STUDENTS WITH DISABILITIES’ PERCEPTIONS OF ASSISTIVE TECHNOLOGY,
THE LIVEScribe SMARTpen, AUDIO RECORDING, AND NOTE-TAKING
SERVICE ACCOMMODATIONS

A Thesis

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Keith Robert Ellis

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Graduate and Professional Studies in Education
Abstract

of

STUDENTS WITH DISABILITIES’ PERCEPTIONS OF ASSISTIVE TECHNOLOGY, THE LIVESCRIBE SMARTPEN, AUDIO RECORDING, AND NOTE-TAKING SERVICE ACCOMMODATIONS

by

Keith Robert Ellis

Brief Literature Review

The literature shows the value of student services in educational institutions and the increasing use of technology in colleges. Expectations continue to grow in California’s community colleges for the increased use of technology to deliver student services. Additionally, technology acceptance is influenced by perceived usefulness and perceived ease of use as well as the facilitating conditions of user inclusion in the system selection, training, and support. Lastly, the student disability educational accommodation process has been outlined and defined by relevant law and court cases including the use of technology as a means of accommodating disabilities.

Statement of the Problem

The purpose of this study was to identify the factors that influence the acceptance of technology by students with disabilities at a community college. Commonly used
accommodations for students with disabilities are note-taking services and or voice recording lectures, but an examination of the student experience with respect to these accommodations may guide or create barriers for student success. The theoretical framework was the Technology Acceptance Model that identified perceived usefulness and perceived ease of use as technology acceptance predictors with the extension of a subjective norm and three facilitating conditions: user inclusion in system selection, training, and support.

Methodology

A qualitative methodology was used with a semi-structured in-depth interview protocol for participants to share their perspectives with regard to their educational accommodations and assistive technology. Data were presented in a case study format. Participants were purposely asked to participate based on specific selection criteria. Creswell’s (2012) qualitative research design was used for analysis.

Conclusions and Recommendations

Generally, students with disabilities have an openness and willingness toward the use of technology as a means of accommodation. Additionally, those who use it view the Livescribe Smartpen and audio recording very positively. Training and support are attributed to the decision-making process. Livescribe Smartpen and audio recording training and support should be developed from ease of use and usefulness demonstrating the benefits. Livescribe Smartpen training must contain note-taking strategies. Note-taking service accommodation is popular, and there is a consensus that it couples with
audio recording; however, there are quality control and reliability issues combined with lack of feedback.

José L. Chávez, Ed.D.

Date
DEDICATION

I dedicate this thesis to all students with disabilities pursuing higher education. Do not let your disability define your identity nor let it limit your ambition and passion.

Through education, you will achieve your own greatness and grow in immense ways to be an awesome force in our society. Let your ambition and passion define you.

I further dedicate this thesis to all educators and student services professionals who support and encourage students with disabilities to pursue higher education. Your efforts are greatly appreciated.
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First, I must acknowledge my parents Sharlene and William Ellis for encouraging me to attend UC Merced and their continued support during this program. My parents taught me to leverage the opportunities that come before me, and they instilled in me the importance of education.

A thank you to all the educators who had a part in educating me over the course of my life, and a special thank you to my 5th and 6th grade teacher Laurie Walker for teaching me the secrets to being a better reader and writer, which have served me well.

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Thank you to all my colleagues from the UC Merced Alumni Association. Together we support each other through our endeavors beyond UC Merced. Let the Journey Continue…

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Chapter 1

INTRODUCTION

Background

As the largest and most accessible of the three tiers of California State public higher education systems, with 2.1 million students at 113 colleges (California Community Colleges Chancellor’s Office [CCCO], 2015), the California community college system is under increasingly greater pressure from the state legislature and public to increase the success rate of students. A study conducted by the National Center for Education Statistics (1999) found that students with disabilities were less likely than students without disabilities to attend college. Also, students with disabilities typically are not as successful in comparison to their non-disabled peers and, as a result, many laws and mandates have evolved to close this achievement gap. According to the California Community Colleges Chancellor’s Office Datamart (CCCO, 2015), in the 2014-15 academic year, 121,406 students with disabilities used Disabled Students Programs & Services (DSP&S).

Prior to the passage of the Federal Rehabilitation Act of 1973, access to education to individuals with disabilities was not a fundamental right. The Rehabilitation Act required schools receiving federal funding to ensure access to individuals with disabilities. Later, the Rehabilitation Act was joined by the Americans with Disabilities Act (ADA) of 1990 and the Individuals with Disabilities Education Act (IDEA) of 2004.
This federal legislation resulted in California State legislation to meet this access mandate, including modification of the California Education Code to provide specific support to students with disabilities in California community colleges and the establishment of DSPS.

Johnson (2006), a third-year doctoral candidate at the University of Arkansas, a Counselor-in-Residence for the University of Arkansas, and a Mental Health Professional for Ozark Guidance Center in Northwest Arkansas, wrote an article discussing some of the difficult issues students with disabilities encounter in college regarding disclosure. Johnson’s article illustrated how Lynch and Gussel discussed the predicament some students with disabilities may come across when disclosing their disability in order to be able to receive their accommodations or services in college. Also, according to Johnson (2006), it appears that students with disabilities are having a different educational experience unexamined by researchers. Johnson also went on to describe another predicament students with disabilities face, and that is how students can never judge how a teacher will respond to their disability. This uncertainty can bring students with disabilities much stress.

A fundamental element of access for students with disabilities is the educational accommodation, which is a service or support provided to help a student with a disability fully and equally access the subject matter and instruction without changing the content or learning outcome. A widely accepted set of accommodations are note-taking services and lecture recordings. Note-taking services typically come in the form of another
student sharing course notes on a paid or volunteer basis. Lecture recording is the allowance of the student to use a device to audio record the lecture for later playback. These two accommodations are not mutually exclusive and a student could use both. Also, in 2007, Livescribe Incorporated developed what they call the “smartpen,” which is an ink pen with a digital voice recorder integrated into it that indexes the audio recording based on the handwritten notes in the Livescribe Notebook (Livescribe.com, n.d.). The Livescribe Smartpen effectively integrates note-taking and audio recording.

The research on the use of technology to deliver student services lags significantly behind that of research for technology used in instruction, and research specific to students with disabilities utilizing specific accommodations is even more limited due to the fact that higher education disability accommodation service delivery philosophy and methodology are not linked to student success as they are in the primary and secondary (K-12) school system. The intention to use and support technologies for services to students with disabilities will be influential in guiding student success. An understanding of factors that influence user acceptance of technology will play an important role as community college administrators and staff seek to leverage technologies in support of student services facilitating student success.

In an effort to identify early in a system development effort the factors that would predict the acceptance of software by users, Davis (1989) identified two variables, Perceived Usefulness (PU) and Perceived Ease of Use (PEU), which became foundational predictors in the Technology Acceptance Model (TAM). Having its roots in
the Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975), this framework provides measures that predict acceptance of a system without waiting for development and deployment to assess system usage. This approach reduces the waste of financial and human resources due to deploying systems users resist accepting or refuse to use. The TAM framework has been extended in TAM2 (Venkatesh & Davis, 2000) and TAM3 (Venkatesh & Bala, 2008) to include other predictors, such as social influences including subjective norm, that influence the PU and PEU predictors. In addition, facilitating conditions have been researched, including the involvement of users in system selection and development, training and professional development during deployment, and system support after implementation. The TAM and subsequent extensions have been heavily researched in a number of settings, with the basic framework being strongly supported. The influence of additional predictors and facilitating conditions examined in extended models vary based upon the environment. This study explores the validity of an extended TAM framework in a community college environment on students with disabilities utilizing the educational accommodations of note-taking services, digital lecture recording, and Smartpen note-taking lecture recording and researches the predictors and facilitating conditions included in previous research.
Statement of the Problem

Commonly used accommodations for students with disabilities are note-taking services and or voice recording lectures, but an examination of the student experience with respect to these accommodations may guide or create barriers for student success.

Definition of Terms

Assistive Technology (AT)

Any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, used to increase, maintain, or improve functional capabilities of a individual with a disability

Disability Support Programs &Services (DSP&S)

Formerly known as Disabled Students Programs & Services, a California State categorical grant administered by the California Community Colleges Chancellor’s Office under Title 5 of the California Education Code and synonymously known as the office at the community college campus from which students with disabilities receive educational accommodations and related services.

Educational Accommodation

A service or support provided to help a student with a disability fully and equally access the subject matter and instruction without changing the content or learning outcome
Perceived Ease of Use (PEU)

One of the major predictive variables used in the Technology Acceptance Model that captures a user’s belief that software will be easy to use once it is developed.

Perceived Usefulness (PU)

One of the major predictive variables used in the Technology Acceptance Model that captures a user’s belief that a system will be beneficial to them in carrying out their work assignments.

Smartpen

A pen with a digital voice recorder designed into it for indexing voice recordings to hand-written notes.

Social Influence (SI)

The influence that other individuals have on an individual’s opinion or behavior.

Student Services

A wide array of services in the California community colleges that support a student’s emotional, cultural, and social development outside the classroom.

Subjective Norm (SN)

An additional predictor in extended technology acceptance models that captures the influence that other people important to an individual have on their intention to use technology.
Technology Acceptance Model (TAM)

A model based on the Theory of Reason Action (TRA) used to predict, during the early stages of system design, if a technology will be used by individuals once it is developed and deployed

Theory of Planned Behavior (TPB)

An extension of the Theory of Reasoned Action that added the concept of perceived behavioral control, or the confidence that one has the resources and ability to successfully carry out an action, to the constructs of attitude and social norm in predicting behavioral intention

Theory of Reasoned Action (TRA)

A model for the prediction of behavioral intention, represented as (BI = A + SN), stating the intention to perform a behavior (BI) depends upon an individual’s attitude (A) about the behavior and subjective norms (SN)

Universal Theory on the Acceptance and Use of Technology (UTAUT)

A model that sought to incorporate many theories on technology acceptance into a single unified framework

Limitations of the Study

This study intended to measure the perceptions and perspectives of community college students with disabilities on the usefulness of assistive technology as a means of educational accommodations. This study was limited to one community college campus;
as a result, wider generalities beyond the campus cannot be concluded from this study. Also, institutional practices at this particular campus may influence the perceptions of the participants, but institutional practices were not examined through this study. Participants were solicited through email, which may contribute some bias because individuals who routinely use email may be more favorable toward the use of technology; those who may be less technologically savvy may not be equitably represented in this study.

**Significance of the Study**

The significance of this study is that by identifying key predictors and facilitating conditions of a TAM framework, the rate of technology acceptance by students with disabilities may increase and student success may be actualized through the perception of the assistive technology. Through a better understanding of student perceptions toward assistive technology, student services professionals would be better equipped to support students with disabilities.

Davis (1989), in the TAM framework, identified two constructs, perceived usefulness (PU) and perceived ease of use (PEU), which he showed directly influence an individual’s intention to use technology. Subsequent research has affirmed the significance of these two constructs and also expanded the model with other factors to provide additional information in predicting the intention for technology acceptance in the early stages of software development. The objective of the TAM, and subsequent
extensions, is to increase the rate at which technology systems, once deployed to a user community, would be accepted and used and reduce the investment in technologies that encounter resistance and non-acceptance when deployed.

This study aimed to examine student perspectives of assistive technology and note-taking services for students with disabilities at a small suburban public community college as related to their perceived success. The objective of this study was to investigate and answer the following research questions:

1. What are the perceptions of students with disabilities toward the usage of Livescribe Smartpen, a digital voice recorder, and or note-taking services and the impact on their perceived success in community college coursework?

2. What are the factors that influence the acceptance of assistive technology by students with disabilities?

3. What student-perceived academic success factors can be linked to the use of the Livescribe Smartpen, digital voice recorder, or note-taking service accommodations?

4. How useful do students with disabilities find the Livescribe Smartpen, digital voice recorder and or note-taking services?

5. How does the use of the Livescribe Smartpen compare to the use of standard digital voice recording and or third-party note-taking services?
Organization of the Remainder of the Study

The literature review that follows examines the following:

• Theories supporting student services and the role of student service professionals in service delivery

• A review of ableism and student disability accommodations

• Technology adoption in student services and the current environment for technology in higher education in California and technology acceptance models that provide frameworks that facilitate the adoption and use of technologies.

A chapter describing the methodology used for the study, including its setting, population, and design, follows as well as a chapter providing an analysis of the data. The study concludes with recommendations for future practices and research.
Chapter 2
REVIEW OF RELATED LITERATURE

Introduction

The purpose of this study was to identify the factors that influence the acceptance of technology by students with disabilities at a small suburban community college. The study also was designed to explore the perceptions of students with disabilities on the use of technology as related to their perceived success in college. As stated previously, research involving students with disabilities is limited, but this study hopes to add to the body of knowledge pertaining to students with disabilities to better aid in service development and implementation by student service professionals and higher education leadership administrators.

Organization of the Literature Review

The literature review presents a framework for the acceptance of technology by students with disabilities in higher education institutions. The literature review comprises three sections: (a) theories supporting student services and student development, (b) a review of literature on ableism and student disability accommodations, and (c) theories on technology acceptance. The theoretical perspectives used in this study are viewed through a lens of perceived student success based on the provisioning of student disability accommodation services through technology, and theories of technology acceptance based upon user acceptance of technology models.
Student Services and Student Development

Student services and the role of student services personnel in delivering them are critical to the success of the student (Kuh, Kinzie, Schuh, & Whitt, 2010). This section is presented in four parts: (a) the foundations of the profession, (b) theoretical structures including theories on student growth and development, (c) holistic institutions, and (d) retention (American Council on Education [ACE], 1937; Astin, 1993; Blair, 1998; Brofenbrenner, 2005; Brown, 1972; Chickering & Reisser, 1993; Evans, 2010; Hamrick, Evans, & Schuh, 2002; Komives, 1998; Kuh, 1996; McClellan & Stringer, 2009; Nuss, 2003; Tinto, 2006). This background provides a context for the use of technology by students with disabilities as technology, technology training, and accommodation support services are provided through student services professionals. Student services professionals provide supplemental academic support outside the academic curriculum, and those student services professionals serving students with disabilities provide the accommodation or the avenue for the accommodation.

Foundations of the Profession

The need for student services professionals has its roots in the environment of the last half of the 19th century (Hamrick et al., 2002). Up until the end of the Civil War, the tradition of American colleges and universities was focused on the student as a whole individual, and the goal of education was to develop the student into their full potential. However, in the latter half of the 19th century, the emphasis changed from the
development of the whole student to the expansion of the boundaries of knowledge. For example, faculty became more specialized in acquiring and transmitting subject area knowledge as experts while neglecting the student as an individual (ACE, 1937).

According to Nuss (2003), in the early part of the 20th century, the modern student services form began to develop, evolving as faculty focused on subject area knowledge and colleges established separate entities to support students. These organizations focused their practice around vocational guidance, the collection of accurate data on individual students, and supervising the use of inventories on occupational interests (Nuss, 2003).

**Student services professionals.** The origins of the modern day student services professional can be traced back to research conducted by L. B. Hopkins in 1926 under the direction of the ACE (1937). The studies resulted in the creation of cumulative records, personality rating scales, and comparable achievement tests, which in turn supported the improvement of student services (ACE, 1937). In the 1937 report *Principles of Good Practice for Student Affairs*, ACE formally identified 23 services, in addition to instruction, that were necessary to support an individual student in an educational program. According to ACE (1937), these services included orientation to college, assistance in determining courses based on assessment tests, and assistance with clarifying occupational goals and educational plans in relation to them. Several years later, further delineation was made for the first time to define and delimit personnel
activities separate and distinct from other instructional and administrative functions in a manner much clearer than anything previously published (ACE, 1949).

**Student services research.** From its origins, the professional practices and standards of student services evolved based on research in the areas of education, psychology, and psychiatry (ACE, 1949; McClellan & Stringer, 2009). For student services personnel, the profession is not only about being capable of relating to and interacting with students, but also about understanding the underlying research. Providing student services is critical to student success. The purpose of student services is to provide students with support that complements academic instruction to assist a student in reaching their educational goal. Further, regional accreditation standards for California’s community colleges require that in addition to academic services, institutions must also provide non-academic services to students for their development and success (Accrediting Commission for Community and Junior Colleges, 2012). Student success, as articulated in the Student Success Act, is defined as the ability of a student to identify their educational goal and achieve it in a timely manner (The Student Success Act, 2012).

The profession requires the ability to both understand research and be data driven as well as the ability to be effective in relationships with students, and the student services professional is often described in the literature as a scholar-practitioner (Evans, 2010). According to Knefelkamp and Komives (as cited in Evans, Forney, Guido, Patton, & Renn, 2010), theories of student development, engagement, and the creation of holistic environments for students provide the foundation for practicing the profession.
Student Growth and Development Theory

Student development theories were developed to describe the growth of students during their college years. Student development theory serves as a foundation for student services professionals in terms of the services put in place to support the whole student, and, according to Evans et al. (2010), it covers foundational theories of identity development (Chickering, 1969; Erikson, 1980; Josselson, 1987; Marcia, 1966), ethical development (Perry, 1970), moral development (Kohlberg, 1981), and experiential learning (Kolb, 1984). Student development is also based on integrative theories as described by Evans et al. (2010), including Bronfenbrenner’s (2005) developmental ecology model as well as theories on self-authorship (Baxter Magolda, 1999) and faith (Fowler, 1981) and Schlossberg’s transition theory (Schlossberg, 1981). A third branch of theories, according to Evans et al. (2010), evolves around the social development of students and includes theories on racial (Degaldo & Stefancic, 2000), ethnic (Phinney, 1990), sexual (Fassinger, 1998), and gender indemnity (Bem, 1981).

In their revised theory on psychosocial development, Chickering and Reisser (1993) described the following seven vectors of student development:

- Developing purpose
- Developing competence
- Managing emotions
- Moving through autonomy to interdependence
• Developing mature interpersonal relationships
• Developing Integrity
• Establishing Identity

Five of the seven vectors described in his research—developing purpose, developing competence, managing emotions, moving through autonomy to interdependence, and developing mature interpersonal relationships—were selected as a focus in this literature review because they can be linked to student services for students with disabilities.

**Purpose**

Developing purpose is one of the key elements to student development described by Chickering and Reisser (1993). Many students come to college with energy and enthusiasm but only have vague, unrefined notions of who they want to become. Student services professionals should assist students in moving beyond the perception that they are attending college to qualify them for a good job to one which helps them build skills for a wide range of life experiences and from a place where they view college as the means to achieve a comfortable living to one where they can develop a broad knowledge base and a broad world-view and philosophy and become lifelong learners (Evans, 2010). From initial contact, the student services professionals must be aware that they are responsible for guiding students through a journey in which they develop a purpose for their life (Chickering & Reisser, 1993).
Competence

The development of competence is also important (Chickering & Reisser, 1993), and student services professionals can facilitate it through the disability accommodation process and assistive technology training. Student services is not just about student growth based upon theories of developing the whole student (Baxter Magolda, 1999; Chickering & Reisser, 1993; Erikson, 1968; Perry, 1970) but is also about creating holistic environments, institutions where students find an integrated ecological system supporting them academically and socially (Blair, 1998; Brofenbrenner & Morris, 2010; Brown, 1972).

Managing Emotions

The development of emotional controls is vital to student development (Chickering & Reisser, 1993). Individuals must learn how to appropriately act on feelings they are experiencing. According to Evans (2010), Chickering’s more recent research examined inclusive range of feelings, including anxiety, depression, anger, shame, and guilt, as well as more positive emotions such as caring, optimism, and inspiration. Some of these emotions are classified as disabilities and or create barriers when coupled with disabilities. Student services professionals provide the support while students are developing emotional controls.

Moving Through Autonomy to Interdependence

Moving Through Autonomy to Interdependence is a further development of managing emotional complexities and results in increased emotional independence,
which is defined as “freedom from continual and pressing needs for reassurance, affection, or approval from others” (Chickering & Reisser, 1993, p. 117). Students also develop instrumental independence that includes self-direction, problem-solving ability, and mobility. Finally, they come to recognize and accept the importance of interdependence, an awareness of their interconnectedness with others. Chickering’s revised theory places a greater emphasis on the importance of interdependence underscored by its renaming from “Developing Autonomy” (Evans, 2010).

**Mature Relationships**

Managing emotions and moving through autonomy to interdependence synthesizes into mature relationships, which is why these three vectors appear in sequence and that experiences with relationships contribute significantly to the development of a sense of self. The tasks associated with this vector include development of intercultural and interpersonal tolerance and appreciation of differences as well as the capacity for healthy and lasting intimate relationships with partners and close friends. Reisser (as cited in Evans, 2010) noted that both tasks “involve the ability to accept individuals for who they are, to respect differences, and to appreciate commonalities” (p. 68). Ultimately, the disability accommodation process and accompanying services require a great deal of self-advocacy and initiative to know when and how to request service. Student services professionals have to help guide students through these processes to aid in their development as individuals.
**Holistic Institutions**

As stated by Blair (1998), higher education institutions must provide student services in a seamless integration with academic branches in order to achieve development of the whole student. This seamless integration service delivery methodology requires creating a total learning environment, going beyond the completion of instructional curriculum (Blair, 1998). According to Brown (1972) and Evans et al. (2010), student services professionals are to extend the in-classroom student experiences into other areas, influencing affective and cognitive development to create a holistic student development environment.

Brown (1972), in *Student Development in Tomorrow’s Higher Education: A Return to the Academy*, stated that student services professionals address student growth in multiple facets, expanding beyond knowledge acquisition and examining the interaction between student and environment. Student services professionals serve to extend the learning environment to address process as well as content, affective and cognitive developments, and competency attainment and learned knowledge (Brown, 1972). The ultimate goal for student services is the holistic development of the student.

Two avenues to affecting student development are the student peer interactions and the student-faculty interactions. Through developing services that create an environment facilitating interactions with these groups, student services professionals generate a critical sense of community fostering student development (Astin, 1993; Brown, 1972). Student services professionals are critical to the success and persistence
of community college students. According to Hardgrave and Johnson (2003) and Ender, Chand, and Thornton (1996), building a sense of community is a critical factor in student success. According to Hornak, Akweks, and Jeffs (2010), student services personnel assist students in building and maintaining relationships with the college, which, according to Astin (1993), facilitates student achievement and academic success through leveraging a student’s sense of belonging to a larger community. Further, research suggests that student services professionals can create lifelong learning opportunities in and outside the classroom (Kuh, 1996) and produce a seamless education system including schools, training institutions, emerging technologies, and distance learning techniques (Blair, 1998). These factors have been shown to facilitate student retention, essential for student success.

**Retention**

Retention is critical for student success, as students who depart from college cannot complete their education; and one of the main objectives for the Student Success Act is program completion. Foundational student retention theories contain elements of student engagement and involvement in academic and extracurricular activities (Astin, 1993; Barnett, 2011; Pascarella & Terenzini, 2005; Tinto, 2006). Tinto (1993) described student retention in terms of student interactions with academic and social systems at an institution:

Broadly understood, [the model] argues that individual departure from institutions can be viewed as arising out of a longitudinal process of interactions between an
individual with given attributes, skills, financial resources, prior educational experiences, and dispositions (intentions and commitments) and other members of the academic and social systems of the institution. The individual’s experience in those systems, as indicated by his/her intellectual (academic) and social (personal) integration, continually modifies his or her intentions and commitments . . . The model posits that, other things being equal, the lower the degree of one’s social and intellectual integration into the academic and social communities of the college, the greater the likelihood of departure. (pp. 115-116)

Faculty can influence retention, and research supports that validation by faculty influences a student’s intent to persist in college and that this critical component is particularly true in the community college setting (Barnett, 2011). Student services can also influence retention by providing services based on ecological theoretical frameworks (Bronfenbrenner, 1986) that facilitate a student’s connection with college and which have proven to be effective for at-risk populations (Arana, Castañeda-Sound, Blanchard, & Aguilar, 2011). Persistence is dependent upon interaction between the student and the institution in both their academic and social relationships. Retention is higher for students who gain integration in both social and academic environments. Academic interactions tend to be provided through the instructional systems facilitated by faculty, while social interactions tend to be in the student services domain.

Student services professionals, by designing and delivering services prescribed by the American Council on Education in manners that support student growth through
holistic environments supporting retention and development, promote the success of students. Technology offers the potential for providing these services to more students in a manner in which students prefer to have them delivered (Hornak et al., 2010).

**Ableism and Student Disability Accommodations**

In this section of the literature review, three interconnected sub-topic areas are discussed: ableism (Hehir, 2007), the disability accommodation process including legal precedents, and universal design. These sub-topics are synthesized through the previous student services theories and philosophies as outlined in the previous section.

**Ableism**

In her discussion on disability justice, Mia Mingus (2011) explained ableism as “connected to all of our struggles because it undergirds notions of whose bodies are considered valuable, desirable and disposable” (para. 18). Within higher education, true inclusion as it relates to ableism must be discussed by the different projects and modes of instruction for every student with individual learning needs. The increasing access to education should consist of enabling every student, whenever possible, to engage in and obtain the same learning outcomes and develop critical skills through that instruction.

Hehir (2007) defined ableism as the practices and dominant attitudes in society that devalue and limit the potential of people with developmental, emotional, physical, or psychiatric disabilities. The Rehabilitation Act of 1973 was the first major legislative effort to secure an equal playing field for individuals with disabilities. As part of the
Rehabilitation Act, Sections 504 and 508 are two critical components utilized on college campuses. Section 504 is about accommodations; it addresses the need for auxiliary aids and services (Rehabilitation Act of 1973). Institutions must provide students who are eligible with the tools to participate in their programs and benefit from their services. Types of auxiliary aids may include brailled or large print versions of materials, audio recordings, qualified interpreters or readers, and other methods of providing access (Rehabilitation Act of 1973).

Correspondingly, Section 508 addresses the infrastructure that allows such access (Rehabilitation Act of 1973). It requires that colleges ensure that individuals with disabilities, both employees and students, have comparable access to and use of electronic information technology. This is addressed through such functions as creating accessible software, websites, videos, and documents. It is a campus wide responsibility to make sure that necessary learning tools are available (Rehabilitation Act of 1973). At institutions of higher learning, access and accommodation must work together to provide an equal opportunity to all students and staff on a campus.

Furthermore, the Americans with Disabilities Act of 1990 (ADA) also protects students with disabilities in college. ADA was enacted to prevent discrimination against individuals with disabilities in school, community, and businesses. For a student to receive services and reasonable accommodations at their college, a student must fall under the “qualified individuals with a disability” category (Americans With Disabilities Act of 1990, 1991). The definition of a disabled person, according to ADA, is (a) A
student who has a physical or mental impairment that substantially limits one or more of his or her major life activities, (b) A student who has a record of such impairment, or (c) A student who is regarded as having such impairment (Americans With Disabilities Act of 1990, 1991).

Title II of the ADA covers public entities, such as state or local government departments. What this means for students with disabilities is that whether or not a school, such as a public community college or a public university, receives federal funding, the student will be protected. Title II does not cover private entities; however, private schools are covered under Title III of the ADA. Thus, despite the institution a student with disabilities attends, they will be protected under ADA. What sets ADA apart from Section 504 is the extent of their law on public campuses; for example, under ADA, buildings do not need to be altered to be accessible to students with disabilities if the program can still be accessed. Private schools conversely have a higher standard of access for students with disabilities. What this looks like for private schools is that they need to remove architectural barriers in buildings where such removal is “readily achievable” or provide services from a place on campus that is accessible to the student (Americans With Disabilities Act of 1990, 1991, subchapter II Sec. 12181).

Additionally, Joyce and Rossen (2006) also agreed that college accommodations for students with disabilities require first, that the student seek services; second, that they monitor how efficient their accommodations are; and lastly, that the student request any needed changes in their accommodations. The student will be expected to handle
anything that may come his or her way first before having someone else look into it, this means that the student will need to be responsible, committed, and even at times resourceful. At the college level, the school is committed to safeguarding the student’s privacy. There will be nothing noted on the student’s transcripts disclosing that the student has a disability or that the college student has used services nor will anyone but the student have access to their records. Therefore, parents will no longer be the primary point of contact unless the student specifically grants consent.

The University of North Carolina at Pembroke (2012) also confirms that the parent does not have access to the student’s records and cannot speak on behalf of the student without their written consent. What this means for those student’s whose parents were actively involved in the students’ education is that the student will still be expected to know, attend, and follow up with any matters pertaining to their education. This is especially true in regard to their own disability-related documentation. Additionally, if a student decides that he or she does not want to be served as a student with disabilities, the student will not be sought out or be obligated to use services (University of North Carolina at Pembroke, 2012). Being an adult brings on many life responsibilities that society assumes everyone will naturally know. When a student has a disability, though they are considered an adult, they may have increased difficulty navigating through everyday dilemmas, but there have been cases when students have had to self-advocate and used legal means to redefine reasonable accommodations and access to students with disabilities.
Court Cases and Legal Precedents

Several precedent-setting legal court cases have defined the landscape for providing disability accommodations in higher education since the inception of the Rehabilitation Act of 1973 and the American’s with Disabilities Act of 1990. Three cases are referenced due to their impact: Southeastern Community College v. Davis (1979), Pushkin v. Regents of the University of Colorado (1981), and Wynne v. Tufts University and Academic Integrity (1991).

Southeastern Community College v. Davis (1979). One of the few misunderstandings about Section 504 and 508 is the idea that it works like “affirmative action” for college admission. The first case that involves the Rehabilitation Act, Sections 504 and 508 was Southeastern Community College v. Davis (1979). The case involved Frances B. Davis, a student with a hearing problem, who was denied admission for nursing school at Southeastern Community College. Davis argued that this denial constituted a violation of Section 504. She claimed it was a discrimination against an “otherwise qualified handicapped individual” in federally funded programs and “solely by reason of his handicap” (Rehabilitation Act of 1973, 29 U.S. Code § 705). On the other hand, Southeastern contended that her hearing impairment would make her participation in the clinical training for nurses unsafe. The case was ruled in favor of Southeastern Community College because the court defined a qualified individual with a disability as one who was able to meet all of a program’s requirements despite the disability. The court's justification was that 504 did not prohibit institutions from
establishing physical qualifications for admission to the clinical program. In addition, Davis’s request pushed for affirmative action, which is not mandated by Section 504 and 508. The court defined “otherwise qualified” as a person who can meet all of the program requirements despite of “handicap” (Rose, 1994). This case sets forth a precedence to determine what accommodations are considered as reasonable and what accommodations for disability would impact the critical components of a program in higher education.

**Pushkin v. Regents of the University of Colorado (1981).** In the case of *Pushkin v. Regents of the University of Colorado* (1981), an M.D. with multiple sclerosis was denied admission for medical residency in the university’s Psychiatry unit. The reasoning behind this decision was based on assumptions. They assumed the worst about how patients and affiliates would react to Pushkin’s condition, that he had not properly dealt with his disability and that an excessive amount of medical care would be necessary for him to satisfy the job requirements. Instead of adhering to Section 508 and creating an environment of access for Dr. Pushkin to pursue his academic goals, the university decided it was too much work and denying him admission was the preferred route. Dr. Pushkin’s therapist attested to the fact that his ability to handle the rigorous workload was sound and that Dr. Pushkin already created a plan of action on how to achieve this. This decision speaks to the larger problem that resided at this university. They disregarded the multicultural framework of ableism, as it did not appear to be as much of a priority as other frameworks, such as race or gender issues. As a result, the process of navigating
ableism is further hindered as students are invalidated by administrators who ignore their responsibilities to investigate ways to provide support. Furthermore, this case runs contrary the fundamental purpose of student services to provide a holistic student development environment when an alternative mode or method would be used to achieve the same outcomes (Astin, 1993; Barnett, 2011; Brown, 1972; Evans, 2010; Pascarella & Terenzini, 2005; Tinto, 2006).

**Wynne v. Tufts University and Academic Integrity (1991).** Although Section 504 may aim to secure auxiliary services for students with disabilities, it cannot guarantee accommodations at the expense of academic standards of the university or program. In *Wynne v. Tufts University School of Medicine* (1991), Steven Wynne sought to petition his dismissal from the university based on his learning disability. Wynne was diagnosed with dyslexia, which impacted his ability to successfully complete his first year of the medical program. Wynne claimed, “the University unlawfully discriminated against him because of his handicap, in violation of the Act, when it refused to modify its testing methods to accommodate his difficulties” (*Wynne v. Tufts*, 1991, para. 6). Wynne did not want to be tested using multiple-choice methods and, similar to the Davis case, expected the university should accommodate his request to modify the exam framework. However, the court ruled in favor of the university, citing that the university fulfilled their duty to investigate every means necessary to assist Wynne. Thomas (n.d.) explained that although the law does not outright express a duty to investigate, the means of providing accommodations cannot occur without such process. This procedure “needs to assess
each student’s ability to succeed given new learning strategies, effective academic
adjustments, and technologies, and not make decisions that reflect stereotypical views”
(Thomas, n.d., para. 45). For Wynne, the university paid for neuropsychological
evaluations and provided counseling, tutoring, note-taking, and other similar auxiliary
services during his exception to repeat the first-year programs. Based on Section 508 of
the Rehabilitation Act, the university followed protocol to eradicate obstacles that would
prevent Wynne from equal opportunities of achieving academic success. As a result, the
court found in favor of Tufts University during the appeal citing, “while some deference
was owed to an institution making academic judgments, such institutions nevertheless
have a duty to seek out reasonable means of accommodating students with disabilities”
(Rose, 1994, para. 5). Subsequently, universities are responsible for providing
accommodations to students, but only as a means to provide equity. The academic
integrity of a program cannot be negatively impacted in terms of its academic standards
and should still provide the critical thinking skills and learning outcomes as it would to
any other student. This case exemplifies how student services integrated with academic
instruction provides for holistic development, but student services and academic
instruction respect each other’s domain and responsibility, especially in terms of
academic quality.

**Disability Accommodation Process**

The stigma of having a disability is still the greatest barrier for students with
respect to receiving disability accommodation services. Just like any other service at a
community college, students have to actively seek disability services. Once receiving services, students still need to self-advocate to ensure accommodations meet their needs. The American’s with Disabilities Act (ADA) and the Rehabilitation Act of 1973 ensure access to higher education through the disability accommodation process. There is a fundamental difference in higher education from primary and secondary education requiring self-advocacy instead of evaluative metrics; this philosophy is rooted in the fact that by the time most students reach college institutions, they have reached the legal definition of adult (age 18+). Under the Individuals with Disabilities Education Act of 2004 (IDEA), primary and secondary education institutions use an evaluation metric to ensure the effectiveness of special education programs and accommodations. Under Section 504 of the Rehabilitation Act and IDEA, secondary institutions are required to develop individualized education plans (IEP) when a student is struggling academically with suspected impairment or disability; this plan sets key goals to ensure a student’s success through regular evaluation. There is no post-secondary requirement to set or evaluate outcomes in the accommodation process.

As delineated in The Documentation Disconnect for Students with Learning Disabilities: Improving Access to Post-secondary Disability Services: A Report from the National Joint Committee on Learning Disabilities (National Joint Committee on Learning Disabilities [NJCLD], 2007), colleges and universities use the standard of verifying a disability with documentation while for primary and secondary institutions, the standard is rooted more in perception; thusly, secondary institution documentation
may not meet the verification standard of post-secondary institutions. Many might assume that since secondary institutions determined special education was needed, that must mean a disability is present while in fact a disability may or may not be present by the higher education standard of verification. The verification standard can require further diagnosis and evaluation from a professional certified to verify a disability, and due to this disparity, a student could go without necessary accommodation services and struggle academically. Additionally, there can be disparities in accommodations from institution to institution based on policy and practice; there are no agreed upon implementation and interpretation standards for verification and accommodations (NJCLD, 2007).

Key intervention points to aid and guide students in transitioning from K-12 to community college could be beneficial. Niagara University developed a weekly individualized progress conferencing program for students with disabilities to develop the necessary skills to succeed and manage their disability (Stoelting, 2010). This program builds self-advocacy skills to obtain academic progress reports from faculty along with building time management skills (Stoelting, 2010). There are difficulties with transitioning between secondary to post-secondary education institutions due to the philosophical differences between the institutions. Niagara University’s individualized progress conferencing is an example of student service professionals working to extend the learning environment to holistically develop the student by fostering an integrated
approach as delineated earlier (Astin, 1993; Barnett, 2011; Brown, 1972; Evans, 2010; Pascarella & Terenzini, 2005; Tinto, 2006).

**Universal Design**

Universal design provides for universal access to education with the principle that every student learns differently, not just the students with disabilities. Universal design provides, “optimal conditions for accommodating the changing needs of multiple constituents [and] provides flexibility in classroom instruction, assignments, activities, and collaborative ventures” (Harper & Quaye, 2009, p. 51). Utilizing multiple resources, teaching techniques, and styles ensures this success. Furthermore,

Educators who practice universal design do not approach learning with a “one-size-fits-all” mentality, but instead tailor their pedagogical assumptions and approaches to students’ differing learning styles and preferences (Meyer & Rose, 2000; Rose & Meyer, 2000). Additionally, these educators design structures from the outset that take physical disabilities into consideration, rather than viewing these students’ needs as an afterthought (Rose & Meyer, 2000)” (as cited in Harper & Quaye, 2009, p. 51).

Ultimately, educators chose this profession due to implicit rewards associated with student development. In American education, the First Amendment of the United States Constitution is extended into the classroom through the principle of academic freedom: “Congress shall make no law . . . abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble.” Academic freedom is generally
accepted as defined by the *1940 Statement of Principles on Academic Freedom and Tenure*, jointly authored by the American Association of University Professors (AAUP) and the Association of American Colleges (AAC, now known as Association of American Colleges and Universities). These principles state, “Teachers are entitled to freedom in the classroom in discussing their subject” (AAUP & AAC, n.d., para. 9). The Principles have only the character of private pronouncements, not that of binding law. Academic freedom is more liberally applied in post-secondary education than in primary and secondary education. Many disability student services professionals approach from the philosophy that “Accessibility is not the enemy of academic freedom,” and work collaboratively with faculty to achieve learning outcomes through universal design. As a result of academic freedom, buy-in is needed to convince educators to utilize universal design. Academic freedom does not trump a student’s right to education, but educators have the power to educate and should do so intentionally.

So, an appeal to an educator’s passion is needed to ensure a student’s access to education. Universal design provides access to all learners, and academic freedom does provide for creative application of universal design. Disability discrimination is the last form of socially acceptable discrimination. Our society battles multiple forms of discrimination with some positive strides towards equality, but ableism is one area where far more focus and attention is required to reduce prejudices toward one’s abilities. Through the variations of strengths and abilities, higher education administrators and
leaders can influence positive progress by utilizing these strengths and acknowledging areas of improvement to create better action plans and processes.

**Technology in Higher Education and Technology Acceptance Models**

This section of the literature review first relates to technology in higher education in general, and then covers three topic areas related to technology acceptance; theories on the acceptance of technology, beginning with the Technology Acceptance Model (TAM) as supported by the Theory of Reasoned Action (TRA), extensions to the TAM based on constructs from the Theory of Planned Behavior (TPB), and constructs found in the Unified Theory of Acceptance and Use of Technology (UTAUT) (Ajzen, 1988; Davis, 1989; Fishbein & Ajzen, 1975; Venkatesh, Morris, Davis, & Davis, 2003) are discussed. The application of technology acceptance models in various environments (Bruner & Kumar, 2005; Koufairs, 2002; Lee & Hsieh, 2011; Lin, 2010), including deficiencies when applied in mandatory settings (Chan et al., 2010; Koh, Prybutok, Ryan, & Wu, 2010), is presented. Finally, technology acceptance models in higher education (Edmunds, Thorpe, & Conole, 2012; Flash, 2014; Lee, 2008; Un Jan & Contreras, 2011) are discussed.

**Technology in Higher Education**

According to Shier (2005) and Moneta (2005), through the later part of the 20th century, the focus of information technology for higher education was invested in the automation of administrative processes. Systems were developed or purchased to support
payroll and human resource functions and to transition record-keeping processes to computerized systems like registration and grades. Technological improvement in the efficiency of administrative processes, including the automation of historically paper processes, has yielded simplicity and optimization, all of which result in enhancement of the relationship between the institution and the student (Moneta, 2005). Technology continues to play an increasingly greater role in higher education, including the manner by which instructors deliver their courses, how students register for their classes, and how students connect with each other and the institution through the Internet and mobile devices. Community colleges in general are using technology for instruction purposes, and doing so in a manner that is at last equal with 4-year institutions (Allen & Seaman, 2007).

Community colleges serve a large number of students in the millennial generation, under the age of 24. These students feel technologically entitled as well as technologically adept. These technologically entitled students have the expectation of having services through technology available when they need it (Hornak et al., 2010). The use of technology by students attending community college is growing, particularly among younger students, and they are increasingly using technology to interact with their environment including peers, student services professionals, and faculty (Center for Community College Student Engagement, 2009).

Research shows that many in higher education believe technology plays an important role in student success; this includes faculty, students, administrators, and IT
staff (Rosario, 2012). Over the past few decades, institutions have implemented self-service technologies for application submissions, course registration, and financial and academic records (Moneta, 2005; Shier, 2005), but students are interested in self-service technologies that extend beyond administrative purposes and into career advising and planning. In a survey of students in the Virginia Community College system, Herndon (2011) found that students of varying ages indicated they were frequently engaged in self-advising with regard to career and college planning. Their preference was to receive student support information via interactive technologies through the Internet.

Through technology, student services professionals can create lifelong learning opportunities inside and outside the classroom (Kuh, 1996) and produce a seamless system of education (Blair, 1998). Emerging technologies during the last decade provide opportunities for supporting students. Student services personnel should explore ways to use emerging technologies to aid in student success (Shier, 2005).

Student services personnel may find it challenging to meet the new responsibilities of serving students in a technologically enhanced environment. These professionals are predominantly from the Baby Boomer generation and historically have not felt as comfortable with technology as their students, who come from the Millennial generation (Rosario, 2012). Moneta (2005) stated that although expectations for all student services staff to be proficient in all the technologies being used by students is unrealistic, a certain level of competency will be required of each professional to understand how students perceive and use technology. Hornak et al. (2010) stated that it
is essential for institutions to incorporate continuous technology-related professional development to ensure effective use. A collaborative approach should be used between Information Technology (IT) and student services to plan which student services should be enhanced through technology-based initiatives (Hornak et al., 2010), and knowledgeable technology staff should be dedicated to the endeavor, either as a direct member of the student services staff or as a reliable partnered service (Moneta, 2005).

Deploying technology as a solution without considering the business processes can be a costly endeavor and lead to failed implementations. Rigby, Day, Forrester, and Burnett (2000) recommended as best practices for the 21st century identifying customer needs and planning for organizational change, which are considered essential elements for implementing technologies as a change agent (Moneta, 2005). As technology is evolving in its use for delivering services to students, the acceptance of technology solutions by student services personnel and students becomes more important.

The Technology Acceptance Model

In researching teachers’ intentions to use technology, Teo (2013) stated the following:

Technology acceptance is posited to be influenced by a variety of factors, including individual differences, social influences, beliefs, attitudes and situational influences (Agarwal, 2000; Teo, 2009a). A majority of the conceptualizations of technology acceptance have drawn on theories and models from social psychology, notably the theory of reasoned action (TRA) (Fishbein &

TAM constructs are defined as perceived usefulness (PU) and perceived ease of use (PEU) (Davis, 1989), and social norm (SN) is supported by research as a valid extension of TAM constructs (Ajzen, 1991). Venkatesh et al. (2003) extended the model by including facilitating conditions that were found to influence an individual’s intention to use technology. Theoretical models identify the determinants of PU, PEU, and SN along with facilitating conditions as influencing an individual’s behavioral intention to use technology (Teo, 2013).

The Technology Acceptance Models and Its Extensions

The Technology Acceptance Model proposed a capability to predict the rate of technology acceptance (Davis, 1989), which is a framework used to describe predictable factors to influence technology adoption. Based on the Theory of Reasoned Action (Fishbein & Ajzen, 1975), the TAM has been researched to verify its validity in multiple environments. Also, many extensions have been proposed to enhance the model.

The technology acceptance model (TAM). In an effort to predict the usage of a technology before it was developed and deployed, Davis (1989) performed a study based on the Theory of Reasoned Action (TRA), a behavioral theory that described determinants that influence an individual’s intention to engage in a particular behavior or action, referred to as behavioral intention (BI). Applying the TRA to technology, Davis’
(1989) study formed the basis for the Technology Acceptance Model (TAM) in which he identified two predictors, perceived usefulness (PU) and perceived ease of use (PEU), as determinants of behavioral intention of an individual to use a technology. TAM provides insight into how behavioral intention is formed (Koh et al., 2010) and states that an individual’s intention to use a technology can be determined before the technology is developed and deployed by examining two variables: the user’s perceptions that they will find the technology useful and that they will find the technology easy to use. The perceived usefulness and perceived ease of use are major determinants in predicting a user’s intention to use a technology, and intention to use serves as a measure to predict acceptance (Amoako-Gyapah, 2007; Lee, 2008; Un Jan & Contreras, 2011). Lee and Hsieh (2011) concluded that TAM can be useful in predicting end user acceptance.

One of the reasons Davis (1989) developed the TAM is that it can be used early in a project, before development and implementation, and can be a factor in increasing the success rate of projects since perceived usefulness and perceived ease of use influence an individual’s intention of using a technology once it is deployed. Sanchez-Franco (2010) supported this perspective, noting that a system that incorporates features based on users’ input can subsequently influence their reaction favorably in later interactions with the system, increasing their perceived usefulness and perceived ease of use of the technology, affecting the users positively, and creating a relationship that results in higher satisfaction and system usage.
King and Jun (2006), in a meta-analysis of 88 studies involving more than 12,000 observations, concluded that the TAM constructs of PU and PEU in predicting BI are highly reliable and that the influence of PU is profound and accounts for much of the influence of PEU. King and Jun (2006) also asserted that TAM, because of its simplicity and understandability, is one of the most widely used models of technology acceptance in Information Systems research.

**Extending TAM with subjective norms.** Even though Davis’s (1989) research validated that perceived usefulness (PU) and perceived ease of use (PEU) influenced attitude (A), and were major determinants of intention to use, he did not explore subjective norms in his study. The Theory of Reasoned Action (TRA) (Fishbein & Ajzen, 1975) posited that an individual’s intention to engage in a particular behavior, called Behavioral Intention (BI), was based upon two determinants, their attitude (A) and the influence of subjective norms (SN), how positively or negatively others viewed that behavior.

Subjective norms, also referred to as social influence, characterize the impact that certain individuals whom the user finds influential has on their intention to use technology. Typically these influential individuals are their peers and leaders in the organization. According to Malhotra and Galletta (1999), TAM did not account for social interactions that may influence an individual’s intention to use a technology. In addition to perceived usefulness and perceived ease of use, Un Jan and Contreras (2011) found that students used technology based on influences from their social environment,
specifically professors and classmates. Additional research (Hardgrave & Johnson, 2003; Koh et al., 2010; Malhotra & Galletta, 1999; Un Jan & Contreras, 2011) subsequently supported subjective norm as a valid determinant in addition to perceived usefulness and perceived ease of use and recommended its inclusion as an extension to the technology acceptance model.

Research performed by Koh et al. (2010) found that social influence has a direct positive effect on performance expectancy. In their study, Hardgrave and Johnson (2003) found that although subjective norm does not directly impact an individual’s intention to use a technology, it does influence their perception of its usefulness, and thereby does modify the likelihood of their acceptance of a technology. Lee and Park (2008) found that subjective norm was not a significant construct in their study of the acceptance of Internet technology by 374 employees in 10 Korean companies covering five industries.

The Theory of Planned Behavior was also based upon the Theory of Reasoned Action, but in it, Ajzen (1988) theorized there were three determinants of behavioral intention (BI): attitude (A), subjective norm (SN), and the additional factor of their perceived behavioral control (PBC). Perceived behavioral control is the belief that an individual who intends to engage in a behavior has the resources necessary to carry out the behavior. Thus, the TPB posited the concept that an individual’s intention is determined by their perception of the usefulness of a behavior, which influences attitude, their ability to perform it, and the social response to their action. The actual performance of a behavior is predicated on behavioral intention, along with the degree of actual
control one has over performing the action (Ajzen, 1988). Combining the Theory of Planned Behavior (TPB) along with TAM produced a model for Information System Developers (Hardgrave & Johnson, 2003).

**Extending TAM with facilitating conditions.** In an effort to create a unified model, Venkatesh et al. (2003) performed a study of four organizations over a six-month period, which resulted in a unified model, the Unified Theory of Acceptance and Use of Technology (UTAUT). It held that four key constructs were determinants of usage intention: performance expectancy, effort expectancy, social influence, and facilitating conditions. Teo (2013) stated the first three determinants are operationalized as perceived usefulness, perceived ease of use, and social norm, respectively. Facilitating conditions refer to the organizational and technical infrastructure an individual believes to exist in support of their use of technology (Taylor & Todd, 1995; Teo, 2013; Venkatesh et al., 2003). In their research into a unified theory on user acceptance of technology, Venkatesh et al. (2003) summarized facilitating conditions from a study by Thompson and Higgens (1991) involving 212 individuals at a multi-national firm into three major items: guidance in selecting the system, training, and support with system difficulties.

In a study of 786 potential users of a computer resource center over a period of 12 weeks, Taylor and Todd (1995) researched determinants from both TAM and TPB and found that while both theories contained constructs useful as indicators on behavioral intention, TPB provided insight into two facilitating conditions, the value of user
participation in forming normative beliefs and the impact of training on self-efficacy. User participation and involvement was found to influence the acceptance of technology by Amoako-Gyapah (2007) in his study of 571 individuals and their intention to use an ERP system. Research performed by Lee (2008) in a study into extending TAM concluded that perceived resources for training and support partially influenced students’ adoption of technology. In their research on personal innovativeness in IT, Agarwal and Prasad (1998) confirmed that the availability of resources positively influences technology acceptance, especially when implementation resources are limited.

Research has supported PU, PEU, and SN (Ajzen, 1988; Amoako-Gyapah, 2007; Davis, 1989; King & Jun, 2006; Malhotra & Galletta, 1999; Sanchez-Franco, 2010; Un Jan & Contreras, 2011; Venkatesh et al., 2003) and the influence of the facilitating conditions of involvement in system selection and development, training and professional development, and support when encountering system difficulties (Agarwal & Prasad, 1998; Amoako-Gyapah, 2007; Lee, 2008; Taylor & Todd, 1995; Thompson & Higgens, 1991; Venkatesh et al., 2003) as constructs in determining the intention of users to accept technology. These constructs have been validated in various environments, including commercial, non-commercial, and educational settings.

**The Application of Technology Acceptance Models in Various Environments**

TAM has been researched for its applicability in various environments, including commercial (Koufairs, 2002; Lin, 2010), non-commercial (Chan et al., 2010; Carter & Bélange, 2005), and educational settings (Edmunds et al., 2012; Lee, 2008; Un Jan &
Deficiencies of the model have also been researched, especially for institutions where the technology is mandated and not voluntary (Koh et al., 2010).

**Applications in commercial and non-commercial environments.** The major constructs of technology acceptance models have been validated in studies of technologies used in commercial industries, such as tourism in a study by Lai (2013) of 205 tourists in Southeast China and by Lin (2010) in a study of 242 users of Taiwanese online travel sites. Constructs have also been validated in the consumer shopping setting by Koufairs (2002) in a study applying TAM to online consumer behavior and by Bruner and Kumar (2005) in their study of consumer acceptance of handheld Internet devices. In addition, a study by Lee and Hsieh (2011) of 552 employees in a business environment in Taiwan supported the validation of TAM constructs for their intention to use an e-learning system.

Limited research is available in studies exploring the validity of technology acceptance models in non-commercial settings, with the primary focus of research in this area being on technology in accessing governmental services. Chan et al. (2010) performed a study 1,172 citizens of Hong Kong and the mandatory use of technology for accessing government services. Their findings validated the core constructs, but found that facilitating conditions were of greater influence than ease of use. In a smaller study by Carter and Bélange (2005) of 105 individuals on their intention to voluntarily use technology to access government services, they found that relative advantage, which they
aligned with perceived usefulness, did not directly influence the intention of citizens to use e-government services, but that perceived ease of use did have a strong influence.

**Deficiencies in mandatory environments.** The TAM framework centers on the intention to use (Davis, 1989; Venkatesh et al., 2003). In their research, Koh et al. (2010) stated that TAM’s applicability in mandatory environments may appear irrelevant, because users *must* use the system, and there is not a concept of intention to use. In environments where the use of a technology is voluntary, usage may be measured as an absolute: the individual uses, or does not use, a technology. Koh et al. (2010) posited that intention to use makes sense only in voluntary organizations where actual use varies. In settings where there is mandatory use of a technology, a user may underutilize or sabotage a system they are required to use; therefore, in environments where use is mandatory, Koh et al. (2010) suggested that the definition of use include attitude as a key construct and recommended use be measured as both the frequency and the intensity of using a technology.

In research by Chan et al. (2010) on the mandatory use of technology for accessing government services, their findings suggested that facilitating conditions were of greater influence in the mandatory use environment. Often researchers place a strong emphasis of perceived usefulness linking to intention to use in mandatory settings when perceived usefulness has less value over facilitating conditions in mandatory settings. Koh et al. (2010) stated it was rare to find research that included net benefits of a technology to an organization and that in mandatory use environments, users have greater
satisfaction with a technology system if they understand the net benefit to the organization.

The TAMs key constructs of perceived usefulness and perceived ease of use have found to be valid predictors of technology acceptance in a number of commercial as well as noncommercial environments. In settings where the use of technology is mandated, and where usage is defined as the frequency and intensity of using technology, facilitating conditions have greater influence on technology acceptance.

**Technology acceptance in higher education.** In addition to commercial and non-commercial settings, TAM has been shown to be a valid model to predict system acceptance in higher education by students (Edmunds et al., 2012; Lee, 2008; Un Jan & Contreras, 2011). Using the TAM framework, Edmunds et al. (2012) researched students in higher education and found that in addition to the usefulness of technology in coursework and university life, their acceptance of technology was also influenced by its usefulness in work environments outside the university. Although many studies focus on acceptance of technology by students, according to Lee (2008), it is rare to find studies that focus on technology acceptance by professionals in educational organizations.

Flash (2014) showed that California Community College student services professionals perceive technology as useful and generally technology is easy to use. Student services professionals’ perceptions of technology are relevant due to the impact of SN on the TAM framework (Ajzen, 1991) and are further amplified by the role of student services professionals in student development and issues of self-competency,
managing emotions, and developing mature relationships (Chickering & Reisser, 1993; Evans, 2010; Tinto, 2006). Furthermore, student services professionals serve as the avenue to provide support for student success and as new technology emerges these professionals can influence technology acceptance.

According to Edmunds et al. (2012), the work context for technology has a strong influence on a student’s perceived usefulness and ease of use under the TAM and those in academia need to link the use of technology to later work functionality. But students may not share the same view of technology as faculty (Edmunds et al., 2012). Lastly, Edmunds et al. warned:

Students also have clear requirements in terms of technology enabling them to produce more in the time that they have, and enabling them to be more effective. Technologies which do not meet these requirements may prove counter productive or simply be ignored. (p. 83)

Rationale for the Study

A review of the literature has shown the value of student services as well as the importance of strategic technology use in higher education institutions. Furthermore, the issues of providing accommodation services to students with disabilities are apparent, but technological solutions could be useful if examined through the student perspective. Expectations continue to grow in California’s community colleges for the increased use of technology to deliver services to students. The literature also shows that technology
acceptance is influenced by the constructs of perceived usefulness and perceived ease of use as well as the facilitating conditions of user inclusion in the system selection and development process, training and specialized instruction, and support when encountering system difficulties. These have been researched in commercial, non-commercial and educational environments as well as settings where usage is mandatory. A review of the literature supports the research questions being explored in this study on the factors that influence students with disabilities’ acceptance of technologies in support of their perceived success in community college.

Summary

A review of the literature has shown the value of student services in educational institutions and the increasing use of technology in colleges and universities. California’s community colleges are under increasing pressure to deliver services to students through technology as a means to increase access as well as provide staff efficiencies. Additionally, the literature demonstrates that technology acceptance is influenced by the following factors: perceived usefulness, perceived ease of use, and facilitating conditions of user inclusion in system selection as well as training and support when encountering system difficulties. Also, the student disability educational accommodation process has been outlined and defined by relevant law and court cases; the use of technology has been an integrated component as means of accommodating disabilities as delineated in law. Finally, a review of the literature supports the research questions being explored in this
study on the factors that influence students with disabilities in their acceptance of technology.
Chapter 3

METHODOLOGY

Introduction

This chapter describes the setting, the population and sample, data collection, instrumentation, and data analysis procedures. Semi-structured in-depth interviews are the research methodology for this qualitative study.

The purpose of this study was to identify the factors that influence the acceptance of technology by students with disabilities at a small suburban community college. The study also was designed to explore the perceptions of students with disabilities on the use of technology as related to their perceived success in college. This study hopes to add to the body of knowledge pertaining to students with disabilities to better aid in service development and implementation by student service professionals and higher education leadership administrators. The research methodology for this study utilized a qualitative design to investigate and answer the research questions.

Setting of the Study

This qualitative study was conducted at a small suburban public community college in Northern California hereby referenced as Blue College (BC). Four demographically eligible participants were selected from a purposive sample population to participate in in-depth semi-structured interviews. The data from these responses were
analyzed for common themes to examine how these variables impact the student experience. Institutional Review Board approval was obtained prior to data collection through the California State University, Sacramento College of Education and at Blue College.

**Research Design**

**Population and Sample**

Blue College had a fall 2014 enrollment of 14,767 Students, which is a 4% increase from the prior fall semester. Fall 2014 is the most current semester for which data were available. The student population comprises 56.7% females with 43.3% males. The ethnic diversity demographics include 14% African American, 29.3% Asian/Pacific Islander, 23.5% Hispanic, 0.5% Native American, 0.7% other ethnicity, and 24.7% White students. First-generation college students comprise 37.7% of the total population. The income demographics are 40.1% below poverty, 23.9% low income, and 25.9% middle income. The student age demographics are 0.5% under age 18, 32.2% age 18-20, 27.3% age 21-24, 14.7% age 25-29, 12.5% age 30-39, and 12.8% age 40 or greater—with the vast majority of student fitting the Millennial age demographic. A greater percentage of BC students are enrolled in programs of study that can be completed online compared to the district average (8.0% compared to 4.6%)—“Convenience seems to be a greater motivator for enrollment in Distance Education courses.” Also, “BC students are more satisfied with how easy it is for them to use the online learning management system to
access discussion boards (over a 5% difference compared to district wide averages).”

Lastly, 937 students utilized Disability Support Programs & Services. This demographic data were retrieved from the college’s website.

Each participant in this study had to meet several criteria. First, the student must have been currently enrolled in classes at Blue College. Second, the participant had to have a documented disability and, as a result of said disability, self-selected to use DSP&S at Blue College. The student must have been actively using DSP&S at Blue College with a current confidential accommodation memorandum, also informally known as an accommodation letter outlining the student’s accommodations for a particular class for the current academic term. Third, as stated on the accommodation letter, the student must be approved for audio recording or note-taking service accommodations. The general population was currently enrolled students at Blue College with the sample narrowing to students actively using DSP&S with audio recording and or note-taking services accommodations (see Appendix A for pre-interview survey). Four participants meeting these criteria ultimately participated in this study.

This study involved a research of the population to which the study applied. The participants for the interviews were selected through a purposive sample, as the researcher works in the DSP&S. Participants were not compensated for their participation.
Design of the Study

This study used Creswell’s (2012) qualitative research design and employed a systematic coding analysis and processes. The study utilized a case-study format. Four in-depth, semi-structured interviews were conducted to gain insight into identifying factors that influence the acceptance of technology by students with disabilities as well as to explore the perceptions of students with disabilities on the use of technology as related to their perceived success in college. A qualitative approach was chosen to allow participants to share their experiences through personal narratives, providing robust and detailed data that would prove more meaningful than quantitative data.

Data Collection Procedures

Final approval to begin data collection for this study was issued on January 29, 2016. The time spent on the interviews spanned from February 8, 2016 when the email solicitation with the informed consent was sent out to eligible participants through March 17, 2016 when the last student was interviewed.

Participants were purposely invited to participate in an interview based on specific criteria (see Appendix B). The four participants were currently enrolled students at Blue College actively utilizing DSP&S with audio recording or note-taking service accommodations. An informed consent form (see Appendix C) was attached to the email inviting the student to participate in the research study. When the student contacted the researcher expressing interest in participating in the study, the researcher summarized the informed consent form. The informed consent form was signed by the participant and the
researcher prior to scheduling the interview. The participant was provided a copy of the informed consent form just prior to the start of the interview, and the researcher briefly explained the form again to the participant before having them complete the pre-interview survey. Following the completion of the pre-interview survey, the researcher began the interview.

Instrumentation

This study involved an evaluation research of the population to which the study applied. The participants were selected through a convenient purposive sample while meeting specific criteria, as the researcher works in the DSP&S office. Participants did not receive any compensation for participating and did so voluntarily.

By communicating with the participants, this researcher was able to hear the story from the perspective of the student, which allowed for better understanding and easier analysis of their responses. The interviews allowed the author to hear first hand of the experiences this group of students with disabilities had in college and it also opened a door for these students to share their experiences regarding their educational accommodations (see Appendix D for interview questions). All interviews took place at the Blue College campus in a private conference room.

Data Analysis Procedures

Data were analyzed using Creswell’s (2012) coding process. Once data were collected, they were transcribed; once transcribed, data were read over several times. After several readings, data were segmented into groups based on their shared
similarities. Segmented groups of information were then labeled with codes for the purposes of identification. Coded groups were then removed of overlap and redundancy. Finally, coded groups were collapsed into themes. Data were destroyed following their analysis and the publication of this study.

A pre-interview questionnaire was used to ensure participants met the established criteria; additionally, this questionnaire collected some demographic data. The pre-interview questionnaire data were disaggregated from the interview responses to maintain confidentiality.

**Limitations of the Study**

Although the qualitative data in this study may be consistent with current literature, the study’s small sample size may not make it easily generalized to that entire population. Age and gender, although acknowledged as part of the demographic data collection process, were deemphasized in this study. Furthermore, the convenience of the sample may limit the accuracy of responses due to the fact the researcher works in the office where the students received services even though it was made clear through the informed consent process that responses would be kept confidential and would not be revealed to others in the DSP&S office.
Summary

This research study used a qualitative methodology using a semi-structured in-depth interview protocol for participants to share their perspectives with regard to their educational accommodations and assistive technology. Participants were purposely asked to participate based on specific selection criteria. A case-study format was used to allow participants to share their experiences through personal narratives, providing robust, detailed, and meaningful data. Creswell’s (2012) qualitative research design of systematic coding was used to analyze the data. This study hopes to add to the body of knowledge pertaining to students with disabilities to better aid in service development and implementation by student service professionals and higher education leadership administrators.
Chapter 4
RESULTS AND DATA ANALYSIS

Introduction

The purpose of this study was to identify the factors that influence the acceptance of technology by students with disabilities at a small suburban community college. The study also was designed to explore the perceptions of student with disabilities on the use of technology as related to their perceived success in college. As stated previously, research involving students with disabilities is limited, but it is hoped that this study adds to the body of knowledge pertaining to students with disabilities to better aid in service development and implementation by student service professionals and higher education leadership administrators. This qualitative study involved semi-structured interviews with four students with disabilities.

Blue College (BC) had a fall 2014 enrollment of 14,767 students. Almost two thirds (56.7%) of students were female with 43.3% male. The student age demographics were 0.5% under age 18, 74.2% ages 18-29, 12.5% ages 30-39, and 12.8% age 40 or greater—with the vast majority of students fitting the Millennial age demographic. The demographic data were retrieved from the college’s website including the following statements, “A greater percentage of [BC] students are enrolled in programs of study that can be completed online compared to the district average (8.0% compared to 4.6%)—Convenience seems to be a greater motivator for enrollment in Distance Education
courses.” Also, “[BC] students are more satisfied with how easy it is for them to use the online learning management system to access discussion boards (over a 5% difference compared to district wide averages).” Additionally, 937 students utilized Disability Support Programs & Services with 525 identifying as female and 412 identifying as male. Eighty-six students met the eligibility criteria to participate in this study with 23 of the 86 students identifying as male and 63 identifying as female. Ultimately, four students responded to the email request to participate in this study. This study endeavored to answer the following research questions.

1. What are the perceptions of students with disabilities toward the usage of Livescribe Smartpen, a digital voice recorder, and or note-taking services and the impact on their perceived success in community college coursework?

2. What are the factors that influence the acceptance of assistive technology by students with disabilities?

3. What student-perceived academic success factors can be linked to the use of the Livescribe Smartpen, digital voice recorder, or note-taking service accommodations?

4. How useful do students with disabilities find the Livescribe Smartpen, digital voice recorder, and or note-taking services?

5. How does the use of the Livescribe Smartpen compare to standard digital voice recording and or third-party note-taking services?
Presentation of the Data

The rest of the chapter describes the data findings of the study beginning with the Pre-Interview Survey followed by interview data. The interview data are presented with the following general themes: (a) Data on Factors Influencing Assistive Technology Acceptance, (b) Quality of Work and Perceived Success, and (c) Comparison of Note-taking Services with Audio Recording and the Livescribe Smartpen. These three general themes group together the research questions through common linkages. Factors influencing assistive technology are presented in the review of the literature, which shows that technology acceptance is influenced by the constructs of perceived usefulness and perceived ease of use as well as the facilitating conditions of user inclusion in the system selection and development process, training and specialized instruction, and support when encountering system difficulties. Also, quality of work and perceived success is tangential to influencing assistive technology acceptance as outlined in the literature. Finally, the comparison of note-taking services with audio recording and the Livescribe Smartpen is a tangible exemplification of the first two themes through the student user perspective.

Pre-Interview Demographic Survey Results

Each interview participant was asked to complete a short pre-interview survey to ensure they met the criteria of the study and to collect gender and age range demographic information. Table 1 states the data collected by the pre-interview survey. Also, interview time duration is included in the table.
Table 1

Pre-Interview Survey Results

<table>
<thead>
<tr>
<th>Question</th>
<th>Interviewee 1</th>
<th>Interviewee 2</th>
<th>Interviewee 3</th>
<th>Interviewee 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 18 Years or Older</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>2 Currently Enrolled</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>3 DSPS Active</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>4 Audio recording or note-taking services accommodations</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>5 Gender Identity</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>6 Age Range</td>
<td>40-49</td>
<td>18-29</td>
<td>18-29</td>
<td>18-29</td>
</tr>
<tr>
<td>Interview Duration</td>
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<td>00:19:52</td>
<td>00:27:02</td>
<td>00:15:23</td>
</tr>
</tbody>
</table>

Data on Factors Influencing Assistive Technology Acceptance

This section provides data collected in relation to Research Questions 1 and 2.

1. What are the perceptions of students with disabilities toward the usage of Livescribe Smartpen, a digital voice recorder, and or note-taking services and the impact on their perceived success in community college coursework?

2. What are the factors that influence the acceptance of assistive technology by students with disabilities?
The findings in this section are presented in four sub-groupings related to (a) perceived usefulness; (b) perceived ease of use; (c) facilitating conditions of user participation in selecting the system, training, and system support; and (d) the factor of social influence and subjective norm.

**Perceived usefulness.** Each participant was asked, “Please tell me how you generally find technology useful?” All participants generally found technology useful as related to their coursework. In their own words, each participant referenced the ubiquity of technology, especially referring to “smartphones.” Even though they were not explicitly asked if they had a “smartphone,” all four referenced the fact that they owned a “smartphone” of some variant. One participant said:

I find technology useful because we’re all walking around with information, worldwide information in our hands now. We don’t have to go and look for a library for a dictionary or wait until we get home. If we need to know something or want to know whatever is going on . . . , we can just look and find out. And, [technology] helps us with our education. If we need to research something and we’re not at a computer . . . most of us are walking around with smartphones nowadays, we could still research on our phones.

Generally, all four participants perceived technology as useful to them and furthermore found technology useful to them as related to their coursework.

**Perceived ease of use.** Each participant was asked, “How do you find technology easy or difficult to use? Please explain or give examples.” Most participants found
technology easy to use, but one of the participants gave a nuanced answer, stating that it depends on the task:

Some things are easier, some things are harder, depends on what it is. Like, say, if you’re doing a graph or something rather than just writing the graph down. If you have to do it on a program, it’s harder and it takes a little bit more time to graph it out and everything. In the same as if writing an essay rather than just writing it out real quick, you have to go and make sure all the font is right and the header and all this stuff. Sometimes, it makes things a little more difficult and takes more time but usually it’s beneficial.

All the participants found benefits to the use of technology when asked about the ease or difficulty of technology.

Another participant explained how her perception of technology changed over time as a result of interacting with it through training and support:

We have the audible books now. It’s just a worldwide of information like it was meant to be. And it’s moving so fast. Every day is something new and I think if we keep up with the times or at least try to, we’re going to know a lot because it’s right there at our fingertips. And me, personally, like I said before, I used to fight technology, but now, I love technology because I can find out so much that I didn’t know or things that I thought I knew. And I’m not saying that everything on the computer is true but you have your certain sites that is true like our library research database.
This same participant explained that her perception of technology changed over time due to training and support at school as well as at times being forced to use technology. She reflected positively on being forced to use technology due to the support she received even though it was difficult and frustrating in the moment.

Facilitating conditions. Each participant was asked, “Who influenced your choice of the Livescribe Smartpen, audio recorder, or note-taking service if it was a choice? If it wasn’t a choice, please explain.” All participants indicated that a DSPS Counselor influenced their decision of the accommodation they chose to use. It should be noted that a DSPS Counselor approves the accommodation, but the student chooses to utilize said accommodation. Furthermore, three out of the four participants indicated that training from other DSPS staff upon counselor referral further influenced the choice. All four interviewees indicated it was a choice for system selection between Livescribe Smartpen, audio recording, and or note-taking service accommodations.

Additionally, each participant was asked, “If given the choice between using technology or not, which do you choose and why?” Generally, all participants chose technology, but a common theme was the synthesis of technology and analog or manual. One interviewee explained the synthesis of analog with technology by saying:

Using it because it’s beneficial. You could even do the note-taker and have the tape recording and then you’re able to read it and play it back and you can hear it . . . You’re studying it in different ways so it’s easier for you to learn the material rather than just reading it or just hearing it in class, you can replay everything
that’s said in class and then go back on your notes too and then read just little things that you jot down.

Another interviewee shared:

It depends. Like they're some things that I could possibly be without and there are some things that I would rather be with it like the audio books. Especially, with books that are like longer and lengthy, so, then it's hard to remember without using those. I actually had an experience with that during the first semester where I have a long book that was hard to memorize without the use of the audio book.

Each participant shared in his or her own words how he or she preferred to use technology, but technology is not always the best solution for him or her. All interviewees shared a willingness to experiment with technology; this was especially true for the two Livescribe Smart Pen users who indicated they had never heard of the device until the DSPS Counselor talked about it with them during the interactive process and referred them for further training on the device. The Livescribe Smartpen is the synthesis of technology and analog handwritten note taking.

The DSPS training influence further linked to the next two questions that were asked, “What kind of training did you receive for the technology you use in support of your coursework? (i.e., Livescribe Smartpen, audio recorder, computer, etc.) Please give detail,” and “What kind of support do you have for the use of technology in your course work?” All participants further reinforced the training that DSPS provided. In addition, some interviewees noted other campus services. For example, one interviewee stated:
Most of the training that I've gotten here on computers was the reading and writing center, teaching me and showing me different things . . . and the librarians are extremely helpful about showing you how to research, showing you how to go into different sites like the school library database.

Generally, all interviewees expressed feelings of support related to the technology they used in their coursework, and they felt they have resources they can turn to assist them.

**Factor of social influence and subjective norms.** Each participant was asked, “Do you provide feedback to your note-taker/manufacturer and or the DSPS? Do you feel you can provide feedback? Why or why not?” Generally, all participants stated they did not provide feedback, but when pressed on why, none felt like they needed to provide feedback. One interviewee stated, “I think so, whenever I have a problem with anything. But so far, things have been going good.” All participants did indicate that if they had a problem with a device (i.e., audio recorder or Livescribe Smart Pen), they would contact the manufacture’s technical support for assistance. When specifically asked about feedback regarding the note-taker service, one interviewee stated:

I've never really given feedback to the note taker I have right now. I say thanks for doing it every time but I haven't really said like, “This is good or you’re doing this well or can you improve on this.” I don't really do that and for the other things, I haven't really given feedback either.

The feedback question elicited a change in body language from all interviewees. From the interviewer’s perspective, it appeared to be a degree of discomfort in what the
question was asking. All other interview questions did not elicit this body language response. Furthermore, two of the interviewees indicated they did not feel comfortable reporting issues with their note-taker to the DSPS Office. Three out of the four interviewees indicated having had experienced note-taker issues in the past, and the one interviewee who chose not to use note-taking services cited several note-taker issues as her rationale for not using the service.

**Data on Quality of Work and Perceived Success**

This section provides data as related to the Research Questions 1 and 3.

1. What are the perceptions of students with disabilities toward the usage of Livescribe Smartpen, a digital voice recorder, and or note-taking services and the impact on their perceived success in community college coursework?

3. What student-perceived academic success factors can be linked to the use of the Livescribe Smartpen, digital voice recorder, or note-taking service accommodations?

Each participant was asked, “How do you think technology affects your success as a student with a disability?” All participants indicated that technology positively affected their success as a student with a disability. For example, one interviewee said:

I think it improves it because without it, I don’t think I would be able to do as well. Like, even before, I wanted to come back to school and I didn’t know about [DSPS], so I didn’t come back and then somebody told me about it and how you can get all the different things to help you. So really the technology is what
brought me back to school knowing that I would have that extra help because you really can’t do a lot of things on your own and can’t get every single book in large print and all that. So it’s hard.

The interviewees indicated that technology supported their success as a student with a disability, referencing both audio recording and the Livescribe Smartpen.

Furthermore, each participant was asked, “How does technology affect the quality of your work?” Three of the four interviewees expressed that technology improved the quality of their work. One of the three seemed somewhat unsure in his response, based on his body language and voice intonation. He stated, “Well, since parts of it helps me study, I think it helps influence how well I end up doing when we come to a test.” The fourth interviewee was not sure if there was a quality change as a result of technology use, “I haven’t really noticed that it affects it or not because I’ve been just using it since I’ve come back to school. So I really wouldn’t be able to notice the difference.”

Additionally, each participant was asked, “How do you or how do you not find technology makes it quicker to do something? Please give an example.” Three out of the four interviewees indicated that technology made things quicker for them to do, citing various academic examples. The one interviewee who disagreed with the other three stated:

It makes it a little slower because you can’t really – it’s not really being as independent. So everything takes more time rather than just if you needed to just go back and look at your notes, it’s usually everything, the main points,
everything is highlighted so you just go and look at the main points and you’re able to read everything on that session versus the tape recorder, you have to fast forward and rewind to find what you’re really looking for to study for exams and stuff. If they tell you it will be chapter one and one, two, three with these subject titles, you can’t really look at the subject titles. You got to rewind and fast forward to find it. So it kind of takes a little more time.

One of the Livescribe users stated:

Well, with the [Livescribe Smart]pen, if I'm going back over the notes then it can be quicker because I just have to sit there and guess what I might have written if I don't remember. I can just listen to exactly what the teacher was saying when I wrote that. With the audio books it might be a little slower because the speaker might be talking like slower, but it still helps.

Generally, participants perceived technology as the means to their success.

**Comparison of Note-taking, Audio Recording, and Livescribe Smartpen**

This section presents the data as related to Research Questions 4 and 5.

4. How useful do students with disabilities find the Livescribe Smartpen, digital voice recorder, and or note-taking services?

5. How does the use of the Livescribe Smartpen compare to standard digital voice recording and or third-party note-taking services?

First, the data are shown for which participants utilized each accommodation followed by their perceptions.
Question 4 of the pre-interview survey, “Are you approved for audio recording or note-taking services accommodations?” only asked if they had the accommodations and did not ask if they used the accommodations because the purpose of the question was to ensure the participant met eligibility for the study. In the interview, they were asked, “What do you use: Livescribe Smartpen, Audio Recording, or Note-taking Services? Please explain why you use what you use?” This question made it clear as to what each interviewee used. Some follow-up prompting by the interviewer was used to determine whether or not a particular accommodation was used or not. Table 2 shows the breakdown of what the participants used based on their examples and through explicit statements indicating use or not. Furthermore, DSPS records corroborated these statements. For the Livescribe Smartpen and audio recording, it was verified that the interviewee checked out the device in question, and for the note-taking service accommodations, another student in a class was paid a $50 stipend from DSPS for providing notes to the interviewee.
Table 2

Services as Used by Participants

<table>
<thead>
<tr>
<th></th>
<th>Interviewee 1</th>
<th>Interviewee 2</th>
<th>Interviewee 3</th>
<th>Interviewee 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Note-taking Services</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Standard Audio Recording</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Livescribe Smartpen</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

**Standard audio recording compared to the Livescribe Smartpen.** All interview participants used standard audio recording while only half the participants used the Livescribe Smartpen, which is most likely due to the similarity between the two devices. The Livescribe Smartpen is a type of audio recorder device and the DSPS Office does not delineate the Livescribe Smartpen as a separate accommodation; it simply falls under the audio recording accommodation. The distinct feature of the Livescribe Smartpen is the indexing to the handwritten notes in the Livescribe Notebook. The two participants who used the Livescribe Smartpen both stated how much easier the Livescribe Smartpen was to use in comparison to standard audio recording due to the ability to tap on a particular note to begin playback of the lecture recording starting at that particular point as opposed to the fast-forward and rewind to find a desired point in standard audio recording. The Livescribe Smartpen users preferred the Livescribe Smartpen to standard audio recording, but both noted that some course subjects and class
formats or styles do not require much note-taking so the utility of the Livescribe Smartpen is less. Both Livescribe Smartpen users indicated that the Livescribe Smartpen worked very well in their math classes specifically. The two other participants who used standard audio recording over the Livescribe Smartpen stated they did not feel confident enough to take good enough notes to effectively use the Livescribe Smartpen.

**Audio recording compared to note-taking services accommodations.** Three of the four interview participants used the note-taking services accommodation provided through the DSPS Office, which was corroborated by DSPS accounting records. The DSPS Office provides a $50 stipend to another student in the same class for providing notes to the student with a disability. The notes can be provided to the student with a disability through email or through handwritten notes on No Carbon Required (NCR) Paper, a.k.a., multipart stationary to provide multiple copies—DSPS provides the NCR paper to the note-taker.

One participant provided a compare and contrast between note-taking service and audio recording:

I use mostly the audio recording because it gets the whole lecture. You don’t miss anything and you don’t have to worry about not being able to read somebody else’s notes or them leaving anything out. You know you have everything and also, I did the note-taking thing before, and I’d have to switch note-takers throughout the semesters because people wouldn’t come to class or they would drop. It’s just more convenient to just do the audio recorder.
The other three participants who used the note-taking services did so as a safety net or backup to their own notes and audio recording. Another participant stated, “I still take my own notes, so, then I can like have a vision of what I’m doing while I have someone else’s notes to help me as well. I’m not just sitting there and might be spacing out.” A second participant stated something similar, “So that I can look at what I have and what the note-taker has, so I can see if I have the same thing as the note-taker.” All three participants who used note-taking services indicated that they still had to do something like taking notes to stay engaged during class and that the notes provided to them filled in the gaps in their own notes. One interviewee stated she “never had a bad note-taker” while the three other interviewees referred to unreliability of note-takers to regularly attend class.

**Summary**

**Summary of Factors Influencing the Acceptance of Technology**

The factors influencing the acceptance of technology fall into the following four sub-groupings related to (a) perceived usefulness; (b) perceived ease of use; (c) facilitating conditions of user participation in selecting the system, training, and system support; and (d) the factor of social influence and subjective norm.

**Perceived usefulness.** All participants perceived technology as useful to them as related to their coursework citing academic examples.
**Perceived ease of use.** All participants found benefits in the use of technology when asked about the ease or difficulty of technology. No interviewee stated any difficulties with technology except one who admitted to difficulties and fear in the past but attributed a current perception of ease due to training and support.

**Facilitating conditions.** Student services staff and counselors influenced the students’ accommodation decisions, but all participants indicated it was their choice. All interviewees shared a willingness to experiment with technology; this was especially true for the two Livescribe Smartpen users.

**Subjective norm and social influence.** All participants stated they did not provide feedback because they did not feel a need. All interviewees responded to the feedback question with an uncomfortable body language response. Furthermore, two of the interviewees indicated they did not feel comfortable reporting issues with their note-taker. Most interviewees indicated experiencing note-taker issues in the past. Lack of feedback was universal across audio recording, Livescribe Smartpen, and note-taking services.

**Summary of Quality of Work and Perceived Success**

Technology was viewed as a positive effect on participants’ success as students with a disability. Many interviewees expressed that technology improved work quality. Most interviewees indicated that technology decreased time devoted to academic tasks. Generally, participants perceived technology as the means to their success.
Comparison of Note-taking, Audio Recording, and Livescribe Smartpen

All participants used traditional audio recording while three out of four used note-taking services, and only two used the Livescribe Smartpen. The one who did not use note-taking services had used it long ago but was not presently using it.

Standard Audio Recording Compared to the Livescribe Smartpen

The wider use of standard audio recording is most likely due to the similarity between the two devices. The Livescribe Smartpen is a type of audio recorder device. Livescribe Smartpen users expressed a greater ease of use for the Livescribe Smartpen due to the non-linear playback functionality. The Livescribe Smartpen users preferred the Livescribe Smartpen over standard audio recording but noted instances in which standard audio recording would be as effective as the Livescribe Smartpen. Math was noted as the best courses for the Livescribe Smartpen. The exclusive standard audio recorder users indicated a lack of confidence to take good enough notes to effectively use the Livescribe Smartpen.

Audio Recording Compared to Note-taking Services Accommodations

Most interview participants used the note-taking services accommodation and used it as a safety net or backup to their own notes and audio recording. Course content engagement is still necessary during class when using note-taking services. Audio recording tends to be more reliable than a note-taker; however, participants do not convey note-taker issues to student services staff.
Chapter 5  
SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS  

Summary  
The purpose of this study was to identify the factors that influence the acceptance of technology by students with disabilities at a small suburban community college. The study also was designed to explore the perceptions of students with disabilities on the use of technology as related to their perceived success in college. As stated previously, research involving students with disabilities is limited, but it is hoped that this study adds to the body of knowledge pertaining to students with disabilities to better aid in service development and implementation by student service professionals and higher education leadership administrators. The study endeavored to answer the following research questions:  
1. What are the perceptions of students with disabilities toward the usage of Livescribe Smartpen, a digital voice recorder, and or note-taking services and the impact on their perceived success in community college coursework?  
2. What are the factors that influence the acceptance of assistive technology by students with disabilities?  
3. What student-perceived academic success factors can be linked to the use of the Livescribe Smartpen, digital voice recorder, or note-taking service accommodations?
4. How useful do students with disabilities find the Livescribe Smartpen, digital voice recorder, and or note-taking services?

5. How does the use of the Livescribe Smartpen compare to standard digital voice recording and or third-party note-taking services?

The study was developed based upon a thorough review of the literature. The methodology used to perform the study, including identifying the population to be sampled and the development of the survey instrument to be used to collect data for qualitative analysis, was presented. The data collected from the respondents and the findings as they related to the research questions were presented in the previous chapter.

**Conclusion**

The purpose of this study was to identify the predictors and facilitating conditions that influence the acceptance of assistive technology by students with disabilities at a small suburban community college. A review of the literature showed increasing technology use for student services and in the academic classroom as well as provided a set of predictors and facilitating conditions that indicated the intention to use technology in various settings, including educational environments. The researcher endeavored to explore the assistive technology acceptance factors for students with disabilities at a small suburban community college environment from the student perspective in order to provide information to administrators who seek to leverage the use of technology for services to students with disabilities.
Research Question One: What are the perceptions of students with disabilities toward the usage of Livescribe Smartpen, a digital voice recorder, and or note-taking services and the impact on their perceived success in community college coursework?

Generally, students have positive perceptions toward the Livescribe Smartpen, digital voice recorder, and note-taking services. Some students have stronger perceived success toward each accommodation in their community college coursework.

Livescribe Smartpen. Students with disabilities view the Livescribe Smartpen positively, which is attributed to the training and support for the device from the student services professionals. The Livescribe Smartpen is limited by a student’s perception of their ability to take notes, so note-taking strategies should be integrated into Livescribe Smartpen training and support. Another factor influencing the use of the Livescribe Smartpen is the course subject and the professor’s teaching style—a consensus surrounds its use in math courses. Students with disabilities do not view the Livescribe Smartpen as useful in courses where the faculty teaching style does not rely on note-taking as a means of active engagement with course content. The perceived success by the students is not the same as the traditional audio voice recorder but is still positive—the Livescribe Smartpen is not as widely accepted as the traditional audio voice recorder and note-taking services. Through robust training and support, the Livescribe Smartpen has the potential of having a higher acceptance rate.
**Digital audio voice recorder.** The digital audio voice recorder is widely accepted by students with disabilities due to its “set it and forget it” capability. Once the device is recording, there is no further interaction needed by the student until they need to pause or stop recording. Just like the Livescribe Smartpen, the audio voice recorder captures exactly what the professor says in class for later playback. Students with disabilities feel the audio recording reduces their stress and anxiety because they can go back and replay exactly what was said in case they feel they missed something from class. The standard digital audio does have one distinct drawback with respect to its linear playback while the Livescribe Smartpen can start playback at the specific desired point based on the handwritten notes.

**Note-taking services accommodation.** Out of all three, note-taking services was viewed more positively by students with disabilities than the Livescribe Smartpen and digital audio voice recorder because students viewed it as a backup or safety net due to their lack of confidence with their own notes. The note-taking services provide the students another place to refer to when they are uncertain about a topic. The major issues with the note-taking services accommodation is the fact that students with disabilities do not feel comfortable with providing feedback directly to the note-taker or to the student services professionals facilitating the service. Quality of the notes and reliability are undeterminable; a quality control, supervision, and feedback system for note-taking services should be developed. Most students with disabilities view their perceived success as attributed to the note-taking services.
**Research Question Two: What are the factors that influence the acceptance of assistive technology by students with disabilities?**

As delineated in the review of the literature and re-enforced in the data findings of this study, perceived usefulness, perceived ease of use, facilitating conditions, and user inclusion in system selection and development are key factors that influence technology acceptance.

**Perceived usefulness.** Generally, students with disabilities perceive assistive technology useful to them. Many students with disabilities believe technology improves efficiency while some find it improves quality of work as well. Establishing practices that continually explore the usefulness of assistive technology for the delivery of services to students with disability services will most likely increase the acceptance and usage rates of technology for the purpose of supporting and accommodating students with disabilities in and out of the academic classroom.

**Perceived ease of use.** If, in addition to being useful, a technology is also easy to use, then students with disabilities are more likely to use that technology as an accommodation. Students with disabilities in general find it easy to use technology and are adept at picking up new technologies to support their academic pursuits.

**Facilitating conditions.** Facilitating conditions are important to consider if services to students with disabilities endeavor to leverage assistive technology as a means of accommodation. Disability accommodations can leverage technology, which tends to increase independence, meaning they rely less on other individuals as the means of
accommodation. How this is achieved depends on student assistive technology acceptance. Inclusion in system selection and development, the availability of training, and having continued support are three key components of technology initiatives known to increase technology acceptance.

**Training and support.** Providing training on the assistive technology accommodation demonstrating the usefulness and ease of use to the student with a disability is critical to their acceptance and use. Training materials containing a comprehensive view of the available features provide a foundation for initial familiarity with the technology; these materials need to be developed through the lens of universal design allowing for flexibility for differing learning styles as well as providing the training in a format that takes the student’s disability into consideration. Furthermore, supplemental training materials that focus on specialized functions, particularly those that are most frequently used are beneficial for ongoing support. Students with disabilities need additional support when encountering difficulties with the assistive technology so they do not give up on it. This ongoing support can come in the form of highly trained expert staff as well as peer-to-peer.

**Inclusion in system selection and development.** Generally, user inclusion in system selection and development are a key factor in technology acceptance because the individuals feel they had buy-in with the system they use. User inclusion in system selection can be integrated in the disability interactive process that determines a student’s accommodations through demonstration and training so they feel they chose the system.
In this study, the students with disabilities felt they made the choice to use the assistive technology, which is a contributing factor to the high use of technology by these students. Though practically students may not be able to provide input into the development of an assistive technology system, allowing participation in a feedback mechanism in future improvements could achieve similar results.

Subjective norm. Social influence and subjective norm play a role in the acceptance of technology by students with disabilities. Generally, students with disabilities do not feel the need to provide feedback or report issues to the student services professional staff. However, students with disabilities may report technical issues with assistive technology to the manufacturer. The social influence data were limited in this study and, as a result, the influence of social norm is inconclusive.

Student service professionals serving students with disabilities should cultivate a positive environment toward technology acceptance leveraging user inclusion in system selection, training, and support while demonstrating its usefulness and ease of use. Many students with disabilities are open to technology, but require staff support to fully leverage it in accommodating their disability. Key expert training staff are critical, but staff support should be interlaced through all individuals who interact with the student to enforce the positive technology acceptance environment. There are probably social influences affecting technology acceptance so a peer-to-peer support system could be beneficial and complement any staff support.
Research Question Three: What student-perceived academic success factors can be linked to the use of the Livescribe Smartpen, digital voice recorder, or note-taking service accommodations?

It is unclear what student-perceived academic success factors are linked to the use of the Livescribe Smartpen, digital audio voice recorder, or note-taking services accommodations. The interview protocol in this study did not push beyond asking how students with disabilities felt toward these accommodations and how they felt their academic success was linked to these accommodations, and, as stated in response to research question one, generally, most students with disabilities felt positively toward these accommodations. Students with disabilities feel that these accommodations are the means by which they are successful. The professor teaching style may have an influence since it had a influence on the students’ decisions between the Livescribe Smartpen and digital audio recorder, but no definite conclusion can be drawn from the professor teaching style linking to the student’s perceived academic success. Specific factors linked to perceived success like grades and GPA were not examined by the interview protocol. A survey methodology perhaps might yield a better response to this question. Further research is needed to answer this question.

Research Question Four: How useful do students with disabilities find the Livescribe Smartpen, digital voice recorder, and or note-taking services?

Livescribe Smartpen. Those students with disabilities who use the Livescribe Smartpen find the device extremely useful so much they prefer to use it over a standard
digital voice recorder. The Livescribe is perceived more useful than a standard digital audio recorder due to its non-linear playback capability—one can begin playback from a specific point in one’s notes—as opposed to the linear playback of standard digital audio recorders. However, those who choose not to use the Livescribe Smartpen opt not to use it due to lack of confidence in their own note-taking capability. The usefulness of Livescribe Smartpen does not supersede the acceptance of standard digital audio recorders. There was a consensus in this study that Livescribe Smartpen was highly useful in math courses.

**Digital audio voice recorder.** Standard digital audio recorders are viewed as useful by students with disabilities who use the device; even Livescribe Smartpen users find them useful but not as useful as the Livescribe Smartpen. The usefulness can be influenced by faculty curriculum teaching strategies; the Livescribe Smartpen is most useful if a professor uses teaching techniques that require note-taking as a means of course content engagement due to lecture audio being indexed to the handwritten notes, and audio playback can be non-linear. If note-taking is not required, then the Livescribe Smartpen has the same linear audio playback capability as a standard audio recorder.

**Note-taking services.** Note-taking services are generally viewed as useful by students with disabilities and are typically used in combination with standard digital audio recording as well as the Livescribe Smartpen. The usefulness of the note-taking service is related to reliability and dependability of the note-taker as well as the quality of the notes. The note-taker stipend provided in this study may have an influence, but it was
not explored. Generally, students with disabilities find the note-taking service useful in filling in the gaps in their own notes. Also, students who use the note-taking service still take their own notes as a means to stay engaged with course content.

**Research Question Five: How does the use of the Livescribe Smartpen compare to standard digital voice recording and or third-party note-taking services?**

**Livescribe Smartpen and standard digital audio recording.** The Livescribe Smartpen is a type of audio recorder that indexes recordings to handwritten notes. Livescribe Smartpen users prefer to use the Livescribe Smartpen over standard audio voice recording due to its usefulness and ease of use, but in courses where note-taking is not key for engagement with course content, the utility of the Livescribe Smartpen is diminished. Those students who do not feel confident in their note-taking ability choose the standard audio voice recorder instead of the Livescribe Smartpen option.

**Livescribe Smartpen and note-taking services.** Many Livescribe Smartpen users use the note-taking service as a backup or safety net to their own notes. They tend to use the note-taker’s notes to fill in the gaps in their own notes. The clear advantage of the Livescribe Smartpen is the audio recording indexed to the handwritten notes. There are reliability and quality issues with the note-taking service, which is compounded by the fact that students with disabilities do not feel comfortable with providing feedback directly to the note-taker nor to the student services professionals facilitating the service. The Livescribe appears to be more reliable than the note-taking service.
Recommendations

The purpose of this study was to identify the predictors and facilitating conditions that influence the acceptance of assistive technology by students with disabilities at a small suburban community college. Specifically, the assistive technology explored were the Livescribe Smartpen and digital audio recording in addition to technology in general while comparing to the less technology-driven third-party note-taking services.

Generally, students with disabilities have an openness and willingness toward the use of technology as a means of accommodation. Additionally, those who use them view the Livescribe Smartpen and audio recording very positively. Training and support are attributed to the decision-making process for those who selected the device they use.

Training and support for the Livescribe Smartpen and audio recording should be developed from the lens of usefulness and ease of use demonstrating the benefits. Also, when developing training, universal design should be employed to cater to a student’s learning style as well as their disability. Furthermore, Livescribe Smartpen training and support must contain note-taking strategies in addition to the fundamental functions of the device to encourage students to develop and implement good note-taking strategies. Students should be encouraged to take notes and engage with course content to build confidence in their own abilities so they are not turned off to using a device based on their own lack of confidence. Support can come in the form of peer-to-peer which would support the training provided by the expert staff.
The costs of these technologies were not explored by this study, but cost may have an impact on the wider use and acceptance. All participants in this study attended an institution with a program that checked out the devices at no cost to the student if they returned the device. The ubiquity of smartphones most likely has an influence since the device itself is a sunk cost to the student and every smartphone has the ability to audio record, whereas purchasing the Livescribe Smartpen would be an additional cost—not to mention the fact that standard digital audio recording devices can be about half the cost or more of the Livescribe Smartpen. Additionally, the institution in this study allowed students the choice of technology or not, which allowed for user inclusion in the system selection process; users need to have buy-in for the system—feeling it is their choice to use the system. Lastly, administrators overseeing programs serving students with disabilities should consider cost and access when developing training and support since if the student does not have a means of access to the technology, the training and support will be superfluous to the student.

Third-party note-taking service accommodation is very popular, and students with disabilities feel note-taking services are a means by which they are successful. There is a general consensus that the note-taker notes fill in the gaps in the student’s notes and couples with the audio recording—there is a synthesis between note-taking services and audio recording: both Livescribe Smartpen and standard audio recording. However, there are major quality control and reliability issues combined with a lack of feedback. Students with disabilities generally do not feel comfortable providing feedback, most
likely due to social norm influences. This study did not explore social norm influences beyond feedback so there could be larger issues at hand. Administrators overseeing services to students with disabilities should develop a quality control and reliability mechanism for note-taking services to ensure it is meeting the student’s need. Lastly, a feedback mechanism and culture of providing feedback is necessary so improvements can be made as well as resolutions to issues can be implemented.

Finally, examination of perceived success through the qualitative methodology in this was difficult, so further study through a quantitative methodology may yield better results with respect to success factors. Additionally, actualized and realized success measures such as recorded grades, grade point averages, graduation rates, and time-to-degree are the ultimate success measures that should be examined in an ethical way to provide insights on student success.
APPENDICES
APPENDIX A

Pre-Interview Survey Form

Pre-Interview Questions

1) Are you 18 years of age or older?

2) Are you currently enrolled at Blue College?

3) Are you actively using Disability Support Programs & Services? (i.e. have accommodation letters for the current semester).

4) Are you approved for audio recording or note-taking services accommodations?

5) What is your gender identity?

6) What is your age range?

6. 18-29 30-39 40-49 50+
APPENDIX B

Invitation to Participate in the Study

Dear [CRC] DSPS Student,

Keith Ellis, a graduate student at Sacramento State, is conducting research on students with disabilities related to the use of audio recording, the Livescribe smart pen, and note-taking service accommodations. Participation in this research is entirely voluntary, and all results will remain anonymous. The DSPS Office is supporting this research, but it is being entirely conducted by Keith Ellis as a graduate student at Sacramento State. For more information, please read the attached informed consent form, and please direct any questions to Keith Ellis at keithellis@csus.edu.

Thank you.

Sincerely,

[Yolanda Garcia-Gomez] CRC DSPS Coordinator

ATTACHED: KELLIS_INFORMED_CONSENT.PDF
APPENDIX C

Informed Consent

INFORMED CONSENT
Students with Disabilities Perceptions of Assistive Technology & Note-taking Services

You are invited to participate in a research study which aims to examine the student perceptions regarding assistive technology and note-taking services for students with disabilities at a small suburban public community college. My name is Keith Ellis, and I am a graduate student at California State University, Sacramento, in the Higher Education Leadership and Policy Studies Master's program. Also, I am a Student Personnel Assistant in the Disability Support Programs & Services. Your participation in this project is voluntary. Even after you agree to participate, you may decide to leave the study at any time.

The purpose of this research is to examine the student perceptions regarding assistive technology and note-taking services for students with disabilities related to perceived success at a small suburban public community college. If you decide to participate, you will be asked to complete a short pre-interview survey and participate in an interview where you will be asked about your experience using audio recording, the Livescribe Smartpen, or note-taking services accommodations as related to your disability and perceived success in college.

Your participation in this study will last approximately one hour. Risks associated with this study are not anticipated to be greater than those risks encountered in daily life. If you have any questions about your rights as a participant in a research project please call the Office of Research Affairs, California State University, Sacramento, (916) 278-5674, or email irb@csus.edu. Additionally, you make seek emotional counseling services before, during, or after your involvement in this study at the Counseling Office located in the Library Building Room or call .

Your participation is entirely voluntary and your decision whether or not to participate will involve no penalty or loss of benefits to which you are otherwise entitled. If you decide to participate, you are free to discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. You are not waiving any legal claims, rights, or remedies. If you have any questions about the research at any time, please contact me at Keith Ellis or e-mail at keithellis@csus.edu.

If you are interested in participating in this study, please sign the consent form and contact me to schedule your interview time. All interviews will be conducted at the campus for your convenience. Thank you for your consideration,

Keith Ellis

Your signature below and participation in this study indicates that you have read and understand the information provided above.

__________________________  __________________________
Signature of Subject Date

__________________________
Printed Name of Subject

__________________________  __________________________
Signature of person obtaining consent Date
Keith Ellis

Printed Name of person obtaining consent
APPENDIX D

Interview Questions List

Date: ______________

Participant Number: ______________

Interview Questions

1) Please tell me how you generally find technology useful?
2) If given the choice between using technology or not, which do you choose and why?
3) How do you or how do you not find technology makes it quicker to do something? Please give an example.
4) How does technology affect the quality of your work?
5) How do you find technology easy or difficult to use? Please explain or give examples?
6) How do you think technology affects your success as a student with a disability?
7) What do you use: Livescribe Smartpen, Audio Recording, or Note-taking Services? Please explain why you use what you use?
8) Who influenced your choice of the Livescribe Smartpen, audio recorder, or note-taking service if it was a choice? If it wasn’t a choice please explain.
9) Do you provide feedback to your note-taker/manufacturer and/or the DSPS? Do you feel you can provide feedback? Why or why not?
10) What kind of training did you receive for the technology you use in support of your coursework? i.e. Livescribe Smartpen, audio recorder, computer, etc. Please give detail.
11) What kind of support do you have for the use of technology in your course work?
12) Is there anything else you would like to share regarding using assistive technology or note-taking services
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