participants based on knowledge and attitude scores. In addition, the researcher analyzed “years of work experience” as a continuous variable to identify whether or not this variable had a statistical relationship with survey scores.

In the second phase of the research project, the researcher identified 10 participants (five BOCES and five district employees) who agreed to participate in interviews on the subject of using assistive technology as an accommodation on accountability assessment. The researcher conducted interviews using questions designed to mesh with Kenneth Burke’s pentad (1945). Pentadic analysis is a method of communication analysis that employs the structure of “drama” to identify the primary elements in an individual’s narrative. By identifying the *act*, *agent*,

agency, scene and *purpose* of a participant's description of an event, the researcher gained a better understanding of the motivation and perceptions that guide a participant's actions. After collecting interview data the researcher compared the pentadic elements identified in individual narratives between groups and against descriptions of these elements identified in standards written by the Colorado Department of Education (Unit of Student Assessment, 2006).

Data and analysis of the qualitative and quantitative portion of this project provided the researcher with significant information which contributed to answers for each of the research questions outlined at the beginning of this study. In the remainder of this chapter, the researcher will address the quantitative research questions first, followed by the qualitative research question. After directly answering each of these questions, the researcher will generate implications for practice and recommendations for further research.

Quantitative Research Questions and Conclusions

When the researcher initially wrote the research questions for this project, he anticipated performing an elementary statistical analysis that would enable him to directly compare the mean of scores between groups of participants. As explained in Chapter 4, the statistical methods presented in the researcher's proposal were modified based on the advisement of several statistical experts and with approval from the PhD candidate's dissertation committee. These changes resulted in a stronger quantitative study than was initially proposed, but resulted in quantitative results that require further interpretation and explanation to provide satisfactory answers to the quantitative research questions. Answers to the following questions may have been more concise if the original statistical methods had not been modified, but they would not have been as valid or informative as the answers that follow.

The researcher addressed the quantitative research questions through collection and statistical analysis of survey data. Each research question will be presented and answered followed by a brief analysis of the answer. Additional implications from these quantitative conclusions will be presented in the final sections of this chapter.

Question 1

Is there a significant difference in the knowledge possessed by less experienced and more experienced educators on the subject of assistive technology as an accommodation on the CSAP assessments?

Results of the regression analysis indicated that there is not a statistically significant difference between the knowledge scores of less and more experienced educators when data from surveys was considered as a whole. When this question is answered according to group affiliation the answer is still “no” but the results justify an addendum.

In the second step of the analysis of the scores of the knowledge items, the effect of the variable “years of experience” was determined to be the most non significant with a p value of $0.8175 > 0.05$. This enabled the researcher to accept the null hypothesis that the slope of years of experience plotted against knowledge scores was equal to zero for group 1 (district employees). In other words, the average knowledge score of district employees remains unchanged as they gain years of work experience.

In the third step of the analysis, the results indicated that knowledge scores increase for participants from group 2 at a rate of 0.011157 points per year of work experience. In other words, the average knowledge score of BOCES employees does increase as they gain years of work experience, but this increase is not statistically significant (p value of $0.0617 > 0.05$.)

These results indicated that there is not a significant difference in knowledge possessed by less experienced and more experienced educators from group 1 (district employees). Although there is a difference between the knowledge possessed by more experienced participants from group 2 (BOCES employees) is higher than their less experienced colleagues, the difference in scores is not statistically significant.

It should be expected that a more experienced educator should possess knowledge that surpasses their less experienced colleagues. Although research reviewed for this project suggests that some new educators possess more knowledge about technology than their more experienced colleagues, the “knowledge” measured by the ten items in the survey is a knowledge construct that was designed to reflect knowledge of federal, state and district regulations, as opposed to broad knowledge of assistive technology. Although results were not statistically significant, data and analysis suggest that special service providers who work for the BOCES are developing

more knowledge on the subject of using assistive technology as an accommodation on accountability assessments as they gain years of work experience.

Question 2

Is there a significant difference in the attitudes possessed by less experienced and more experienced educators on the subject of using assistive technology, specifically as an accommodation on the CSAP assessments?

Results of the regression analysis indicated that there is not a statistically significant difference between the attitude scores of less and more experienced educators for group 1 (district employees). The difference, however, is significant for participants from group 2 (BOCES employees). In the second step of the analysis of the scores from the attitude items, the effect of the variable “years of experience” was determined to be the most non significant with a p value of $0.6630 > 0.05$. This enabled the researcher to accept the null hypothesis that the slope of years of experience plotted against attitude scores was equal to zero for group 1 (district employees). In the third step of the analysis, the results indicate that attitude scores increase for participants from group 2 at a rate of 0.01682 points per year of work experience. The intercept variable and the “years dummy” interaction were both determined to be significant at a p value of < 0.05 (0.0001 and 0.0203 respectively).

These results indicated that there is not a significant difference in attitudes possessed by less experienced and more experienced educators from group 1 (district employees), but there is a significant difference between the attitudes possessed by less experienced and more experienced educators from group 2 (BOCES employees).

Two questions that warrant additional discussion arose from the answer to the second research question. First, why do attitude scores increase for participants from group 2 (BOCES employees) as they gain years of work experience? More experienced BOCES employees have a better awareness of assistive technology and its effectiveness as an accommodation than their less experienced colleagues. Some of the questions in the attitude portion of the survey may have been difficult for less experienced employees to answer positively. For example, consider each of the following survey items:

- *My students do not benefit from using assistive technology.*

- *My students like to use assistive technology.*
- *Using assistive technology is relatively easy.*

Each of these items assumes that the respondents have experience using assistive technology with students. Thirteen percent of the BOCES employees completed this survey two months into their first year of work in the field of education. More than 40% of the BOCES staff had less than five years of work experience. In contrast, none of the district participants were first year educators and less than 10% had fewer than five years of work experience. Lower survey scores may be related to limited experience of this portion of the BOCES participants

The second question of interest that was generated by the answer to this research question is, “Why do the attitude scores of participants from group 1 (district employees) remain unchanged as they gain years of work experience?” The most likely answer, based on the experience of the researcher, is exposure to assistive technology-related continuing education and training. The researcher has conducted several hands-on trainings and presented information about assistive technology services at BOCES meetings. The researcher is aware of no assistive technology education that has been conducted exclusively for school districts. District employees are not gaining knowledge related to using assistive technology as an accommodation on accountability assessments as they gain years of work experience.

Question 3

Is there a significant difference in the knowledge possessed by special service providers and special education teachers on the subject of assistive technology, specifically as an accommodation on the CSAP assessments?

The first step of analysis of the knowledge scores of participants indicated that the “dummy variable” which represents group affiliation is the most non-significant variable with the largest p value $0.8732 > 0.05$. This allowed the researcher to accept the null-hypothesis for that variable and conclude that the two intercept values (projected knowledge scores for participants with no years of experience) of group 1 and group 2 are equal. In other words, the model predicts that educators without any experience have the same mean knowledge score, regardless of group affiliation.

In the next step of the analysis, results indicated that as educators from group 2 (BOCES employees) gain years of work experience, their knowledge scores increase at a rate of 0.01157 points per year. The scores of educators from group 1 (district employees) remain unchanged. As employees gain years of work experience differences between the knowledge scores between the two groups become more pronounced.

District and BOCES employees have survey scores on the knowledge items that are almost identical when the variable “years of experience” is controlled. This implies that district and BOCES employees who have no work experience have a similar knowledge base. Although the difference was determined to be not statistically significant, BOCES employees improve their knowledge regarding the use of assistive technology as an accommodation on accountability assessments, while the knowledge scores of district employees remain statistically unchanged as they gain years of work experience. This difference implies that BOCES employees are gaining knowledge from education, training or other forms of information on the subject of assistive technology that district employees are not receiving.

Question 4

Is there a significant difference in the attitudes possessed by special service providers and special education teachers on the subject of assistive technology as an accommodation on the CSAP assessments?

The first step of analysis which analyzed the attitude scores of participants indicated that the “dummy variable” (which represents group affiliation) was the most non significant variable with the largest p value $0.8841 > 0.05$. This allowed the researcher to accept the null-hypothesis for that variable and conclude that the two intercept values (projected attitude scores for participants with no years of experience) of group 1 and group 2 are equal. In other words, the model predicts that educators without any experience have the same mean attitude score, regardless of group affiliation.

In the next step of the analysis, results indicated that as educators from group 2 (BOCES employees) gain years of work experience, their attitude scores increase at a rate of 0.01682 points per year while the scores of educators from group-1 (district employees) remain

unchanged. As employees gain years of work experience, differences between their attitude scores become more pronounced.

District and BOCES employees have survey scores on the attitude items that are almost identical when the variable “years of experience” is controlled. This implies that district and BOCES employees who have no work experience have a similar attitudes regarding the use of assistive technology on accountability assessments. As BOCES employees gain work experience, their attitude scores regarding the use of assistive technology as an accommodation on accountability assessments increase. As district employees gain years of work experience, their attitude scores remain statistically unchanged. This discrepancy also implies that BOCES employees are receiving some exposure to education, training or other information on the subject of assistive technology that district employees are not receiving.

Qualitative Research Question and Conclusions

The qualitative research question for this project is:

How do members of IEP teams describe the process of using assistive technology as an accommodation on accountability assessments?

The researcher structured interview questions to align with the elements of the pentad (Burke, 1945). As a result, interview data provided descriptions of each of the elements, a primary barrier and the identification of a dominant element. The interview questions directed participants to describe what Burke believed to be essential components of this phenomenon. The researcher presents the primary answer to the qualitative research question as a description of each of the pentadic elements. To elaborate upon this answer the researcher also identifies the primary barrier, the dominant element and briefly describes the relationship between elements of the composite pentad. Following the description of elements, the researcher presents six additional descriptive conclusions that have been drawn from qualitative data and analysis. Data gathered through in-depth interviews and analyses using pentad analysis (Burke) resulted in the identification of elements listed in Table 6.1.

Table 6.1 Composite Pentadic Elements for all Participants

• <i>Act: The IEP process</i>
• <i>Agent: The IEP team</i>
• <i>Scene: The IEP meeting</i>
• <i>Agency: The IEP documentation</i>
• <i>Purpose: To find out what a student knows/Allow students to demonstrate knowledge</i>
• <i>Barrier: Teacher knowledge and attitudes/Funding and resources</i>
• <i>Dominant Element: Act: The IEP team process.</i>

Act

The participants described the *act* of deciding whether or not to use assistive technology as an accommodation on accountability assessments as part of the IEP process.

B-5: I think it is an IEP process. The IEP team makes that determination.

D-5: For a child with a disability, it should come through the IEP team process.

Participant characterization of *act* as part of the IEP process is notable for several reasons. According to Hallahan and Kaufman (1993) the IEP was established as a provision of Public Law 94-142, to help guarantee students with special needs a free and appropriate public education. Being linked to the IEP process lends legitimacy and gravity to the process of determining whether or not students should use assistive technology as an accommodation on accountability assessments. The characterization of *act* as the IEP process suggests that members of IEP teams view consideration of assistive technology accommodations as part of established special education protocol and linked to a federal legislative mandate.

There is a significant drawback that may result from this characterization. The Colorado Department of Education identified assistive technology services as one of the related services that must be available for students with IEPs (Unit of Student Assessment, 2006). The CDE, however, do not intend assistive technology supports to be available only to students who qualify for special education programs. Any student who can benefit from using assistive technology to perform academic work more effectively or efficiently should have access to that educational tool. In her follow-up interview, B-4 addressed this issue directly when she stated,

Assistive technology is not just for special education students.

If educators view assistive technology exclusively as part of an IEP process, then assistive technology may not be considered for a significant number of general education students who could benefit from using this tool, but do not have IEPs.

Agent

The participants described the *agent* that decides whether or not to use assistive technology as an accommodation on accountability assessments as the IEP team.

B-1: I think that the [IEP] team can help make that decision

B-4: Probably the IEP team.

Participants' characterization of *agent* as members of the IEP team is notable for several reasons. Simply by identifying an *agent*, participants acknowledge that someone is responsible for making this determination. Furthermore, IEP team members are charged with specific responsibilities in terms of implementing the IEP and are typically required to list which team members are responsible for carrying out specific components of this educational plan. For example, if a student qualifies for assistive technology services, a specific service provider (a member of the student's IEP team) must be identified. That service provider is specifically listed in the IEP, and therefore, is responsible for providing assistive technology services and tracking student progress.

Characterizing the *agent* as members of the IEP team may have drawbacks as well. While identifying an *agent* of action is essential, this should not absolve other members of a student's educational team from responsibility regarding the use of assistive technology as an educational support. General education teachers must see themselves as part of the team that supports students who use assistive technology, even if they do not see themselves as an integral member of a student's IEP team. B-3 illustrated the importance of having general education staff support assistive technology use when she said,

I mean a lot of times it is used when the support staff or related service providers are there, or it is used in the special education room, but not in the general education room and then when find it in closets.

To make an optimal impact in the field of education, assistive technology cannot be viewed as exclusively as a special education service or responsibility.

Scene

The participants described the *scene* where the decision is made whether or not to use assistive technology as an accommodation on accountability assessments as the IEP meeting.

D-2: The annual IEP review that happens every year, or an amendment to the IEP that can happen anytime.

B-3: Probably at an IEP meeting. You have to call an IEP meeting for everything.

Having a specific time, location and mechanism for making decisions regarding the use of assistive technology is valuable. An IEP meeting is a *scene* that includes a variety of special education professionals with broad knowledge and experience. Cook and Hussey (2002) advocated for decisions regarding assistive technology to be made by a diverse team of professionals and an IEP team can be the embodiment of that “diverse team.”

Viewing the *scene* where assistive technology decisions regarding the use of assistive technology as an accommodation on accountability assessments, exclusively as the IEP meeting, could be problematic. Thurlow et al. (2003) emphasized the importance of using accommodations in instructional settings and documenting their effectiveness before determining whether or not they should be used during testing. To make the best decision on the use of assistive technology as an accommodation, the IEP team must have data from the general classroom that documents the effectiveness of using assistive technology to perform work. For example, a student may use a portable keyboard to produce writing independently in the classroom, but they may benefit more from using a scribe to perform writing on an accountability assessment. A scribe may enable a student to perform writing tasks more efficiently while decreasing the student’s independence with the performance of the task. It is appropriate to have the student use assistive technology to build capacity during instruction, but it may not be appropriate to have the student use assistive technology to best demonstrate their knowledge on the subject of writing. The *scene* where assistive technology decisions are made may be the IEP meeting, but these decisions may be ill advised if they do not include data from general education and instructional settings. Participant B-1 illustrated the importance of making preliminary decisions regarding the use of assistive technology in the classroom when she said,

I would never introduce the idea of using assistive technology in an IEP meeting, because at IEP meetings you throw out a concept and people are going to say “yeah yeah, that

sounds good,” but unless you can get them to buy into it in the classroom working with a student they are not going to do it.

In her initial interview, participant B-4 (the psychologist) initially identified the IEP meeting as the *scene* where decisions are made concerning assistive technology interventions. In her follow-up interview B-4 makes a compelling argument for including a student’s classroom in the depiction of *scene*. B-4 described the classroom as follows:

That is where you gather your data. That is where you determine whether there is a need or not. That is where you implement the intervention. That is where you perform observations. That is where you determine whether or not it is working. The classroom is where you determine whether or not the student needs and benefits from assistive technology.

Focusing on IEP meetings at the expense of attention to what is happening in the classroom could be detrimental.

Agency

The participants describe the *agency* that determines how assistive technology will be used as an accommodation on accountability assessments as the IEP documentation.

B-2: It is documented by the IEP team at a meeting.

D-4: It is also documented in our student’s IEP or literacy plan.

Characterizing the *agency* for determining assistive technology accommodations for accountability assessments is notable for some of the same reasons as it was for other elements of the pentad. The IEP is a legitimate form of documentation. In fact, some educators describe a student’s IEP as a “legal contract” that delineates what an institution has agreed to provide a student to ensure that they receive a free and appropriate public education. Violating an IEP is grounds for legal action. In that respect, the IEP seems to be a powerful agency for guaranteeing that students, who can benefit from this support, receive assistive technology accommodations on accountability assessments.

Only students who qualify for special education services have a right to Individual Education Plans. For students who do not qualify for special education services, other mechanisms and related documentation must be used to ensure access to appropriate assistive technology accommodations. 504 plans, literacy plans, and documentation from Child Study

and SIT teams are examples of other potential *agencies* for addressing students' assistive technology needs. Most of the ten interview participants are special education employees which may explain their focus on IEP documentation, but the vast majority of students in public schools are not eligible for IEPs and their educational advocates must use another *agency* for securing access to assistive technology.

Although an IEP is a significant document it would be a mistake to assume that this *agency* is not susceptible to misinterpretation or simple disregard. As participant B-1 articulated:

Humans are following the IEP, so just like any law, it is only going to keep honest people honest. So if they were not doing what was best for the student before, then, they are not going to do what is best for a student just because you have it written down somewhere.

IEP documentation may be analogous to a contract for educational services, but like all contracts the IEP is not a guarantee that specific outcomes will be accomplished.

Purpose

The participants described the *purpose* of using assistive technology as an accommodation on accountability assessments as enabling students to demonstrate knowledge or to better find out what students know.

D-2: We want to know what the student knows.

B-2: To be able to demonstrate their own knowledge.

The *purpose* of providing students with an accommodation in an instructional setting is to enable them to perform a task more efficiently or effectively. Elliot & Ysseldyke (2003) explained that in a testing situation, the purpose of providing a student with an accommodation may be slightly different:

Accommodations are provided to students with disabilities to 'level the playing field' when they take an assessment. Without accommodations for their disabilities, an assessment may not accurately measure what the students know and are able to do. The measure will reflect the disability rather than the students' knowledge and skills. (p. 30)

Participant descriptions of the *purpose* for providing students with assistive technology accommodations on accountability assessments is aligned with the purpose according to the Colorado Department of Education (Unit of Student Assessment, 2006) as well as educational scholars (Elliot & Ysseldyke).

Primary Barrier

The participants described the primary barrier to using assistive technology as an accommodation on accountability assessments as teacher attitudes and knowledge or resource limitations.

B-1: One is money...and two is other teachers. They think it [using assistive technology] is cheating.

D-5: Beyond funding, more awareness, training and availability of AT resources and materials is needed.

The National School Board Association (2005) validates the description of barriers offered by participants with a report that identified funding and teacher preparedness as barriers to better integrating technology into classrooms. The responses of participants indicated that they are aware of the challenges that stand in the way of improving assistive technology supports for students. One of many questions that the researcher did not ask participants was, “How can educators overcome these barriers?” Focusing attention on what educators can do to improve assistive technology services is critical. Avoiding what one educator (a faculty member in the department of education at Kansas State University and a veteran high school teacher) described as the “blame game” is also critical. When the researcher shared the preliminary results of responses to the question about “barriers” and reported that several participants blamed general education teachers for inhibiting assistive technology interventions, this experienced teacher expressed no surprise,

We used to call that the “blame game”. Middle school teachers blame elementary teachers because their students cannot read. High school teachers blame middle school teachers because their students cannot do math. Everyone blames someone else for dropping the ball and nobody is ready to accept responsibility when students fail to learn.

(S. A. Nielson-Atchison, personal communication, 3-20-08)

In addition to identifying barriers, educators must identify plans for overcoming barriers, measure the effectiveness of those efforts and modify their problem-solving as needs arise.

Dominant Element

The participants characterized the dominant element in this pentad as *act: the IEP team process*.

B-2: Nothing without the team. God Forbid.

B-5: We facilitate AT services for students through the IEP process.

The IEP process is a powerful mechanism for addressing the educational needs of special education students. Interview participants adamantly associated assistive technology services with the IEP process. In the opinion of the researcher, this is a positive association. It does, however, have the potential to become problematic if it overshadows other mechanisms that are available for fostering the use of assistive technology as an educational support, especially for students who do not qualify or are not yet a part of special education programs. If Response to Intervention (RTI) becomes the mechanism for “universal screening and on-going data analysis to inform instructional interventions” (Colorado Department of Education, 2008, p.3), then assistive technology services will certainly be one of the interventions in this process and educators will no longer be able to associate assistive technology interventions exclusively with the IEP process.

Additional Conclusions Regarding Qualitative Data

Based on analysis of qualitative and quantitative data and the answers to respective research question, the researcher has generated several conclusions that warrant additional attention. A brief analysis follows each conclusion. Although the results listed in Table 6.2 represent composites created by the researcher from a variety of interview responses, the researcher identified patterns in data.

- **Based on data from interviews, participants used language and terms similar to those outlined by the Colorado Department of Education (CDE) when they described the significant elements involved in their decision-making regarding whether or not to use assistive technology as an accommodation on accountability assessments.**

Pentadic elements for the Colorado Department of Education and the composite pentads for BOCES and district participants are included in Table 6.2.

Table 6.2 Colorado Department of Education and Participant Pentads

	Act- Process	Agent- Who	Scene- Where	Agency- Means	Purpose- Why
Pentadic Elements according to CDE manual	Educational Plan (IEP, 504, ILP, etc.)	Educational Team	Educational Team Meeting	Education Plan Documentation	Equal access opportunity, demonstrate knowledge
Pentadic Elements according to Participants	IEP Process	IEP Team	IEP Meeting	IEP documents	Allows students to show knowledge/ find out what the student knows.

Interview data indicated that district and BOCES employees, for the most part, demonstrate an awareness of the guidelines for determining whether or not assistive technology should be used as an accommodation on accountability assessments. Although it is beyond the scope of this research, it would be of value to determine whether or not general education staff at the district level possesses the same level of awareness concerning CDE regulations regarding accommodations and assistive technology. This is of importance for at least two reasons:

1. Many special education students receive a significant portion of their instruction from general education teachers.
 2. In Colorado, general education students that demonstrate a need can use assistive technology accommodations. Those students, however, depend on general education staff to determine appropriate accommodations and foster use of the accommodations during instruction as well as complete appropriate documentation.
- **Interview data from District and BOCES employees were more focused on the IEP process than any of the other “team processes” listed in the CDE guidelines (Unit of Student Assessment, 2006).**

Whereas the CDE manual emphasized that these decisions should be made and executed by any number of teams that work with students that are eligible for accommodations, district and BOCES employees focused primarily on the IEP process rather than 504 Teams, Child Study Teams or other groups charged with implementing RTI.

Differences between CDE standards and the narratives of participants in this study are not extreme. The differences, however, appear to be critical and may become more critical in the near future. Traditionally students with special needs were identified by special education professionals (the IEP team) and served in special education settings (the resource room). In state guidelines, the CDE emphasized the role that non-special education teams play in determining whether or not a student should use assistive technology as an accommodation on accountability assessments. Response to Intervention is a state-wide mandate (Colorado Department of Education, 2008) designed to improve educational interventions before students are referred for special education evaluation. Assistive technology interventions are a resource that is available to educational teams that implement RTI. Although several interview participants mentioned 504 Plans, Child Study Teams and the RTI process in their narratives related to assistive technology interventions, the primary elements identified in these narratives were focused on IEP teams (a special education entity). The focus on IEP teams may be related to the fact that nine of ten interview participants were special education employees or responsible for administering special education interventions.

- **Participants from the BOCES identified teacher attitudes, knowledge and behavior as the primary barriers to effective use of assistive technology. Whereas district employees identified funding and knowledge as the primary issues preventing more effective use of assistive technology.**

Although several participants in both groups acknowledge personal short-comings on the subject of effective assistive technology use, most identify “outside sources” as the primary barrier. Even some district employees identified their general education colleagues as the primary barrier to effective assistive technology use. Deficits in teacher attitude and knowledge are most likely barriers to optimal use of assistive technology, but it should be noted that BOCES employees were not consistent with their criticism of the attitudes and knowledge of their district colleagues. While some BOCES participants accused district educators of being unwilling to try assistive technology, other participants described district employees as putting too much stock in the effectiveness of assistive technology.

District employees also cited teacher attitudes as a barrier to assistive technology use, but additionally pointed to issues related to funding and access as primary barriers to optimal use. The barriers described by BOCES and district employees, at least in part, resulted from the same

source. District employees most likely do not have optimal knowledge and attitudes on the subject of using assistive technology as accountability assessments. Some of that deficit could be ameliorated by providing district employees with more continuing education opportunities, access to loan programs, funding sources and other resources. Making such resources available is to a great extent, the responsibility of the South Central BOCES.

It is disturbing to the researcher, that his colleagues identify district staff as the primary barrier to optimal assistive technology use. In a sense, this blame is analogous to identifying students as the primary barrier to optimally educational gains. Certainly some district educators are resistant to using assistive technology, but it is the responsibility of special service providers to collaborate with educators and foster the use of assistive technology when appropriate.

- **Some educators and service providers were unaware of, or dismissed special education protocol and procedure.**

Some participants from, both groups, were unaware of guidelines related to the use of assistive technology as an accommodation on accountability assessments, unfamiliar with where and how related decisions should be documented or reported that these standards were not effective and chose to operate outside of state guidelines. At least one BOCES employee argued that Individual Educational Programs do not translate into effective classroom interventions.

Regulations and guidelines are of little use unless they are observed and practiced. If educators are unaware of guidelines or believe that they do not provide a mechanism for effective educational practice, the Colorado Department of Education has some work to do. Although it would be a mistake to assume that every educator is competent and acting in good faith, gaining a better understanding of why educators are not following state regulations is imperative. A district that has special education employees whom are not aware of key special education policy is negligent.

- **Some BOCES and district participants emphasized the importance of having an expert involved in initiating and implementing assistive technology services. For these participants, the ‘expert’ was identified as the assistive technology coordinator (the researcher).**

Although a move toward RTI requires all educators to participate in designing creative educational interventions, district and BOCES participants both emphasized a need to have an “expert” involved with assistive technology interventions. Although the value of an expert on intervention teams is supported by some research (Lahm, 2003), relying on an expert to lead decision making and guide assistive technology interventions could be problematic. RTI takes place at a local level and schools must be and willing to pull interventions from local resources and track their effect on student performance without depending on an outside expert to guide and track this intervention. RTI will not be effective unless school-based teams develop basic competencies in a wide variety of educational interventions. Having an expert involved in assistive technology interventions is understandable and sometimes essential, but this narrative also reflects a need to build competency at all levels (from administrators to paraeducators) on the subject of using assistive technology as an intervention.

- **Data from several participants indicated confusion concerning what constitutes assistive technology equipment or a lack of awareness regarding the use of assistive technology in their schools.**

When questioned by the researcher, several interview participants reported that they were not using assistive technology with students. In each instance, the researcher was able to help participants recognize examples of assistive technology that they were currently using with students. This confusion was more than an issue of nomenclature. If administrators are not aware of the variety of assistive technology and the frequency with which it is being utilized in their schools, they will be less likely to allocate funding and other resources to support this intervention. In addition, if educators are not aware that they are using assistive technology with students, they will not accurately report the value of this intervention to their administrators, the families of their students and others who advocate for assistive technology resources.

Implications for Practice

As indicated in Chapter 1, the researcher designed this study to contribute to the limited academic dialogue concerning the use of assistive technology as accommodations on

accountability assessments. In addition, the researcher intends to use what he has learned during this project to help develop the assistive technology program for the South Central BOCES. Data and conclusions resulting from this research have led to the following recommendations for practice. Recommendations are listed in no particular order.

- **Educators, and the institutions responsible for their training, must develop better awareness and related knowledge on the subject of using assistive technology as an accommodation for instructional work and accountability assessments.**

Institutions that prepare educators must incorporate information related to accommodations and accountability assessments into their respective programs of study. Schools, districts and other governing agencies charged with providing practitioners with appropriate continuing education and training, must address issues of knowledge and awareness on the same subject. When agencies like the Colorado Department of Education revise regulations designed to directly impact the practice of special educators, they are acting irresponsibly if they do not ensure that the pragmatic impact of new regulations are understood by administrators, educators, parents and students.

- **Special education and general education staff must develop competencies related to using assistive technology. They must also develop competencies related to determining appropriate accommodations for instructional work and accountability assessments.**

Institutions that prepare special educators and professionals whom perform related services must foster the development of skills on using assistive technology and performing appropriate assistive technology interventions. Schools, districts and other governing agencies charged with providing practitioners with appropriate continuing education and training, must address the development of skills and assessment on the same subject. Providing effective assistive technology service is much more than learning how to use, and having access to, equipment. Educators must develop a better understanding of assistive technology processes and the regulations that guide this educational intervention.

- **At a local level, the South Central BOCES must foster better attitudes and knowledge related to assistive technology accommodations among district staff.**

An essential part of improving assistive technology services at a district level is to provide accessible and appropriate continuing education and training opportunities for district staff. BOCES participants attended BOCES-wide meetings and work sessions, several times in the years previous to this research. Special education staff from the districts that the BOCES serves, do not have the same opportunity for continuing education and trainings that can be attended by educators from each of the 13 school districts. Lahm (2003) claimed that continuing education is key for fostering effective assistive technology intervention. Training and continuing education on the subject of assistive technology and accommodations must be designed to effectively reach as many district staff as possible in the 10,000 square miles served by the South Central BOCES.

- **At a local level, the South Central BOCES must improve communication and collaborate with district employees to avoid perpetuating the perception that teachers are the primary barrier to optimal use of assistive technology.**

Blaming district educators for not using assistive technology well is akin to blaming students for not learning. In reality the “barrier” to optimal assistive technology use, in the eyes of BOCES participants, is also the means for attaining optimal assistive technology use. Educators are charged with a myriad of responsibilities. Assistive technology is a resource that can help educators perform their work, but effective use of this tool on the part of educators, will only occur when they understand why, when and how to use this tool. BOCES staff can facilitate this understanding.

- **Special education staff must work to educate general education staff on the subject of assistive technology, especially considering the move at a state-level toward RTI as a universal tool for addressing the needs of struggling students.**

Response to Intervention (RTI) is not a special education process. It is a general education initiative intended to provide all students with individualized interventions to improve their education. To make this initiative work interventions that have traditionally been viewed as special education interventions must be made available to general education staff. Improving awareness of assistive technology among general educators is a key step down the path of implementing effective RTI. Individuals with knowledge of assistive technology must participate actively in RTI. In addition, these “experts” must foster the development of skills and knowledge on the subject of using assistive technology with their peers. Assistive technology will not be an effective part of RTI unless general educators understand when and why it is useful and are comfortable supporting the use of this intervention in their respective classrooms.

- **The South Central BOCES and area school districts must train their para educators on the subject of assistive technology as well as broader aspects of special education.**

Paraeducators work directly with special education students. Several of the paraeducators who participated in this study reported having no educational certification or college degree. It is essential to provide paraeducators, especially those working in isolated communities, training on the special education process, especially since some have not received this training in college. In addition, paraeducators should be included trainings on interventions (including assistive technology) if we expect them to incorporate these tools into their work with students. Paraeducators are the “frontline” in special education interventions. A district or governing agency that does not invest significant resources into the education and development of their special educators is acting irresponsibly.

- **Advocates of assistive technology must document the effectiveness of assistive technology interventions and use this evidence to guide interventions, and when appropriate, advocate for better assistive technology funding.**

Expecting every student to benefit from assistive technology is like expecting every student to benefit from using a wheelchair. Some students will benefit from using assistive technology, while other students will not benefit from this educational intervention. Assistive

technology funding and resources are limited. Data which demonstrates the impact of assistive technology on student performance can be used to ensure that appropriate students are using appropriate tools. Data concerning the impact of assistive technology use will be essential in securing additional assistive technology resources at local, state and national levels.

Implications for Research

Limitations for this research project were outlined in Chapter 1 and Chapter 3. Several suggestions for future research result directly from limitations of this project. It is the opinion of the researcher that the field of special education and the subfield of assistive technology would benefit from the following research projects. Potential research projects are listed in no particular order.

- **A research project of similar design that included a more representative group of schools and participants would lead to results that could be of more use to the general to the field of assistive technology.**

Data regarding the attitudes and knowledge of educators on the subject of using assistive technology as an accommodation on accountability assessments would be of value to district, state and federal organizations in terms of evaluating and designing policy. In addition, this research demonstrated that regression analysis with backward elimination was effective for comparing the attitude and knowledge scores of less and more experienced educators.

- **A similar type of research project that focused on the attitudes and knowledge of parents and student users of assistive technology could provide insight into two groups of primary members of IEP, 504 and Child Study Teams.**

The Director of Special Education for the BOCES identified students as an “excellent source” of information for determining the effectiveness of using assistive technology on accountability assessments. For younger students, parents can contribute valuable information on the effectiveness of assistive technology interventions with their children. In addition, gaining a better understanding of student and parent knowledge and attitudes concerning

assistive technology, especially as an accommodation for accountability assessments, is appropriate.

- **Additional research concerning the effectiveness of assistive technology as an instructional and test accommodation should be performed.**

Assuming that assistive technology is always an effective or appropriate intervention or accommodation would be a mistake. Studies that address effectiveness of specific assistive technology interventions on a large scale are imperative, but evidence based research, designed to evaluate the effectiveness of assistive technology, must also be performed on a case-by-case, item-by-item basis. There is no valid excuse for failing to ground decisions regarding the use of assistive technology in evidence based practice.

- **Research focused on the best ways to provide educators with continuing education on the subject of assistive technology is imperative.**

Assistive technology is part of the ever changing landscape of special education interventions. No Child Left Behind, is an example of federal legislation that can dramatically change how educators are required to perform their jobs. More changes in the field of education are inevitable. Providing effective training and continuing education opportunities, especially for educators embedded in the field, is imperative. This challenge is even more daunting for organizations like the South Central BOCES who provide services to poor, ethnically diverse and rural communities. Continuing education units may not have an impact unless they are incorporated as mandatory professional development for educators. Bush (2005) concluded that voluntary continuing education and professional development is typically accessed by only a small group of individuals. It is imprudent for governing agencies like the Colorado Department of Education, change policy, without providing a sufficient mechanism for educating the districts that they govern about the content and impact of those changes.

- **Research designed to determine why so few students are using assistive technology as an accommodation on accountability assessments is imperative.**

Data from the Colorado Department of Education (2005) indicated that only a fraction of one percent of students who took CSAP tests used assistive technology to help them perform the assessment. Data gathered during this research suggests several possible explanations for low percentages of use. Educators may not know that students can use assistive technology on assessments. Educators may consider the use of assistive technology to provide students with an unfair advantage. Educators may not have access or knowledge that would enable them to use this intervention with students. Educators may not see assistive technology as an effective accommodation. Students may not want to use assistive technology to perform accountability assessments. It is also possible that officials at the local and state level do not correctly identify or count accommodations that fall under the broad, but sometimes, misunderstood definition of assistive technology. Gaining a better understanding of why assistive technology is not utilized more as an accommodation would be valuable.

- **Research should be performed to determine whether the use of assistive technology has an impact on student performance on accountability assessments.**

Research reviewed for this study determined that assistive technology can improve student performance on accountability assessments. Research on this subject, however, is not conclusive. There is some indication that when students use assistive technology on accountability assessments, their scores decrease (D. L. Edyburn, personal communication 6-4-07). A student who performs a writing assessment independently using an electronic keyboard, may not write as efficiently as when they use a scribe, but they may be performing work more independently when keyboarding. Many aspects of using assistive technology as accommodations on accountability assessments have yet to be explored.

Conclusion

Assistive technology is a powerful educational tool. Not only is this intervention available for special education students, in the state of Colorado, it is a resource intended for use with general education students as part of the Response to Intervention initiative (Colorado Department of Education, 2008). Assistive technology is used by students in instructional

settings, however, only a small fraction of students use assistive technology as an accommodation on accountability assessments in the state of Colorado (Colorado Department of Education, 2005).

Special educators play a significant role in determining whether or not a student will use assistive technology in the classroom and are also the gatekeepers for permitting and facilitating the use assistive technology accommodations on accountability assessments. Accountability assessments resulting from No Child Left Behind (2002) have dramatically impacted education. These impacts affect general education and special education students in equal measure. Special education students are expected to participate in accountability assessments, however the unique needs of special education students are not always considered during assessment design. It is unacceptable to exclude a child from accountability measures which have been implemented, at least in part, to monitor and guarantee the quality of their education, simply because that child cannot fill in a bubble sheet with a number 2 pencil.

Measuring and, when necessary, modifying the attitudes and knowledge of educators on the subject of using assistive technology as an accommodation on accountability assessments is critical. The information gleaned from this research project concerning the knowledge and attitudes that educators hold toward the use of assistive technology is narrow in scope, but a valuable contribution to the on-going and limited dialogue on the role that assistive technology should play in accountability assessments.

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Appendix A: Survey

This survey is designed to gather information about your experience, attitudes and knowledge related to using assistive technology. Please answer each question to the best of your ability. Your individual answers are confidential and will not be shared with you colleagues or supervisors. Your answers will be used to improve the quality of assistive technology services for the SC BOCES. Information you provide in this survey may be referenced in an academic paper or publication, but will not be associated with your name.

Participation in this survey is not mandatory. Those who complete and return the attached survey will be included in a drawing for one of several gift certificates to Barnes and Noble Bookstore. When you have completed the assessment, return it to the survey administrator or use the attached envelop to return the survey to: Brad Atchison, SC BOCES, 100 W. Spruce, Walsenburg CO, 81055. Thank you for your participation.

Circle the number that best corresponds to your belief about the correlating statement to the left. Circling “1” indicates that you strongly disagree with the statement. Circling “5” indicates that you strongly agree.

- | | |
|---|---|
| 1. Assistive Technology services are available for my students. | Disagree-----Agree

1-----2-----3-----4-----5 |
| 2. My students like to use assistive technology. | Disagree-----Agree

1-----2-----3-----4-----5 |
| 3. Using assistive technology as an accommodation on CSAP testing gives students an unfair advantage. | Disagree-----Agree

1-----2-----3-----4-----5 |
| 4. My students do not benefit from using assistive technology | Disagree-----Agree

1-----2-----3-----4-----5 |
| 5. I do not feel as though I have received adequate training on using assistive technology with students. | Disagree-----Agree

1-----2-----3-----4-----5 |
| 6. Special education students are not allowed to use assistive technology when taking CSAP tests. | Disagree-----Agree

1-----2-----3-----4-----5 |
| 7. Using assistive technology is easy. | Disagree-----Agree

1-----2-----3-----4-----5 |

8. All students could benefit from using assistive technology accommodations on CSAP testing.
- Disagree-----Agree
- 1-----2-----3-----4-----5
9. The BOCES is responsible for providing assistive technology services to special education students.
- Disagree-----Agree
- 1-----2-----3-----4-----5
10. Some of my students benefit from using assistive technology.
- Disagree-----Agree
- 1-----2-----3-----4-----5
11. Special education students should use accommodations in an instructional setting before using them in a test setting.
- Disagree-----Agree
- 1-----2-----3-----4-----5
12. State and federal regulations do not specifically address the use of assistive technology with special education students.
- Disagree-----Agree
- 1-----2-----3-----4-----5
13. Allowing a student to keyboard, instead of handwrite, could be an example of an assistive technology accommodation.
- Disagree-----Agree
- 1-----2-----3-----4-----5
14. Using assistive technology prevents students from developing basic skills (handwriting, reading etc...).
- Disagree-----Agree
- 1-----2-----3-----4-----5
15. Special education students can use assistive technology as an accommodation on CSAP tests.
- Disagree-----Agree
- 1-----2-----3-----4-----5

16. Assistive technology is not worth the time and effort it requires.

Disagree-----Agree

1-----2-----3-----4-----5

17. Recorded books could be an example of an assistive technology accommodation.

Disagree-----Agree

1-----2-----3-----4-----5

18. Using accommodations on CSAP tests threatens the validity of the assessment.

Disagree-----Agree

1-----2-----3-----4-----5

19. My students do not have access to assistive technology.

Disagree-----Agree

1-----2-----3-----4-----5

20. Assistive technology services should be considered for use with every special education student.

Disagree-----Agree

1-----2-----3-----4-----5

21. I would be willing to participate in an in-depth interview on the subject of using assistive technology as an accommodation on CSAP testing.

Yes No

(circle one)

If “yes” please provide a phone number or e mail address so that you may be contacted if chosen.

22. District: _____

Your name: _____

(optional)

23. What is your job title?

23. When did you last take a college course?

24. Please list your college degree(s) and year of completion.

25. How many years have you been working in the field of education?

26. Please write a brief definition of assistive technology.

Appendix B: IRB Approval



University Research
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TO: Marjorie Hancock
Elementary Education
246 Bluemont Hall

Proposal Number: 4365

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: August 1, 2007

RE: Proposal Entitled, "The knowledge and attitudes of special educators toward using assistive technology as an accommodation for accountability assessment"

The Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is exempt from further review.

This exemption applies only to the proposal currently on file with the IRB. Any change affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Exemption from review does not release the investigator from statutory responsibility for obtaining the informed consent of subjects or their authorized representatives, as appropriate, either orally or in writing, prior to involving the subjects in research. The general requirements for informed consent and for its documentation are set forth in the Federal Policy for the Protection of Human Subjects, 45 CFR 46.116-117, copies of which are available in the University Research Compliance Office and online at <http://ohrp.osophs.dhhs.gov/humansubjects/guidance/45cfr46.htm#46.116>. In cases of remote oral data collection, as in telephone interviews, oral consent is sufficient and the researcher is required to provide the respondent with a copy of the consent statement only if the respondent requests one. The researcher must, however, ask the respondent whether he or she wishes to have a copy. The initiative in requesting a copy must not be left to the respondent. Regardless of whether the informed consent is written or oral, the investigator must keep a written record of the informed consent statement, not merely of the fact that it was presented, and must save this documentation for 3 years after completing the research.

The identification of a human subject in any publication constitutes an invasion of privacy and requires a separate informed consent.

Injuries or any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

Appendix-C: Interview Questions

- 1) Do you use assistive technology with students? Yes / No
Follow up: Why?
- 2) Do you use assistive technology as an accommodation for instructional work with some special education students? Yes / No
Follow up questions:
Why?
What kinds of AT do students use?
- 3) Do you use assistive technology as a testing accommodation with some students? Yes / No
Follow up questions: Why?
What kinds of AT do students use?
- 4) Please describe the process of determining whether or not a student can use assistive technology as an accommodation.
- 5) Who is responsible for determining whether or not a student can use assistive technology as an accommodation?
- 6) Where and when is the decision made concerning whether or not a student can use assistive technology as an accommodation?
- 7) Where and when is the decision documented concerning whether or not a student can use assistive technology as an accommodation?
- 8) What is the purpose of allowing students use assistive technology as an accommodation during CSAP testing?
- 9) What is the biggest barrier to successful use of assistive technology in schools?
- 10) Please add any other thoughts you might have related to the subject of this interview.

Appendix D- Expert Panel

Karen Spencer

Associate Professor of Occupational Therapy

Department Head, Occupational Therapy

Colorado State University

Former director of the Assistive Technology Resource Center

Trudy Salsberry

Professor of Educational Leadership

Kansas State University

Professor Salsberry teaches qualitative research methods for the college of education.

David Edyburn

Professor of Exceptional Education

University of Wisconsin Milwaukee

Professor Edyburn has researched and written extensively on the subject of assistive technology.

Cathy Bodine, Ph.D.

CCC-SLP, Assistant Professor and Section Head in the Department of Rehabilitation

University of Colorado Health Sciences Center

Director of Assistive Technology Partners (ATP)

Aaron H. Carlstrom, Ph.D.

Assistant Professor of Education

Licensed Psychologist by Temporary License Dept. of Counseling & Educational

Psychology College of Education

Kansas State University

Maureen Melonis,
M.N.S., CCC-SLP
Director/Education Coordinator
University of Colorado Health Sciences Center

Stephen Benton, Ph.D.
Professor and Chair
Department of Special Education, Counseling, and Student Affairs
Kansas State University
Dr. Benton teaches quantitative research methods and has conducted numerous research projects using surveys.

Appendix E: Sample Interview Transcript

Interview Transcript: B-1

B: Please say your name

B1: (participant stated name.)

B: And your position?

B1: Itinerant teacher for the South Central BOCES.

B: I have several questions for you and then I might ask you follow up questions.

- 1) Do you use assistive technology with students? Yes / No

Follow up: Why?

B1: Yes I do.

B: Why do you do that?

B1: Some of my students... I feel like it is appropriate for them to use. Should I give you some examples or what?

B: That would be great.

B1: Like for instance for a student who does not have the ability to talk. Maybe technology can give them that voice to express their wants and needs.

- 2) Do you use assistive technology as an accommodation for instructional work with some special education students? Yes / No

Follow up questions: Why? What kinds of AT do students use?

B1: Some students I have seen it work effectively with, especially when students get older. Students who have a hard time writing. Even though they have the concepts, maybe they don't have the fine motor or the patience that it takes to write out the words. It's harder for them. They can express their ideas better by typing or they just feel more comfortable by typing.

B: So you have used AT as an accommodation?

B1: Yes. Yes.

B: You gave me kind of a "why?", now can you tell me what kinds of assistive technology have you seen used in these situations?

B1: Keyboards. I think it is better for older students, because they are moving more in that direction. Using laptops and when they get to college, if they go to college. That is what they will be using. I think for younger students it is better to go with pen and paper. To just get them to keep trying to refine those skills rather than just jumping right into assistive technology.

B: You are someone who provides hearing aids or helps people to get hearing aids or has done some kind of intervention that way?

B1: Yes.

B: Do you think that is an assistive technology?

B1: Yeah, I guess so and along with FM systems also.

B: Do you think that is an effective assistive technology?

B1: Definitely. My students who don't wear their hearing aids fall behind more and more. The earlier that kids can get that AT the better for them.

B: Do you have to write those kinds of things into accommodations and do you include that in IEPs?

B1: FM systems we do, but as far as hearing aids we don't. Or I don't.

- 3) Do you use assistive technology as a testing accommodation with some students? Yes / No.

Follow up questions: Why? What kinds of AT do students use?

B1: No I haven't, because I haven't personally administered any tests to the students that I work with. That is usually their building teachers.

B: As a member of an IEP team have you ever advocated or requested that students be able to use AT as an accommodation on standardized assessments?

B1: Definitely. Yeah.

B: Can you think of an example?

B1: Well definitely with the writing. Yeah, that is a big one.

B: And why did you recommend using AT on a standardized assessment, on a testing situation?

B1: Because the student has been using it in class and so it is only appropriate that it gets to be carried over to the testing situation where they have been using AT all year and so

we are testing them on what they know and how they get it done.

- 4) Please describe the process of determining whether or not a student can use assistive technology as an accommodation.

B1: I look at the goals that we are deciding to use for that student. And then, try to brainstorm ways we can match to that goal. And so if some of the technology or materials we use currently are not working...like for instance with a talking device for a student who isn't talking. It is more natural for them to have a voice. It makes them more like their peers, to use something that can say the word for them rather than always presenting a card. You can teach them to push the button and then it talks for them and then that makes them more like their peers and so I think that those ways of using technology are good.

B: I am going to ask one part of this question again. What is the process for determining whether or not to use it? If you were going to focus on that...

B1: Oh let's see. Just looking at the goal and I don't know how else to determine. Okay actually, I guess I don't have checklist or anything. Judgment. Personal judgment!

- 5) Who is responsible for determining whether or not a student can use assistive technology as an accommodation?

B1: I think the team can help make that decision. And I said again, when you are looking at the goals that you are trying to master. When the team is talking about how you are going to master those goals then everyone has a voice and how you think it can be used. Because if it is use across the whole team, every person working with that student, then it falters out and the student isn't successful because they are not generalizing it to every situation. So I think that everyone needs to have a hand in helping to determine that.

B: And are you talking about the IEP "team"?

B1: Yes.

- 6) Where and when is the decision made concerning whether or not a student can use assistive technology as an accommodation?

B1: Hmmm. I don't know. Personally I make it whenever it becomes appropriate. If I think it is going to help the student then it is something that I try to introduce. It is not a magic wand, nothing is, but um, but it is one thing to sit in a meeting and say "hey we are going to try this device," but then the student might reject it. And if the student doesn't want to use it then that would be appropriate time to say "okay that is obviously not an effective intervention for that student." So that would be the appropriate time to say "hey what else can we do?" and go back to the team and say.... It is always evolving I guess.

B: It sounds like you are saying that it happens in the course of working with a student...working directly with a student.

B1: Yes. Evolving. Yes.

7) Where and when is the decision documented concerning whether or not a student can use assistive technology as an accommodation?

B1: I hadn't really thought about that, but in progress monitoring. I think that if you are deciding to use it as something that is going to help you attain a goal, then that would be the place to look and see if that is helping attain that goal. If it is successful or not.

B: Can you think of anyplace else where you might document accommodations?

B1: What do you mean? Can you clarify that?

B: Uh, if a student has accommodations, you have worked them and you have said "oh yeah, I want this person to have this or this or this, is there anyplace else that you can think of where you might document that besides, progress notes, besides those kinds of reports?

B1: No

8) What is the purpose of allowing students to use AT as an accommodation on CSAP testing?

B1: Kind of like we alluded to before, that if they have been using it all year, and that is how we have been teaching them the skills that we feel like they need through out the

year, then when we start looking at the CSAP testing, if we don't let them use that accommodation again on the testing, then that is not really showing what they know. If we...because they know how to use it. Because they are trying to show what they know and if they use technology then that is something that is going to make them successful in life, then that is what we are really trying to show.

B: So it sounds like you are really saying that it is related to the type of instruction. If a kid is getting educated with that tool, that you feel like it is something that they should use when they are tested.

B1: Definitely.

B: Did I put words in your mouth?

B1: No, you didn't. That is exactly what I was saying.

10) Please add any other thoughts you might have related to the subject of this interview.

B1: I think that there is a blanket view that maybe it might be a magic wand. And for people who like it, I think that they might view it as a magic wand that the student will suddenly be able to do the skill that they are trying to teach them. And the people who do not like it will have that view, like that it is a magic wand and that suddenly it is going to help the student do something that they couldn't do. They still need to be taught it, regardless. The people that don't want them to use it on CSAP they feel that it gives them an unfair advantage, when all year you have been working at teaching them that skill, and so you are showing that they know that skill. And it is not a magic wand would be my main thought on that. It is still something that needs to be worked on and it is not going to happen in a week, it is not going to happen in two weeks, but you need to give it a chance and be consistent all year from when you decide to use it.

B: One more question, and we are done. And I think that you will get to your class on time. What would you list as the number one barrier to successful AT use?

B1: The teachers do not take the time to let their students use it. That they...like it is put up on a shelf. They don't want to, not that they don't want to, but they don't take the time to teach the student how to use it. If it doesn't work immediately, then it is not going to work and it gets put away. The end.

Appendix-F- Letter of Introduction

Dear Colleague:

I am conducting this survey as part of a research project I intend to use to complete my dissertation. The primary purpose of this survey is to gather information related to the use of assistive technology as an accommodation on accountability assessments, specifically the CSAP and CSAPA. Data generated from this survey will be used to improve assistive technology services by helping the South Central BOCES to better understand knowledge and attitudes you currently hold related to the use of assistive technology as an accommodation.

Data generated from these surveys will also be used to complete my dissertation in partial fulfillment of requirements for a Ph.D. in Curriculum and Instruction at Kansas State University. This survey is being distributed to all special education staff who work with students who participate in CSAP testing.

If you choose to participate in this study, please fill out the enclosed survey and return it in the stamped envelop enclosed or via the BOCES courier. It should take you approximately 10-15 minutes to complete the survey. Surveys have been marked with identification numbers to enable me to contact survey participants if necessary. Participating in this study should result in no adverse effects and you are under no obligation to participate. Your demographic information is being requested for purposes of comparison, but you will not be identified personally in the survey analysis or reporting. Copies of survey results will be made available to your districts upon completion of the research project.

If you take the time to return the completed survey you will be eligible for a drawing for a Barnes and Noble Bookstore gift certificate. Five \$20 gift certificates will be awarded.

If you would like more information regarding this project you may contact me at the number or address listed below or my advisor Marjorie Hancock. For more information about human subject procedures at Kansas State, you may contact Dr. Clive Fullagar, Chair, Committee of Research Involving Human Subjects, 103 Fairchild Hall, Kansas State University, Manhattan KS, 66506. (phone) 785-532-6195.

Thank you for considering this request.

Sincerely,

Brad Atchison
Director of Assistive Technology
South Central BOCES
atchison-b@scboces.k12.co.us 719-738-1701

Appendix-G- Consent Letter

Dear Colleague:

The enclosed survey is part of a study which is sponsored by the South Central BOCES. The primary purpose of this survey is to gather information related to the use of assistive technology as an accommodation on accountability assessments, specifically the CSAP and CSAPA. Data generated from this survey will be used to improve assistive technology services by helping the South Central BOCES to better understand knowledge and attitudes you currently hold related to the use of assistive technology as an accommodation.

Data generated from these surveys will also be used to complete my dissertation in partial fulfillment of requirements for a PhD in Curriculum and Instruction at Kansas State University. This survey is being distributed to all special education staff who work with students who participate in CSAP testing.

Please fill out the enclosed survey and return it in the stamped envelop enclosed or via the BOCES courier. It should take you approximately 10-15 minutes to complete the survey. Surveys have been marked with identification numbers to enable me to contact survey participants if necessary. Participating in this study should result in no adverse effects and you are under no obligation to participate. Your demographic information is being requested for purposes of comparison, but you will not be identified personally in the survey analysis or reporting. Copies of survey results will be made available to your districts upon completion of the research project.

If you take the time to return the completed survey you will be eligible for a drawing for a Barnes and Noble Bookstore gift certificate. Five \$20 gift certificates will be awarded.

If you would like more information regarding this project you may contact me at the number or address listed below or my advisor _____ at _____. For more information about human subject procedures at Kansas State, you may contact:

- Dr. Rich Scheidt, Chair, Committee of Research Involving Human Subjects, 203 Fairchild Hall, Kansas State University, Manhattan KS, 66506. (phone) 785-532-6195.
 - Dr. Jerry Jaax, Associate Vice Provost for Research Compliance and University Veterinarian, 203 Fairchild Hall, Kansas State University, Manhattan, KS 66506, (785) 532-3224.
- Thank you for considering this request.

Sincerely,

Brad Atchison
Director of Assistive Technology
South Central BOCES
atchison-b@scboces.k12.co.us
719-738-1701