# Transforming Teaching: Implementing Mobile Technology Learning Strategies in Serving Students with Visual Impairments

by

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## ABSTRACT

This dissertation study used a sequential mixed methods research design that explored the issues related to teacher professional development in the field of visual impairment regarding the use of iPads with students with visual impairments. The study surveyed participant teachers of students with visual impairments (TVIs; $N = 371$) regarding their knowledge, skills, and self- efficacy related to using iPads with students who have visual impairments. A smaller group ($N = 30$) of participants was selected to participate in an intervention. The intervention was a learning module about using iPads with students who have visual impairments hosted on iTunes U accessed on each teacher's iPad. The participants in the intervention were asked to answer survey questions and submit case study assignments from the learning module. Teacher growth was summarized using a researched model for defining technology integration from novice iPad users to transformative iPad users. The study used quantitative methods to present mean data regarding iPad knowledge, skills, and self-efficacy and used qualitative surveys and open ended questions to offer thematic categories that tell a richer story of technology use with these students. From these data, significant findings were related to the areas of participant age, region in the United States, and service delivery model. Participants who completed the iPad learning module, *TiP for TVIs*, showed significant progress in the areas of iPad knowledge, skills, and self-advocacy for iPads with students. Finally, the research project made recommendations for future research and teacher professional development related to technology being used by students who have visual impairments.

*Keywords:* iPads, students who are blind, visually impaired and/or multiply-impaired, high-technology, teachers of students with visual impairments, professional development, assistive technology

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# CHAPTER I

# INTRODUCTION

## Statement of Problem

In the small field of visual impairment (VI), it is difficult to find empirical evidence pertaining to best assistive technology strategies for this student population (Zhou et al., 2012). Each student presents with a unique set of learning needs and teachers need to be adept enough to gracefully problem solve technology challenges (Koenig & Holbrook, 2000; Presley & D'Andrea, 2009). Students who are visually impaired with multiple impairments have a complex set of issues presented to a new teacher of students with visual impairments (TVI) around implementing technology such as: accessibility issues, training of other teaching professionals and paraeducators, collaborating and connecting with family, understanding the complexity of need around a set of disabilities, and being able to solve input and output issues with technology when troubleshooting a student's physical, cognitive, sensory, and behavioral abilities (Copley & Ziviani, 2004; Zhou et.al., 2012).

At the university level, assistive technology courses may teach adult teacher candidates what is available and potentially how to use the technology themselves (Smith & Kelly, 2007). What is missing is that adult learners, just as K-12 learners, need opportunities to reflect on their learning and adjust their pedagogy (Darling-Hammond & Richardson, 2009; Meizrow, 1997; Svinicki & McKeachie, 2011; Zhou, Parker, Smith, & Griffin-Shirley, 2011). Adults need opportunities to apply their learning in meaningful contexts just as do students do (Dewey, 1938); in addition, adults need to feel that what

they are learning is valuable and, important, and that they will be successful in learning it (Cohen & Hill, 2001; Wigfield & Eccles, 2000).

Meizrow (1997) wrote about the process of adult learning. He discussed how adult learning is about transforming ideas through critical reflection. Adult learning is an active process. In addition, there must be validation of thoughts or assumptions through conversation and debate. These active processes often take place in online environments; the majority of TVI coursework and professional development has moved online to address the critical shortage of TVIs who are spread out throughout the nation in urban and rural areas serving students with visual impairments (Ajuwon & Craig, 2007; Bickford, 2006). There are valuable theories and strategies specific to online learning: faculty engagement, active learning with discussion boards, wikis, simulations, project-based learning, formative assessments, hybrid models, and multi-media engagement such as podcasts or video streaming (Burden, Tinnerman, Lunc, & Runshe, 2010; Chmiliar & Cheung, 2007; Dewey, 2007; Kennedy et al., 2012; Ko & Rossen, 2004). Harrell and Harris (2006) found important benefits for online teacher education programs: attracting mid-level career changing candidates, similar student outcomes to face-to-face students, easy work transition due to no loss of income as with face-to-face college courses, and filling the demand for high-need teachers in partnering districts.

There is little research on the effectiveness of using mobile technologies, specifically Apple's iPad, with students who have visual impairments (Erin, 2012; Smith & Kelly, 2007). In addition, there is little research regarding how to help itinerant TVIs implement mobile technologies in their educational programs. Existing research is

typically case study, small sample sizes, and non-experimental based (Andrea et al., 2012; Smith & Kelly, 2007). Lastly, there are several barriers to learning for both student and teacher populations in the visual impairment field. For students, accessibility is a primary roadblock to learning; this problem can potentially have better results with a highly accessible technology device to access student learning materials (Presley & D'Andrea, 2009). For teachers, there are barriers to learning with regard to time management and professional development when it comes to learning about and implementing high technology with their students (Project Red, 2012). Despite the barriers to learning about assistive technology solutions, specifically Apple's iPad, students with visual impairments are reliant on their TVIs to introduce, implement, and advocate for technology devices to be used as assistive technology (Johnstone, Altman, Timmons, & Thurlow, 2009).

**Past Research on the Problem and Deficiencies**

In the wake of assistive technology legislation, namely Individuals with Disabilities Education Act (IDEA of; 1990), No Child Left Behind Act of 2001 (NCLB of; 2002), and the Assistive Technology Act for Individuals with Disabilities of 1998 (Tech Act of; 2004), a question still remains: Is every student with a visual impairment and/or multiple impairments being evaluated for and then instructed in assistive technology that meets their educational program needs and ability levels? There are several obstacles to ensuring assistive technology implementation, advocacy, and progress-monitoring (Alper & Raharinirina, 2006; Copley & Ziviani, 2004; Johnstone et al., 2009; Kelly, 2009; Smith & Kelly, 2007).

Koenig and Holbrook (2000) recommended a national call for more comprehensive training and implementation of TVI certification programs to implement assistive technology with little change in status quo (Smith & Parker, 2007). Numerous deficiencies in the previous research discussed assistive technology for students with visual impairments. Firstly, Smith and Kelly (2007) reviewed literature over the past 45 years that addressed assistive technology in the visual impairment field and found 256 studies addressing assistive technology. Of those studies, "48% of the articles were discussions of a theory, belief, or practitioner-based concept, and 13% were discussions of product reviews or evaluations" (Smith & Kelly, 2007, p. 77). This synthesis of research, confined by studies regarding K-12 programs serving students with visual impairments, found that only two studies of the 256 total presented data regarding the effectiveness of an intervention that included a group of appropriate participants and intervention, control, and comparison groups. Second, the research around Apple products for individuals with visual impairments is virtually non-existent and/or anecdotal (Andrea et al., 2012; Erin, 2012).

Conversely, there is evidence that adults with visual impairments who are purchasing their own assistive technology devices after graduating from K-12 are often buying Apple devices due to the affordability and accessibility features which come free on the device (National Federation of the Blind, 2012). In addition, students with visual impairments are reliant on their TVIs to introduce, implement, and advocate for an iPad to be used as their assistive technology device. If teachers are not exposed or confident using Apple's mobile technology, they will not include it as a possible assistive

technology device (Day & Huefner, 2003; Kelly, 2009). Lastly, due to the lack of research, TVIs do not have evidence-based practices (EBPs) to use when/if they choose to implement iPads as the assistive technology device in their students' programs (Zhou et al., 2012). This study addressed many of these issues by adding to the research base with a mixed methods research study and offers evidence-based practices to use while implementing iPads as assistive technology devices for students with visual impairments in TVI service delivery models.

## Purpose of Study

The purpose of this sequential, embedded, mixed methods research study was to describe and explain the progression of teacher professional development around assistive technology in an online learning format for teachers of students with visual impairments. The online learning format was similar to a learning management system (LMS) and will included multi-media resources and a comprehensive framework with steps toward iPad implementation. At this stage in the research, the teacher professional development was generally defined as *transformative teaching,* which means teachers are progressing in their levels and expertise of technology implementation. Eventually, the transformative teacher will redefine how technology is being used with students who have visual impairments by incorporating and implementing technology throughout a student's educational program. The study sampled from a large national group of TVIs in order to implement the intervention iPad learning module. The primary purpose was to explore teacher development in the field of visual impairment using an online learning

module and potentially make inferences regarding teacher attitudes and behavior (Creswell, 2009).

The study used an embedded sequence of quantitative/qualitative methodology with the qualitative methodology embedded within the quantitative phase II. The study was transformative in nature as it proposed to implement an intervention with the goal of impacting social change in the area of assistive technology for students who have visual impairments. Creswell (2009) contended,

> Transformative mixed methods procedures are those in which the researcher uses a theoretical lens as an overarching perspective within the design that contains both quantitative and qualitative data. This lens provides a framework for topics of interest, methods for collecting data, and outcomes or changes anticipated by the study. (p. 15)

The two stages were pre-intervention Phase I and intervention Phase II. Newman, Ridenour, Newman, and DeMarco (2003) listed nine categories that provided a list of the general purposes of social science research: predict, add to knowledge base; personal, social, institutional, or organizational impact; measure change; understand complex phenomena; test new ideas; generate new ideas; inform constituencies; and examine the past (p. 175). This inquiry is most closely aligned with adding to the knowledge base and measuring change. The first, adding to the knowledge base, is an area that is clearly indicated through the lack of assistive technology research regarding both the implementation of high technology solutions for students with visual impairments and the effectiveness of professional development for teachers who work with students who are visually impaired. There is a research deficit in both student and teacher areas of interest. The second large category of measuring change is of particular importance in this study:

to evaluate the effectiveness of professional development on both technology implementation and teachers' sense of self-efficacy for transformative teaching in their instructional practice.

## Research Questions

**Phase I**

1. What level of proficiency do TVIs have regarding use of iPads as assistive technology?
2. What are the perceived values teachers place on using iPads as assistive technology with students who have visual impairments?

**Phase II**

3. How will participation in this intervention using an online LMS (iTunes U) increase a teacher's sense of transformative teaching self-efficacy for using assistive technology?
    a. Was the intervention effective with regard to increasing the teacher's sense of transformative self-efficacy - why or why not?
    b. What were the challenges associated with completing the course and course assignments?

## Theoretical Framework

There are several theories regarding teacher professional development-from learning theories to motivation theories (Darling-Hammond & Richardson, 2009; Svinicki & McKeachie, 2011; Mezirow, 1997). There are also studies exploring teacher

professional development in the field of visual impairment as it relates to the unique needs of students with visual impairments and the dominance of distance education models in which TVIs learn (Pogrund & Smith, 2012). The TVI professional development will be situated within a technology implementation model that suggests a teacher-learning path toward transformative technology use and teaching. Puentedura (2012) proposed an approach to evaluating teacher technology implementation from basic inclusion of technology to the transformative level called the SAMR model. The SAMR model acronym stands for substitution, augmentation, modification, and redefinition. His model helps explain how teachers are rethinking how technology can provide access and learning for a student. This model is actively used by entire states to guide teacher professional development, research bodies, and technology organizations (Centre, 2012; Hogan, 2010; Linckels, Kreis, Weber, Reuter, & Meinel, 2009; Oostveen, Muirhead, & Goodman, 2011; Puentedura, 2012).

The SAMR model will provide a framework for describing the research results of teacher technology implementation in this dissertation study. The model allows for both an interpretation of the level of teacher self-efficacy, meaning teachers perceived confidence around technology, for each stage and concretely what implementation at each stage looks like in the K-12 educational program. Each stage adds more value and application to the teachers' technology use until they reach the point of redefining how they use and apply technology in ways never before thought possible. For example, in the field of visual impairment, each stage of the hypothetical model for iPad use for student and teacher could be defined as shown in Table 1.

Table 1

*Substitution, Augmentation, Modification, and Redefinition Model with Student and Teachers of Students with Visual Impairments: Implications for Transformative Technology Growth*

| Model Definitions | Student with visual impairment | Teacher of students with visual impairments (TVI) |
|---|---|---|
| Substitution: technology acts as a direct tool substitute, with no functional change | Student accesses hand-out with technology device outside of class | E-mailed student the handout instead of printing it out in large print or having it brailled |
| Augmentation: technology acts as a direct tool substitute, with functional improvement | Student accesses hand-out at the same time as sighted peers using mobile device with braille display or headphones for screen reader | E-mailed student the handout on his/her mobile device instead of printing it out in large print or having it brailled |
| Modification: technology allows for the significant task redesign | Student accesses outline of digital notes for class using a mobile device in real- time to add information from lecture | TVI works collaboratively with classroom teacher to have student access a classroom wiki or Google doc to take notes during class |
| Redefinition: Technology allows for the creation of new tasks, previously inconceivable | Student creates a podcast, video, or interactive blog for research report and presents to class with mobile device and wireless Bluetooth technology. | TVI collaborates with student wirelessly through e-mail, Google docs, or a blog to help create and revise classroom research project. |

## Assumptions

This research study explored and described the path of professional development TVIs follow regarding iPads as assistive technology. Several assumptions were inherent in the study procedures. The study assumed participants would be honest on their pre- and post-survey data regarding iPad knowledge and skills. The study also assumed participants would complete the iPad technology plan and implement the plan recommendations with an actual student. Lastly, the study assumed that transformative growth using iPads is an individualized and unique growth cycle for each participant. Participant growth would be mainly compared against his or her initial survey responses.

## Hypothesis

This study hypothesized that TVIs would transform in their teaching and usage of mobile technologies, mainly iPads, due to the learning module and increased experiential learning opportunities provided by the learning module's case study exercises.

## Audience

Audiences that would profit from the study include the community serving students and clients with visual impairments, the special education community, researchers who study adult learning, university programs serving teacher certification candidates in special education and visual impairment, and students who are visually impaired. The *TiP for TVI* iPad learning module would fulfill a need in the visual impairment field to address the instructional challenges associated with implementing new technology and providing training that is relevant, hands on, and updated.

## Operationally Defined Variables

### Assistive Technology (AT)

Assistive technology can mean a continuum of low to high technology learning equipment or products that will help student's access or maximize their access to their educational program. Assistive technology is formally defined by IDEA'97 (Edyburn, 2004) as "…any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability" (p. 16).

### Self-Efficacy for Transformative Teaching

Self-efficacy for transformative teaching describes a teacher's level of perceived confidence-if he or she tries hard enough and has access to resources, then he or she can learn anything related to technology to use in his or her teaching or professional activities related to teaching.

### Transformative Teaching

Tranformative teaching describes a teacher's ability to redefine what he or she can do with technology related to his or her teaching or professional activities related to teaching.

## Visual Impairment Field-Specific Terminology

### Blind

"One is blind to the extent that the individual must devise alternative techniques to do efficiently those things which he would do if he had normal vision" (Jernigan, 2005). A person who is blind may or may not have light perception. Statistically, some

accounts note that 80% of people who are blind have some light perception or may see shapes or fluctuations in light. Lastly, often blindness is categorized in the areas of functionally blind or not functionally blind. In Texas, a designation as functionally blind means a student must be instructed in reading and writing braille (Texas Education Code, 1995).

**Expanded Core Curriculum (ECC)**

The expanded core curriculum includes: compensatory skills (communication modes, concept development, skills needed to access the core curriculum), social skills, recreation and leisure, use of assistive technology, orientation and mobility, independent living skills, career education, sensory efficiency skills, and self-determination. These skills have been indicated as necessary for students with visual impairments to help bridge numerous gaps in knowledge and understanding (Sapp & Hatlen, 2010), which must be included in any individualized student program to ensure greater student success.

**Itinerant Teacher**

An itinerant teacher travels to multiple schools within or between several districts. This teacher works in a consultative and collaborative model, addressing a disability-specific need or providing a related service within a district or across several districts (i.e., an itinerant TVI may serve all the students with visual impairments in one district that could include several schools in grade levels early childhood-12).

**Low Vision**

Low vision means "a visual impairment after correction, but with the potential for use of available vision, with or without optical or nonoptical compensatory visual

strategies, devices, environmental modification, to plan and perform daily tasks" (Koenig & Holbrook, 2000, p. 814).

**Multiple Impairments in the Field of Visual Impairment**

A student who has multiple impairments has a visual impairment and additional impairments. In the field of visual impairment, this group can be referred to as students with visual and multiple impairments or students who are MI/VI. Students with multiple impairments may comprise up to 60% of the population of K-12 students with visual impairments in the United States (Erickson, Lee, & von Schrader, 2013; Sacks and Silberman, 1998). The potential categories of multiple impairments are physical, intellectual, psychomotor, communication, and social or emotional development.

**Teacher of Students with Visual Impairments (TVI)**

A TVI is a "specially trained and certified teacher who is qualified to teach special skills to students with visual impairments" (Koenig & Holbrook, 2000, p. 818). These special skills may include braille, assistive technology specific to visual impairments, expanded core curriculum areas such as compensatory skills, etc.

## Limitations

The study contained several limitations out of the control of the researcher. The primary limitation was sample size; the field of visual impairment is a relatively small field when compared to higher incidence disabilities such as learning disabilities. Phase I sampled from a national group of TVIs in an effort to provide a national snapshot of TVI iPad knowledge and skills. Further, limitation in regional participation of TVIs will vary from state-to-state. In Phase II, the sample consisted of 30 TVIs, which limited the

generalizability of the research findings. A further limitation was the geographic locations of TVIs; that made it more difficult to have access to consistent Internet, which was needed for the iPad Learning Module. TVIs have limited planning time, student resources, or administrative support for learning and implementing new AT skills, which were additional limitations. Due to the time of year this study occurred, TVIs were more or less engaged with a professional development module. Last, since iPad technology changes so rapidly with additional apps, software updates, and new products from Apple, the learning module might have become out-of-date in some aspects during the study.

## Delimitations

In addition to limitations, delimitations are factors that can be somewhat controlled by the researcher and are to be noted regarding this study. The initial survey in Phase I included both open- and closed-ended survey questions with the open-ended questions only analyzed if needed for Phase II sampling. In Phase II, the study only closely analyzed a small group of intensive case study participants ($n$ = 5) to maintain a manageable amount of data analysis.

## Significance of Study

The researcher intended to add to the research base regarding iPads being used as AT for students with visual impairments. The study addressed effective professional development practices using online formats, evidence-based practices using iPads for students with visual impairments, and the growth pattern of TVIs attempting to become more proficient technology users and teachers. There was limited research of an experimental nature in the field of visual impairment regarding AT. This study will be a

forerunner in areas of iPads as AT and professional development in the field of visual impairment using an online learning module.

## Conclusion

In summary, IDEA (1990), Assistive Technology Act (2004), and Americans with Disabilities Act (Yell, 2012) have made clear recommendations in the areas of assistive technology, both in device acquisition and services related to K-12 and post-secondary AT. Several barriers remain to obtaining and being trained to utilize AT. Additionally, there is a lack of experimental studies regarding AT to help guide teachers who are trying to implement AT in their students' individualized programs. Further, despite the clear legal requirement to consider AT in a student's individualized education program (IEP), courts are still ruling in favor of school districts that can show adequate progress was made toward a student's IEP goals without assistive technology. What can be done in response? In the field of visual impairment, teachers, students, parents, and administrators can look specifically at the expanded core curriculum to guide AT use and implementation. Students with visual impairments who are provided access and training using AT have had positive outcomes for independent living, job access, and self-sufficiency (Presley & D'Andrea, 2009).

Some facets of an effective assistive technology program include that they are integrated throughout the school day, collaborative across the educational team, and individualized to meet students' learning needs. The attributes of effective professional development around assistive technology are that it is engaging, has hands-on activities, has relevant and timely technology information including multi-media and case studies,

and that it is experiential. Online learning presents its own set of learning needs that can be challenging if instructors do not embrace what advanced technologies have to offer. Teachers, as do EC-12 students, need engaging learning environments where they are applying their new skills and knowledge.

## Organization of the Study

Chapter I has presented an introduction, statement of problem, research questions, significance of study, definition of terms, and limitations of the study. Chapter II contains a review of literature related to assistive technology, teacher professional development, and mixed methods research techniques and frameworks. Chapter III contains the research methodologies and procedures that will be used for gathering data and analyzing findings for the research study. Chapter IV presents the results and findings that emerged from the study. Chapter V discusses and summarizes the research findings, thematic categories, and conclusions related to the study findings. The chapter concludes with recommendations for future study.

# CHAPTER II

# LITERATURE REVIEW

> Vision is the primary system of sensory input for human beings; it is the basis for the majority of human learning. When it is reduced or eliminated, there is a major impact on the individual as a whole. (Fazzi & Klein, 2002, p. 107)

Are students with visual impairments being provided enough opportunity to be technologically proficient in our digital society? What are the professional development offerings for teachers of students with visual impairments (TVIs) regarding new and advanced technology that can be used to access learning? An effective technology implementation program is one that transforms the way one interacts with technology. Some facets of an effective assistive technology (AT) program include integration throughout the school day, collaboration across the educational team, and individualized technology that meets students' learning needs (Zabala, 2012). This literature review analyzed and evaluated the research regarding experiences and implementation in teacher professional development and student AT use in special education K-12 educational programs.

The review was divided into two broad categories: (a) assistive technology (AT) and (b) teacher professional development. Where these two areas of research came together was a critical juncture in planning for the use of AT for students with visual impairments. Current literature pertaining to professional development and AT in the field of visual impairment was reviewed. Further, there was an analysis of the trends in special education and general education regarding iPads in order to develop a strong foundation for the study of teacher professional development regarding mobile

technologies used as AT for students with visual impairments. Research has shown that the combination of absent professional development and access to AT means students are not provided access to assistive technology in their educational programs (Kelly & Wolffe, 2012; Zhou et al., 2012).

There are several questions regarding technology and teacher professional development in the field of visual impairment. Before any of these questions can be effectively answered and implementation models can be provided, the visual impairment research community must validate a technology implementation model for TVIs (Smith & Kelly, 2007). At this time, the greater issues of teacher time, knowledge, funding, and ability are all barriers to implementation of AT. Due to the learning needs associated with visual impairments and/or multiple impairments, the burden rests firmly on the shoulders of the TVI to implement AT (Copley & Ziviani, 2004; Johnstone et al., 2009).

There was limited research providing evidence of certification or professional development programs ameliorating the issue of teacher need for professional development regarding the effective use of AT (Smith & Kelly, 2007). However, Pogrund and Smith (2012) conducted a study of an intensive, short-term training module to educate TVI certification candidates about AT to meet this growing need. Participating TVIs reported gains in their knowledge and skills associated with AT. Research studies such as these show positive results in bridging the gap of teacher knowledge about AT.

**Framing Teacher Professional Growth: Substitution, Augmentation, Modification, and Redefinition Model**

For this review, the professional development section was connected to a technology implementation model that suggested a teacher path toward transformative technology use and teaching. Puentedura (2006) proposed an approach to evaluating teacher technology implementation from basic inclusion of technology to the transformative level (see Figure 2.1). His model helps explain how teachers are rethinking the ways technology can provide access and learning for a student. The Substitution, Augmentation, Modification, and Redefinition (SAMR) model provided a framework for the review of literature related to teacher development. The model allows for both an interpretation of the level of teacher self-efficacy, meaning teachers' perceived confidence around technology for each stage, and the operationalization of each stage in the K-12 educational program. Oostveen, Muirhead and Goodman (2011) described how the SAMR model could be used to show the incremental technology change within learners becoming transformative technology users. The model has also been used for teacher learning communities to categorize the incremental changes teachers move through as they become transformative technology users (Hogan, 2010). Jonassen, Howland, Marra, and Crismond (2008) suggested the model integrates the five "principles of meaningful learning with technology: (1) active (2) constructive (3) intentional (4) authentic (5) cooperative" (p. 82). These five principles describe the teacher actions and attitudinal approach to technology integration. When combined with the SAMR model, the technology principles and learning path provide a framework toward transformative learning.

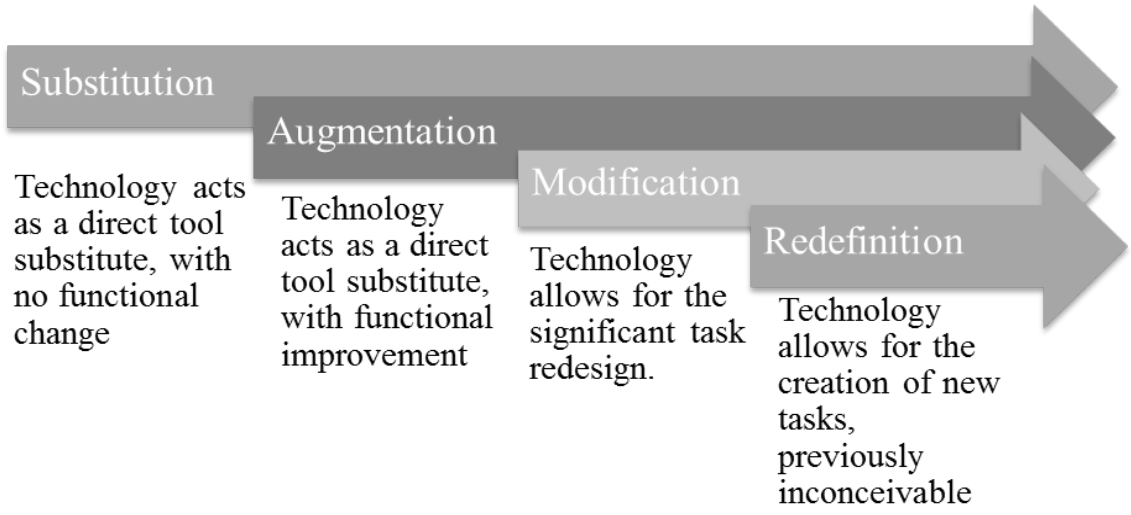



*Figure 2.1.* Substitution, augmentation, modification, and redefinition model (Puentedura, 2006).

**Assistive Technology in the Field of Visual Impairment**

Presley and D'Andrea (2009) stated:

> Being adept at using technology is therefore essential—in fact critical—for visually impaired students. First, in order to access the environment around them, learn about the world, and function in their daily lives, these students need to learn to use devices that help them gain that access. (p. 4)

Presley and D'Andrea broke up AT into the four categories of technology for accessing: learning and literacy, electronic information, producing written communication, and producing materials in alternative formats. A summary of the table provided in Presley and D'Andrea's text is included below. Examples are included for the three types of access a student may use depending on his or her eye condition: visual, tactile, and auditory. In the field of visual impairment, students' eye conditions are unique and typically require an intensely individualized program. Erickson et al. (2013)

suggested that 60% of the students who are identified as having a visual impairment in K-12 educational programs will also have additional impairments. Depending on the severity of a student's additional impairments, AT will need to be modified or adapted to be most successful for a student. For example, a student may be visually impaired and determined to be a tactual learner who will access his or her educational program using tactual media, i.e., braille. This same student may also use a mobility device due to orthopedic impairments, which could mean that tactual learning media may require additional stands or apparatus for it to be accessed while a student is using a wheelchair. Table 2.1 summarizes Presley and D'Andrea's resource list of AT as it is associated with student learning media needs. "Smart phones" are included in brackets since this newer technology was not included in the original publication of the AT textbook. Assistive technology can further be divided into two broad categories of low technology and high technology (Presley & D'Andrea, 2009; Reichle, 2011). These categories are used to describe whether or not a technology is "high technology," which means it is potentially more expensive, advanced, and must be a digital device or computer. Whereas, AT can be "low tech" if it is an adapted learning material, i.e., bold-lined paper, wheelchair tablet stand, or tactile symbols for a communication system being used with a student who has multiple impairments. (see Table 2.2).

Table 2.1

*Summary of Types of Assistive Technology for Students Who Are Blind or Visually Impaired*

| Type of Technology | Visual Access | Tactile Access | Auditory Access |
|---|---|---|---|
| Technology for accessing print | Large print, reading stands, video magnification systems, whiteboards | Braille reading, tactile graphics, tactile math tools | Audio recording, digital talking books, screen readers, talking calculators, specialized scanning systems that read scanned documents |
| Technology for accessing electronic information | Computers, software options, PDA's {smart phones}, e-book readers | Refreshable braille displays, touch tablets, computers | Talking word processing programs, screen reading software, talking books, dictionaries, voice recorders |
| Technology for producing written communications | Manual tools- bold raised line paper, felt tip pens, bold graph paper. Electronic tools- word processors, imaging software, laptop or computers, drawing software | Braillewriters, slate and stylus, electronic braillewriters, braille translation software, embosser, computers with word processing, PDAs {smart phones} | Accessible computers and PDAs with word processing |
| Technology for producing learning materials into alternative formats | Scanning and OCR systems, computer with word processing, laser printer | Scanning, computer with word processing, graphics software, braille embosser, equipment to produce tactile graphics, materials for collage, fusers and capsule paper | Digital and analog audio recording devices, scanning and OCR systems |

Source: Presley & D'Andrea, 2009, p. 23.

Table 2.2

*Comparison of Low Technology Versus High Technology in the Field of Visual Impairment*[1]

| | Low Technology | High Technology |
|---|---|---|
| Student use for access to learning materials | • Bold lined paper<br>• Optical devices<br>• Tilted desk tops or stands<br>• Audio recorders<br>• Braillers<br>• Low tech writing aids: writng guides, tactile maps, daily living technology aids such as talking watches or electronic clothing tags<br>• Mathematical aids such as: tactile geometry figures, talking calculators, braille rulers<br>• Textbooks or novels on disc<br>• Tactile symbols, object symbols<br>• Bump dots and/or landmarking tactile symbols | • Computers<br>• Smart phones<br>• Tablets<br>• Braille printers, electronic braille writers, portable braille notetakers, magnification systems<br>• Video magnifiers (e.g., CCTVs)<br>• Speech synthesizers and speech output systems (for students who are not verbal)<br>• Screen readers (JAWS, VoiceOver)<br>• Laptops<br>• Large print software for computers- ZoomText or Large Print (Apple) |
| Teachers use to create modified materials for students | • Photo copier for enlarging print, graphics<br>• Digital recorders | • Machines to create raised line drawings, etc. such as thermoform machines or embossers to create braille documents<br>• Scanners<br>• Computers |

[1] Summarized from AT START (Kyme, 2013); Texas School for the Blind and Visually Impaired (Allan, 2010)

Unfortunately, much of the information regarding the use of AT in visually impaired education is outdated, anecdotal, or merely product reviews outlining what a device could do if implemented (Kelly & Wolffe, 2012; Smith & Kelly, 2007). Koenig and Holbrook (2000) edited two definitive textbooks in the field of visual impairment that include comprehensive information regarding the background and instructional strategies in the field. The AT chapter written by Kapperman and Sticken (2000) provides an overview of AT at that time and the role of the TVI. Kapperman and Sticken asserted:

> Students who are visually impaired have an opportunity to achieve much higher levels of independence through the use of the technology…[but that] along with the considerable promise of AT for students with visual impairments come a number of challenges for their teachers. (p. 503)

Further considerations for AT include that the severity of a student's visual impairment and/or multiple impairments are directly related to the level of sophistication the AT will need to meet (Copley & Ziviani, 2004; Kapperman & Sticken, 2000; Reichle, 2011).

The role of the TVI in the AT process is comprehensive and implicit at each stage (Johnstone et al., 2009; Pogrund & Smith, 2012). The inherent TVI involvement in the process is warranted due to how specialized AT will need to be to meet the unique needs of students with visual impairments. In effect, the TVI directly working with these students must take the lead on AT despite not having enough professional knowledge or access to resources (Smith & Kelly, 2007). The ideal TVI role in implementing AT is proposed by Kapperman and Sticken (2000) who suggest that TVIs will guide and advocate for AT devices on the educational team, conduct appropriate VI-related as well as AT evaluations to determine what device(s) to train students to use, advise school

district officials on the acquisition of AT devices that will meet each caseload of students' learning needs, guide the individualized education program (IEP) team in creating goals and benchmarks with regard to AT, design and provide all the direct instruction to the student regarding how to use appropriate AT device(s), and provide ongoing assessment and evaluation of the use of the AT device with the educational team and student. These roles represent a considerable amount of tasks associated with AT for each TVI who could have up to 20 students or more on his or her caseload (Kelly, 2009; Olmstead, 2005; Pogrund & Smith, 2012). Additionally, AT programs must be guided by vision-specific evaluations, i.e., functional vision evaluation and learning media assessment (FVE/LMA), to ensure best practices matched to student learning media needs (Erin, Holbrook, Sanspree, & Swallow, 2006; Lueck, Dote-Kwan, Senge, & Clarke, 2001).

As noted previously, AT includes a continuum of low to high technology learning equipment or products that will help students access or maximize their potential in their educational program. Assistive technology is formally defined by the Individuals with Disabilities Education Act (IDEA, 1990) as "…any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability" (20 U.S.C. 140(1)). Day and Huefner (2003) offer a comprehensive list adapted from the Adaptive Technology Resource Center (2001) list including items such as positioning systems, daily living aids, visual aids, auditory materials, computer software, switches, refreshable braille, accessibility aids/technology, etc.

The IDEA extends its definition of AT to include the services associated with the recommended comprehensive scope of devices, equipment, or any product that will help meet the needs of a student's individualized learning program. Within IDEA, 34 CFR 300.346(a)(2)(v), the following is stated, "IEP team also shall…consider whether a child requires AT and services." Further, the law recognizes that if the team decides that a student requires AT in order to receive a free and appropriate public education (FAPE), then the child is entitled to have the AT and take the technology back and forth from school to home (34 CFR 300.308). In IDEA, a summary of other services related to AT are evaluation regarding AT; purchasing, leasing, etc.; assistive technology for a student; selection, design, fitting, customizing, etc. of AT for a student; coordinating and using other therapies and services for a student's AT implementation; training and technical assistance regarding AT for student, staff, and family; and lastly, training for professionals working with the student and his or her AT. In both the definition presented by IDEA and the comprehensive nature of what the definition allows, there is room for a large variety of AT to be tested and implemented in students' individualized learning programs.

## Assistive Technology and the Law

Assistive technology was directly addressed in the Federal Office of Technology Assessment in 1982 (Yell, 2012). At this time, legislators included requirements for AT to be included in a student's IEP. This report highlighted the issues related to coordination and technology functionality, which led to Congress passing The Technology Assistance for Individuals with Disabilities Act in 1988; the schedules of

services summarized previously are a result of this act, which was reauthorized in 2004 (p. 74). The key element within this legislation and any case brought to due process by parents or students with regard to AT is

> that AT devices and services should be included in the IEP if necessary to provide a FAPE as a special education service or a related service or to maintain children and youth with disabilities in the [Least Restrictive Environment] LRE through the provision of supplementary aids and services. (p. 75)

Essentially, if the AT device would be a great addition to a student's education program but the district is already meeting the requirements of free and appropriate public education (FAPE) in the current program, staff or administrators may be reluctant to include it within the IEP goals.

Day and Huebner (2003) extensively reviewed the legal precedents regarding special education students and AT. Introducing the argument, they noted,

> Technology was not considered an important feature at that time {in 1970} for general education, nor was it on the agenda for the young field of special education, a field that had scarcely located space within the walls of the public school building. (p. 23)

Presently, AT plays a large role in the delivery of a FAPE for a student in special education. In contrast, in the field of visual impairment, Kelly (2011) found that only 42% of academic-oriented high school students were using high tech AT products or devices. Additionally, in the field of visual impairment, Johnstone et al. (2009) noted that students in five different states were solely reliant on their TVI to provide, advocate for, and teach them how to use their AT if it was provided. In the original definition cited in IDEA, AT also contains an "AT service" (Alper & Raharinirina, 2006), which is an important inclusion under the law. The service component of AT ensures access to

potentially beneficial AT for an individual eligible for special education services, but this AT may not always be carefully maintained in districts with limited technology expertise (Centre, 2012; Johnstone et al., 2009).

**Barriers and Limitations to the Use of Assistive Technology**

When thinking about the issues regarding the need for AT, a framework for discussion can be provided using the law, student need, and accessibility to training and support (Zabala, 2012). Essentially, the law requires schools, teachers, and individualized education programs to provide AT for students with disabilities in order for them to be productive members of society. Turnbull (2005) presents a thorough investigation into the query of the reauthorization of IDEA under No Child Left Behind (NCLB; 2002), suggesting there is a much greater emphasis on self-sufficiency in society falling on the shoulders of the student being served in special education. Turnbull contends that the reauthorization of IDEA changes the landscape dramatically for what is expected on the part of the educator, student, and parent regarding increased accountability to align with the requirements in NCLB.

Assistive technology can help meet the needs of greater self-sufficiency for students who are receiving special education services (Presley & D'Andrea, 2009). However, there are critical barriers to the use of AT. First, the nature of the technology systems, which innovate and change, means that schools must have continued funding and expertise to maintain and acquire new technology. Yell (2012) explained that these challenges require sufficient federal funding to comply with legislative requirements of AT inclusion in students' educational programs. These issues are compounded for K-12

students who are visually impaired and/or multiply impaired as technology continues to evolve and these students become further behind (Erin, 2012). Prensky (2010) coined the phrase "digital natives," defining students who have grown up around technology, and suggested they will learn best by embracing this evolution instead of asking students to forego use of technology. Students who are visually impaired may not have grown up as immersed in technology as their sighted peers; additionally, as their sighted peers become more proficient in this technology-rich world, students with visual impairments continue to be put at an extreme disadvantage (Erin, 2012). Erin (2012) introduced the issue emphasizing our brave, new digital world where students with visual impairments are becoming even further behind since TVIs can hardly keep up with the changes in technology each year:

> Over the past 30 years, technological options have proliferated at a rate that puts rabbits to shame. It is no wonder that the breathless growth of technology sometimes leaves us wondering whether we can maintain the pace of learning and application that is required for each new device. (p. 694)

In addition, there are barriers to AT use on the implementation and accessibility side such as teacher knowledge and understanding, school infrastructure (e.g., to support wireless technology), and community and home support to implement technology solutions seamlessly between home and school (Centre, 2012). In schools where one-to-one technology is being implemented for all students, including students requiring a personal computer or tablet as an AT device, there are numerous infrastructure implications for teachers hoping to use one-to-one AT. Some of these issues for teachers are troubleshooting support for malfunctioning technology, adequate planning and collaboration time for teachers, systems to check out technology for students, adequate

wireless support for mobile technology, and an integrated approach across curriculum (Centre, 2012; Project Red, 2012; Zabala, 2012).

For students with visual impairments and/or multiple impairments, their future independent living and post-secondary options are greatly affected by the level of AT being provided in K-12 (Yeagar, Kaye, Reed, & Doe, 2006; Zhou et al., 2012). If students do not come from a technology-rich home and are not receiving AT at school, will they be able to function in our digital society as an independent adult? Early research in the field of visual impairment pressed these questions regarding the need for greater technology access for students who are visually impaired (Augusto & Schroeder, 1995; Edwards & Lewis, 1998; Mack, Koenig, & Ashcroft, 1990). These foundational research studies only reported minimal use of AT for activities as advanced as word processing or other academic-related tasks. Edwards and Lewis (1998) suggested technology, at that time, should also be included in independent living routines, e.g., banking, for students who are visually impaired.

Yeager et al. (2006) conducted a comprehensive survey of people with disabilities in independent living centers in California. They found that regardless of the type of disability, respondents reported their disability as the primary reason they were unable to work. Respondents who were working and had increased independence were using AT in their lives and at their jobs. For those 20% who were working, their household median income was between $10,000-15,000 and for those who were living alone and working, their annual median income was $5,000-10,000. The group was asked what AT would help them work or keep a full time job; the top three answers were computer

hardware/software with accessibility features, mobility devices, and mobility-related transportation help. According to the national statistics on disability, it is estimated that 36.8% of non-institutionalized men and women with visual impairments (with/without multiple impairments) between the ages of 21-64 are employed in the United States (Erickson et al., 2013). It should not be surprising that in 2011, it was estimated that 31% of individuals with visual impairments between the ages of 21-64 reported living below the poverty line; 36% of those same individuals had attained a high school diploma or equivalent in the United States. The remaining percentage approximations for other educational attainments were 29%--associates or some college; 11%--bachelors, and 26%--less than a high school diploma or equivalent; an extra 2% accounted for a Margin of error due to small sample size of individuals with visual impairments.

Kelly and Wolffe (2012) examined the percentage of transition age students with visual impairments who were using the Internet regularly in three waves of data collection during the years 2005, 2007, and 2009. They found only 43% of transition aged youth with visual impairments were using the Internet regularly to socialize, for research, or for any other everyday task. The primary determining factors that characterized the 43% of participants using the internet were if they had a job, were in post-secondary training, or volunteered regularly in the community. D'Andrea et al. (2012) interviewed twelve braille and AT users ages 16-22 and found students preferred to use AT to read dense text assignments and relied on AT to keep up with high school to college level readings.

Alper and Raharinirina (2006) noted barriers to AT that perpetuate the problem of students not being provided opportunities to become proficient using AT. The primary barriers identified were inadequate school resources to purchase AT, lack of information to families and professionals coupled with the high cost, inadequate training and professional development of teaching staff, ongoing support once the AT is implemented that can result in it being abandoned, and eligibility issues affecting student access to AT. Among their findings, the authors noted that research about AT for individuals with visual impairments represented the smallest category of all articles. There also were limited articles regarding early childhood and post-K-12 transition aspects of AT. The content analysis found little to no evidence of ongoing support, family collaboration, or AT being used in community or home settings of students with disabilities.

Additionally, Kelly and Smith (2011) reviewed literature over the past 46 years that addressed AT in the visual impairment field and found 256 studies addressing AT. Of those studies, "48% of the articles were discussions of a theory, belief, or practitioner-based concept, and 13% were discussions of product reviews or evaluations" (Kelly & Smith, 2011, p. 77). This synthesis of research, confined by studies regarding K-12 programs serving students with visual impairments, found that only two studies of the 256 total presented specific data regarding the effectiveness of an intervention, which included a group of appropriate participants, the intervention using a control group, and a comparison group. In a separate study, Kelly (2011) found that only 46% of academically-oriented high school students with visual impairments were using high-tech AT in their classrooms. Kelly noted that this finding matched the results of the few other

studies examining students with visual impairments in other states (Kapperman, Sticken, & Heinze, 2002).

**Expanded Core Curriculum and Assistive Technology**

Hatlen (1996), a pivotal leader in the field of visual impairment, discussed the importance of the ECC and helped advocate for the inclusion of the ECC in all educational programs for students with visual impairments. Hatlen asserted, "Blind people should have the opportunity to learn the same knowledge and skills as sighted people, but that much of what sighted people learn incidentally and spontaneously blind people learn differently" (p. 25). This section outlines the historical context, the components of expanded core curriculum, the legal ramifications, and a summary of research.

The ECC is composed of compensatory skills, social interaction skills, orientation and mobility, independent living skills, recreation and leisure skills, career education, accessing AT, self-determination skills, and sensory efficiency skills (Blankenship, 2007; Lohmeier, Blankenship, & Hatlen, 2009). First, compensatory skills are about students learning communication techniques from braille to calendar systems to meet their communication needs, both in expressive and receptive communication. It also includes concept development and organizational skills needed to access the core curriculum. Within social skills, students learn about social interactions through sequenced and careful instruction that addresses how to be socially understood and ways to avoid being socially isolated. Although students will potentially have certified orientation and mobility specialists, TVIs support orientation and mobility skills, addressing students'

right to travel as independently as possible in familiar and unfamiliar settings. Independent living skills include an organized curriculum targeting personal hygiene, food preparation, money management, time monitoring, and organization. Recreation and leisure is an important area of the ECC and is comprised of students receiving direct instruction pertaining to physical fitness and hobbies, promoting lifelong skills that students who are blind are not able to self-select through viewing athletic events or peers participating in recreation and leisure activities. Career education needs to be taught and explored in a systematic way for students who are blind to combat the overrepresentation of adults who are blind who are under or unemployed (Koenig & Holbrook, 2000; Yeagar et al., 2006). Assistive technology can be the difference between access and increased learning versus isolation as well as underachievement for students who are blind. Some researchers call it the "great equalizer" since technology such as braille notetakers, accessible computerized software or hardware, and voice output devices can increase communication and learning for students who are blind that matches the use of their sighted peers (Koenig & Holbrook, 2000; Presley & D'Andrea, 2009). In the area of sensory efficiency skills, students with low vision are instructed to use their remaining vision to the greatest advantage in their lives; students without functional vision need to develop their listening and tactile sensitivity skills to interact more efficiently with their environment and learning media. Lastly, the area of self-determination concerns students being self-advocates and self-sufficient. All these areas need to be directly addressed through careful instruction by trained TVIs in order to provide a quality education to

students who are blind or visually impaired (Blankenship, 2007; Erin et al., 2006; Sapp & Hatlen, 2010).

National Agenda, Goal 8, created a shared language for TVIs and school programs to better include the ECC in their instructional program for students who are blind (Lohmeier et al., 2009). Hatlen (1996) reiterated that for too long, most educators have continued to offer reasons and excuses as to why they cannot implement the ECC. Numerous research-based reasons focus the discussion on how these areas are implemented or omitted from educational programs, e.g., teacher time and planning; parent, administrator, or teacher disbelief of curriculum validity; time constraints in K-12 student education model; and unequal time devoted to expanded core versus core curriculum (Griffin-Shirley et al., 2004; Lohmeier, 2006; McDonough, Sticken, & Haack, 2006; Wolffe et al., 2002). Wolffe et al. (2002) observed teachers and students in six states, representing one third of students who are blind or visually impaired in the United States, to calculate the amount of time devoted to expanded core curriculum versus "academic curriculum." The study found that all TVIs in itinerant, residential, and resource room models overwhelmingly spent the majority of their time on academic instruction with most expanded core curriculum areas being addressed as incidental and fractional smaller pieces of the educational programs for students. They noted that the areas of orientation and mobility, communication, and AT were exceptions; more time was devoted to targeted instruction but these areas still did not occupy the amount of time one might hope. Iselin and Lewis (2002) noted that less than half of the study participants, when compared to their sighted peers, could perform daily independent

living skills as reported by their parents. Both of these studies noted the importance of addressing the expanded core curriculum and both found that students were not functioning at levels as successful as their sighted peers. Griffin-Shirley et al. (2004) studied what skills were being taught by TVIs when breaking down their weekly schedule and found that an accumulated two hours a week were spent on AT and eight hours a week were spent on compensatory skills in order to access the core curriculum.

While the roadblocks to learning and independence are many for students who are blind or visually impaired, the ECC offers a comprehensive guide that will help eliminate many gaps in learning. Since students with visual impairments do not see the incidental learning that is happening in the environment, the ECC offers numerous opportunities to fill in the holes in understanding. Several articles pointed to possible solutions: schedule changes, legislation mandating inclusion of the ECC, more teacher collaboration in itinerant models, within the visual impairment community renewed confidence in the success of the ECC in helping students, and of primary importance, direct instruction in these expanded core curriculum areas for students who are blind.

## Kindergarten-12 Student Benefits and Outcomes Regarding Assistive Technology

There are numerous student benefits when it comes to technology programs. In the field of visual impairment, technology is seen as extremely beneficial to students with visual impairments (Koenig & Holbrook, 2000). Several studies have shown positive effects for students when they have been engaged in robust technology implementation programs. For example, students' writing quality improved when they were producing more text, which guided Koppenhaver (2011) to couple this effective writing theory with

a mentoring program for junior high students in the ePal Program. The students were paired with a teacher certification candidate and they corresponded with each other to work on the students' writing skills. All student participants read at or below the second grade level and 95% received speech or language services as well. Students learned various skills: questioning, summarizing, writing e-mails, instant chats, etc. The primary benefits included increased student motivation and growth in written communication skills since students were consistently engaging in writing.

In another large study, Project Red (2012) surveyed over 1,000 schools nationwide that were implementing one-to-one technology programs and offered a comprehensive implementation plan shown to be most effective in order to have success. They noted implementation aspects such as administrative support, teacher planning, school and community buy in, and infrastructure support for increased technology. Researchers in Project Red noted several positive correlations toward student achievement within one-to-one technology programs such as fewer disciplinary actions, lower dropout rates, less paperwork, lower paper and copying expense, higher teacher attendance, higher test scores, Advanced Placement course enrollment, higher college enrollment, higher course completion rates, and higher graduation rates.

It is the age of innovation and technology. When considering student learning benefits associated with technology, the argument would not be complete without considering the need for students who are visually impaired to be able to seamlessly navigate the internet and be virtually connected to their world as their sighted peers are doing. According to the 2011 U.S. Census (Erickson et al., 2013), over 70% of

households have a computer and search the Internet. In comparison, 15% of households reported having a computer in the home in 1989. Internet information was not collected. The U.S. Census noted an interesting contrast to previous connectivity data concerning computing, Internet, and access to technology. Historically, the biggest disparities in Internet connectivity and computing were among Black and Hispanic racial groups, groups that were of low socioeconomic status, and groups that were located in southern states. The difference today is that smartphones are enabling connectivity across all these groups. In general, more Americans across all categorical groups are able to connect to the Internet on their smartphone than ever before. This connectivity is a huge leap forward in the field of special education due to this never before access to affordable technology. Despite this brave new world of Internet connectivity, the field of visual impairment still reports that only 60% of its students are using the Internet and/or AT in their daily lives (Kapperman et al., 2002; Kelly, 2009, 2011; Kelly & Wolffe, 2012).

Zhou et al. (2012) conducted a quantitative study to compare six factors independently regarding computer and Internet use for secondary students with visual impairments and/or multiple impairments. The results showed positive correlations to Internet usage on three of the six standardized test scores (science, reading comprehension, and math calculations) used to provide correlation. Similar to the 2011 U.S. Census (Erickson et al, 2013), students from families with lower incomes were less likely to have a computer at home to complete homework or use the Internet as a resource. In addition, students who were completely blind and students who were

visually impaired with additional impairments scored lower than did their peers who had low vision with no additional impairments.

## Assistive Technology Research Specific to iPads in the Field of Visual Impairment

In the field of visual impairment (VI), the typical *high* technology solutions for students are computers with screen readers, braille notetakers, scanners with word recognition, and digital recorders and players (D'Andrea et al., 2012; Koenig & Holbrook, 2000; Smith & Kelly, 2007). Assistive technology textbooks being used by VI university programs primarily focus on high technology solutions using PC-based software and hardware (Presley & D'Andrea, 2009). Apple ™ computer's VoiceOver screen reader software has been included on all Apple ™ computers since April 30, 2005, initially added with Apple's Tiger™ 10.4 Operating System (Leventhal, 2005). The latest *Journal of Visual Impairment & Blindness* (*JVIB) Special Technology Edition* (D'Andrea et al., 2012) included numerous articles pertaining to iPods and iPhones. There is still a bias in the field for PC-based technology solutions but leaders in the field have begun to consider Apple™ technologies to a greater extent due to the affordability, accessibility, and possibility Apple™'s iPhone, iPod, and iPad offer consumers with visual impairments (Erin, 2012).

Kuber, Hastings, Tretter, and Fitzpatrick (2012) suggested numerous recommendations regarding the feedback they received from a study of adults with visual impairments who used mobile screen readers. Users suggested screen readers have ways to cut down cognitive overload when reading information and more efficient ways of navigating text such as searching headings or scrolling through information in multiple

ways to increase productivity. Since 2005, Apple™ has addressed many of these issues with the inclusion of the VoiceOver Rotar, which allows users to control many VoiceOver functions with a dial motion on the touch screen and an ability to turn off VoiceOver reminders in the settings menu to cut down on cognitive overload (Apple Inc., 2013).

There has been a surge of activity regarding Apple's™ mobile technologies (iPads, iPhones, and iPods) over the past two years in the visual impairment field. Spungin (2012) excitedly pointed out the seemingly endless accessibility features and growing list of applications (apps) to be used with Apple's™ iPads. Hong (2012) debated the benefits and challenges associated with using an iPad with a braille display. The primary advantages were that iPads are affordable, mainstream, and offer more comprehensive access to the Internet versus traditional braille notetakers. Additionally, Apple™ products can be taken to the Apple Store for repair, which is more convenient than the current troubleshooting process for vision-specific AT. The primary disadvantages offered were that non-native (non-Apple) applications may not work well with VoiceOver (Apple's™ screenreader); there is a learning curve for new users and there is not as much instructional strategy information provided for Apple products being used with braille displays as exists for BrailleNotes™. Junior Blind (Campana, 2013), a nonprofit organization in California, conducted a longitudinal study regarding iPads and infants with visual impairments. This study was experimental in nature comparing APH lightboxes and iPads. i*Exploration* showed increased engagement, communication,

visual attentiveness, reaching, and activation when babies with visual impairments used iPads versus lightboxes (Campana, 2013).

## Assistive Technology Evaluation and Implementation in the Special Education Field

There is a wealth of resources for teachers to help create AT plans and assess students' current technology functioning (Ault & Bausch, 2013). Some examples of AT resources are *Quality Indicators for Assistive Technology (QIAT;* Zabala, 2012), *Student Environment Tools & Tasks (SETT;* Zabala, 2005, 2007), *AT For Students Who Are Blind or Visually Impaired: A Guide to Assessment* (Presley & D'Andrea, 2005), *Evaluating Visually Impaired Students* (EVALS; Sewell, 1997) and *University of Kentucky Assistive Technology Toolkit* (UKAT; 2002). Due to the flurry of attention toward mobile technologies, there are also new evaluations addressing the additional complexity of assessing apps (mobile software applications) such as the Council for Exceptional Children's (2011) *Apps for All Students: A Teacher's Desktop Guide*, which includes a checklist for considering sensory issues related to auditory, visual, cognitive and sensory impairments (Ault & Bausch, 2013). Each one of these evaluations brings many tools to teachers to consider the whole student, the environment, and the tasks or skills the student is trying to master. Of the list above, two evaluations are specific to visual impairment; *EVALS* and *AT for Students Who are Blind or Visually Impaired* (Presley & D'Andrea, 2009) while, the *SETT, QIAT and UKAT* are more comprehensive evaluations for any student needing AT.

**Teacher Professional Development**

Over the past 20 years, the field of VI has exploded with much needed attention to professional development of TVIs. Pogrund and Wibbenmeyer (2008) clearly demonstrated that a "highly effective" teacher under No Child Left Behind (NCLB) may be able to ensure academic content areas including special education teacher knowledge and skills but that this competency does not ensure the level of skill specialty needed for instruction of students with visual impairments. However, IDEA (1990) emphasized the importance of specialized skills to serve students' individualized needs in special education programs. The state of Texas provides an example of more rigorous TVI standards. Most recently, (2011) legislation has created precedence in the state of Texas to ensure that TVIs must complete coursework in the field of visual impairment and pass the Braille and VI TExES exams for certification as a TVI (TAC§§ 21.0485 (a)(1)(A)(B)(2)(3)). The Texas Education Agency states that the instruction of students with visual impairments must be facilitated by a certified TVI in order to address the specialized needs students have such as braille or compensatory academic skills (TAC §§89.1050(c)(4)(A) & 89.1050(c)(4)(C)).

This Texas legislation for teacher certification requirements for TVIs is representative of the varying range of national TVI requirements. Pogrund and Wibbenmeyer (2008) found that 44% of states required visual impairment coursework only, while 36% of states required visual impairment coursework and successful completion of a test regarding visual impairment (p. 12). After completing teacher certification in the field of visual impairment, the nationally recognized board of

certification management for the field is the Academy for Certification of Vision Rehabilitation and Education Professionals (ACVREP). This certification body does not certify TVIs but does provide a professional development protocol for TVIs to follow. All TVIs are advised to earn "100 recertification points every 5 years. A minimum of 25 of these points must be ACVREP approved continuing education (CE) hours. That amounts to an average of five (5) CE hours a year" (Academy for Certification of Vision Rehabilitation and Education Professionals, 2013). In Texas, to recertify through the Texas State Board for Educator Certification every five years, TVIs must have 150 clock hours of professional development.

**Standards and Delivery of Teacher Certification Programs and Professional Development in the Field of Visual Impairment**

The development of TVIs is guided by programmatic competencies that encompass educational programs for students birth to 22 years of age who are eligible for special education services under IDEA (D'Andrea & Farrenkopf, 2000; Koenig & Holbrook, 2000). The content knowledge is wide in scope and includes several areas: specialized skills associated with visual impairment such as braille and orientation and mobility, evaluation procedures individualized for visual impairment such as the functional vision and learning media assessment, anatomy and function of the eye, consultative and collaboration skills, early childhood and transition processes, specialized instructional approaches for visual impairments, and instruction in the nine areas of the expanded core curriculum (ECC; Blankenship, 2007; Erin et al., 2006). For example, in Texas, eight standards guide the TExES visual impairment competency assessment (Texas Education Agency, 2004).

The content that guides TVI programs is comprehensive and relevant to the unique needs of visual impairment. It is also dynamic in nature as the field grows and more evidence-based practices are found through research. It is important to explore where the breakdown happens when there is such a disparity in AT for students with visual impairments. Over 20 years ago, Mack et al. (1990) asserted that the inclusion of computer training of students with visual impairments in teacher education programs obligates those in the field to train teachers in the necessary knowledge, skills, and motivation to provide a bridge between students and technology (Smith & Kelly, 2007). Smith and Kelley (2007) further found that of the 30 VI personnel preparation programs in North America with a 78% response rate, TVIs were being instructed about assistive *high* technology in only limited ways with few standards to guide in the certification of course offerings. Despite finding that over half of the university programs have a dedicated AT course, national studies have found students with visual impairments are still far behind their peers in using computers and the Internet (Johnstone et al., 2009; Zhou et al., 2012).

These professional development advances in the field of VI are helping to ensure that students are afforded an educational program that meets specific needs related to visual impairment. In summary, TVIs are working with students from birth through 22 years of age in specific ways to address vision loss-related educational program needs; they may be required to be certified depending on the state and/or program they complete. The ACVREP recommends professional development at a minimum of five hours per year of continuing education credit. Despite the progress made, the field

continues to struggle in the areas of relevant and comprehensive AT professional development. Most TVIs are inadequately prepared to be the lead team member for AT in addition to all other vision- and ECC-related curriculum and instruction needs for each student on any given TVI caseload (Johnstone et al., 2009).

## How Adults Learn and Implement New Strategies

This section addresses how adults learn to implement new strategies and provides an overview of successful professional development and university programs addressing the needs of AT. Do adults learn passively or actively? As with K-12 students, adults are active learners and benefit from relating the new information to their classroom or caseload (Tate, 2004). Do adults need the same level of hands on, experiential learning as students need? The answer to this question is yes (Darling-Hammond & Richardson, 2009; Dewey, 1938; Koenig & Holbrook, 2000). In current teacher certification programs and professional development offerings in the field of visual impairment, teachers should be having the opportunity to have (a) hands-on practice with AT devices, (b) an overview of information regarding use and teaching strategies, and (c) a scaffold experience in practice in using and teaching these AT devices in authentic real-world settings. These recommendations are summarized and/or implied from the proposed research agendas in the *Journal of Visual Impairment & Blindness Special Technology Issue* (D'Andrea et al., 2012). In teacher education, the expectancy-value theory can help explain teacher motivation; people tend to value and work at content they believe they will be successful at completing and achieving (Wigfield & Eccles, 2000).

Without the needed ways of learning to impact change, what can be interpreted from the current offerings for TVIs? In a seminal body of research, Cuban (1993) wrote extensively on how teachers change or do not change in the wake of learning new skills or school reforms. After an exhaustive analysis of the past century of American teachers, Cuban found that teachers did not change. Teacher-centered strategies dominate educational programs including programs serving students with visual impairments (Johnstone et. al, 2009; Walls & Palak, 2009). In Luxemburg with its highly resourced educational programs and schools with one-to-one computers to student ratios, teachers mostly reported increased technology as a useful tool to support learning but did not change the pedagogical practice from a more traditional model where the teacher lectures in front of the class (Linckels et al., 2009). There must be a paradigm shift that moves from teacher-centered learning to student-centered learning to better facilitate transformative technology in classrooms.

The combination of TVIs only having a proficient level of awareness regarding AT (Smith & Kelley, 2007) and a deeply rooted practice of teacher-centered instruction (Cuban, 1993) does not create an environment conducive to hands- on, student-centered AT instructional programs. Research studies regarding AT specifically in the field of visual impairment and teacher training are few in number, providing little foundation to extend evidence-based practices from this research. Pogrund and Smith (2012) noted that there have been five studies since 1990 evaluating AT knowledge and skills for teachers working with students with visual impairments (Abner & Lahm, 2002; Candela, 2003; Edwards & Lewis, 1998; Kapperman et al., 2002; Zhou et al., 2011). Koenig and

Holbrook (2000) emphasized the key phrase used in the field of visual impairment: "Make me a doer, not a done-to-er." The experiential learning required for TVIs to implement is "…systematic instruction, practice, and application" (Lowenfeld, cited in Koenig & Holbrook, 2000, p. 201). If TVIs are too entrenched in a teacher-centered approach, then the educational program for their students will truly suffer; this situation is potentially where the AT breakdown begins.

Common barriers to teacher growth are the antithesis of teacher learning. Teachers learn best as students do-through active, engaging educational experiences in low stress environments with high motivation and intrinsic value in what they are learning (Svinicki & McKeachie, 2011). In *McKeachie's Teaching Tips for College Classrooms* (Svinicki & McKeachie, 2011), some key features of effective professional development are emphasized such as adult students needing opportunities for autonomy and choice, high expectations, opportunities for promoting individual mastery, the perspective that their abilities are malleable, application of effort and learning strategies, and constructive group work. When individuals learn, they need multiple vehicles to understand, synthesize, and thereby store that "data." Ineffective professional development and coursework for teachers may include non-experiential, non-active, and isolated, one-shot programs that do not apply or relate to what is being learned that has real-world application (Cohen & Hill, 2001; Darling-Hammond & Richardson, 2009). Cohen and Hill (2001) emphasized the importance of teacher autonomy, suggesting that top-down administrative reforms are not effective in promoting teacher motivation and change. Guskey (1986), a seminal researcher in the field of adult education, suggested a

change from the traditional "deficit-training-mastery-model" in which a skill area is identified as a deficit and a one-shot development is implemented. In response to research supporting a more comprehensive, dynamic approach to professional development, Clarke and Hollingsworth (2002) developed the Interconnected Model, which is composed of four domains: the personal domain, the domain of practice, the domain of consequences, and the external domain. In this dynamic model, teachers progress in a non-linear way toward professional development.

## Professional Development and University Programs Addressing the Needs of Assistive Technology

This literature review cast a wide net in each category area since the range of specific studies on visual impairment and teacher technology implementation was extremely narrow and limited. However, the lessons to be learned from research throughout the education field are applicable to the discourse regarding effective strategies. The continuing themes of teacher planning time, training, and collaborative teaming are present throughout the literature as primary roadblocks to effective implementation (Johnstone et al., 2009; Project Red, 2012). Specifically, in special education classrooms working with students who are visually impaired with additional disabilities, a complex set of issues and challenges are presented to a new TVI. This teacher needs to juggle issues surrounding implementing technology that include but are not limited to accessibility issues, training of other teaching professionals and paraeducators, collaborating and connecting with family members, understanding the complexity of need around a set of disabilities, and being able to solve input and output issues with technology (Copley & Ziviani, 2004; Zhou et al., 2012). There must be more

than a minimum level of expertise in the area of AT in order to be successful on each of those fronts.

Since there is some idea of what is not working, the most important question becomes determining what does or will work. Frey (2009) noted the importance of any research on professional development linking both teachers' understanding with improved student achievement and showing effective development by using project-based case studies for special education teachers. Bebell and Dwyer (2010) reported positive student and teacher outcomes when professional development and planning time were in place for teachers implementing new one-to-one technology programs. Bell, Cihak, and Judge (2010) suggested that confidence and knowledge did not prevent the barriers to AT but were significant determining factors as to whether teachers included it when it was accessible. Lastly, the study emphasized that the inclusion of a dedicated AT course in both university-based and alternative certification special education programs is a necessity if AT is to be included in special education students' individualized education programs (IEP). LePage and Courey (2010), in a comprehensive list of recommendations for the *Curriculum Recommendations for Inclusive Teacher Education* (CTE), suggested teachers in pre-service programs need to be doing case studies, action research projects, developing curriculum, and analyzing and teaching from video samples. Lastly, Avalos (2011) reviewed 111 articles focusing on professional development (PD) and found co-learning, engaged faculty, case studies, and partnering with universities as all highly effective practices.

The majority of TVIs are completing certification requirements and professional development continuing education units (CEUs) online (Ajuwon & Craig, 2007; Bickford, 2006). These courses, predominantly located online using learning management systems (LMS) such as Blackboard, are an important area to consider when asking what is working in special education programs and professional development. Johnson (2004) suggested that coursework merely uploaded online to a LMS is little more than a correspondence course that results in learner disengagement and lack of application. Technological and theoretical considerations encompass everything from who the learners are, where they are in their study (graduate, undergraduate), what is the content and how should it be delivered, instructor technological abilities going from content expert (i.e., university faculty) to facilitating learning in a technology-rich environment. There are valuable strategies specific to online learning such as cooperative groups, learner engagement with simulated environments and discussion boards, and hybrid course options (Ko & Rossen, 2004). Harrell and Harris (2006) found important benefits for online teacher education programs including attracting mid-level career-changing candidates, showing similar student outcomes to those of face-to-face students, facilitating easy work transition due to no loss of income as with face-to-face college courses, and filling the demand for high-need teachers in the partnering districts.

There are several positive gains for the field of VI by having coursework online. The next step is to ensure the coursework provides for enough learner engagement. The ACVREP (2013) reported that 20 of the 32 programs in the United States had online components to meet the needs of the TVI shortage and geographic challenges. Bickford

(2006) examined the effectiveness of online programs serving TVIs, summarizing that university programs can increase effectiveness by providing for engagement with faculty who are flexible and responsive. A largely effective aspect was instructor enthusiasm for the content and course as well as a commitment to student interaction such as discussion boards (Bickford, 2006). There is much research regarding positive online practices as universities burst with new online bachelor's, master's, and doctoral programs. Kennedy et al. (2012) evaluated the successful inclusion of content acquisition podcasts (CAPs), which reviewed information first related to special education teacher weekly readings, and found tremendous gains in learner retention and application of core concepts. This study provided an evidence-based practice (EBP) for using multi-media podcasts in higher education settings to enhance learning and provide more effective instruction in non-face-to-face courses. Burden et al. (2010) found growth in teacher understanding regarding IEP meetings using video simulations and reflective journaling.

Chmiliar and Cheung (2007) created an entire online course instructing special education teachers about AT and reported the outcomes to address the gap in information being provided in Canadian teacher certification programs. The course has had positive feedback and includes an AT tool lending library, discussion board, multimedia with access keys (for text only or smaller file sizes for Flash movies to accommodate students' learning needs and technology bandwidth), interactive study modules, assignments, and a digital reading room. Oostveen et al. (2011) highlighted the positive effects of using web-based technologies to transform learning. Instead of using technology to "upload" as often happens, technology systems instead transformed the way students accessed and

interacted with information. With the addition of a discussion forum, students had a higher level of professional community and a resource-rich environment in which to learn. University students transformed the way they used tablet technology at the Augmentation level of the SAMR model (Puentadura, 2006) by using the tablet for several aspects of their educational program such as taking digital notes that were searchable and saved to cloud servers.

**Research Summary and Research Methods Foundation**

There is a lack of understanding and lack of research on how to implement and instruct about AT for students who are visually impaired and/or multiply impaired. Most AT courses teach university certification students what is available and potentially how to use the technology themselves. There is a lack of comprehensive, hands-on learning regarding AT for TVI certification candidates, both as professional development and within university level programs. Dede, Ketelhut, Whitehouse, Breit, and McCloskey (2009) created a comprehensive report for the National Science Foundation, recommending funding for research grants for online teacher development. They suggested funding only be considered for projects that are related to student outcomes, built on the current LMS being used by the university or educational service center, include interventions or action-based research, and include research with purposes that are aligned with the creation of evidence-based practices (EBP). For teachers, there is a complex relationship between what they learn in professional development and/or coursework and what they do with it. This review established what AT is, the legal

requirements and content regarding AT, and the strides in TVI professional development and university programs to address the unique needs of students with visual impairments.

Chmiliar and Cheung (2007) showed positive results around the greater understanding of AT for teachers already in special education classrooms that used a free course to learn and simulate new technologies. It was accessible and thorough in delivery. It included a lending library, video simulations, and easy learner navigation. However, despite some anecdotal information, still missing were research-based practices pertaining to professional development offerings for TVIs on updated high technology such as iPads to be used as AT. These research-based practices need to be situated in highly engaging, learner-centered, online environments to meet the needs of the diverse group of TVIs currently serving students in our country.

This review has thus far examined the research literature foundation regarding AT and professional development. There is a need for a research base of experimental studies regarding AT for students with visual impairments (Smith & Kelly, 2007). There is a precedent for improved professional development in the area of AT, helping increase the teacher-perceived level of technology growth (Chmiliar & Cheng, 2007; Pogrund & Smith, 2012). Lastly, the SAMR model has proven to be an informative framework for evaluating teacher growth toward becoming transformative technology users (Hogan, 2010; Jonassen et al., 2008; Puentedura, 2006). The final area of analysis for this literature review is the use of mixed methods research in order to fully explore and describe teacher professional growth in the areas of AT for students with visual impairments.

**Foundation Studies for Mixed Methods**

Mixed methods research is most closely aligned with the philosophical orientation of pragmatism (Teddlie & Tashakkori, 2009). Researchers are less interested in looking for what is true; instead, they are more interested in examining what works regarding the research question being posed. In mixed methods research, investigators harness both quantitative and qualitative research methods to address research questions. The quantitative and qualitative research methods must influence one another in some way-whether it be in a sequential design where one method must be conducted in order to conduct the phase or explanatory where one method helps provide information directly related to the findings of the other method (Creswell, 2009; Teddlie & Tashakkori, 2009). Creswell (2009) explains,

> In quantitative studies, one uses theory deductively…with the objective of testing or verifying a theory rather than developing it, the researcher advances a theory, collects data to test it and reflects on its confirmation or disconfirmation by the results. (p. 55)

Muijs (2012) explained the distinctions between experimental, non-experimental, and quasi-experimental groups in quantitative educational research. Numerous criteria are needed for a study to be quasi-experimental. In this study, participant TVIs were a purposive group selected from a quantitative survey regarding iPad knowledge, skills, and value; the study included an intervention, making it experimental in nature.

Newman et al. (2003) listed nine categories that provide a list of the general purposes of social science research: predict; add to knowledge base; personal, social, institutional or organizational impact; measure change; understand complex phenomena; test new ideas; generate new ideas; inform constituencies; and examine the past (p.175).

This inquiry was most closely aligned with adding to the knowledge base and measuring change. The first, adding to the knowledge base, is an area that is clearly indicated through the lack of assistive technology research regarding both the implementation of high technology solutions for students with visual impairments and the effectiveness of professional development for teachers who work with students who have visual impairments. There is a research deficit in both student and teacher areas of interest. The second large category of measuring change was of particular importance in this study in order to evaluate the effectiveness of professional development on both technology implementation and teachers' sense of self-efficacy for transformative teaching in their instructional practice.

Several foundational mixed methods studies provided both a framework and rationale for using mixed methods for this study. A summary of mixed methods studies is organized in the table below (see Table 2.3). Additionally, several professional development studies regarding assistive technology provided a framework for this study (see Table 2.4).

Table 2.3

*Mixed Methods Studies*

| Authors | Year | Study Rationale | Study Purpose |
|---|---|---|---|
| Walls & Palak | 2009 | Qualitative helped better interpret the quantitative. | To test whether teachers would continue to use teacher-centered strategies in technology rich classroom environments. |
| Collins, Onwuegbuzie & Sutton | 2006 | Rationale and Purpose 4-Dimensional Model (RAP) | Typology for mixed methods studies being conducted in special education. |

| | | | |
|---|---|---|---|
| Onweuegbuzie et al. | 2007 | The RAP Model, which optimized the sample, utilizing the best research methods for each phase, and maximizing interpretations due to be quantitative and qualitative techniques and analysis. | The purpose of the study was to conduct a validity study of the Teaching Evaluation Form (TEF), which is used to decide promotion and tenure for faculty members working at the university level. |
| Denscombe | 2008 | Qualitative and quantitative methods combined can explain a third research paradigm | To explain that mixed methods research is a good fit for social science research. It can be thought of as a "community of practice," which will provide a framework for conducting mixed methods studies. |

Mixed methods research summarized in Table 2.3 provide a rich foundation of exploratory and in depth research methods. The back and forth nature of the qualitative versus quantitative argument is seen by Berg and Lune (2011) as a waste of time and counterproductive. Berg and Lune noted any research study could benefit from knowing the interpretation of particular phenomena from both paradigms. Triangulation is an effective way to check for themes or evidence inside data against several different sources within a research study. Triangulation, where data from qualitative and quantitative methods come together, can be interpreted in various ways, e.g., multiple researchers reviewing and/or categorizing data or different forms of data being used to defend the findings of the other. Jick (1979) asserted that triangulation is defined as the mixing of methodologies and can be separated into the categories of within-method or using multiple methods. This echoes the sentiments of mixed methods researchers who are clear in stating that when mixing the two methodologies, qualitative and quantitative, they must inform one another, not simply by legitimizing one or the other more dominant methodology (Teddlie & Tashakkori, 2009). Berg and Lune broadened the definition of

triangulation by suggesting it consists of multiple theories, multiple researchers, multiple data techniques or technologies, and multiple "action lines" (p. 7).

Table 2.4

*Research Base on Teacher Development and Assistive Technology*

| Authors | Year | Study Rationale | Study Purpose |
|---|---|---|---|
| Wigfield & Eccles | 2000 | Defining frameworks for professional development | Develop the expectancy-value theory of adult learning. |
| Koenig & Holbrook | 2000 | The need for a research base for teaching strategies for the field of visual impairment. | To create a foundational textbook for the field of visual impairment |
| Clarke & Hollingsworth | 2002 | Develop a model of effective professional development | Interconnected Model was developed and defined. |
| Puentedura | 2006 | To develop a model of teacher professional growth when learning how to use and implement technology | SAMR model was developed. |
| Chmiliar & Cheng | 2007 | Meet the need for professional development for special education teachers in Canada around assistive technology | To create a learning module about assistive technology which any teacher in Canada can complete online. |
| Bickford | 2006 | To define effectiveness strategies and program components for online preparation programs serving TVIs | Investigate the effectiveness of online preparation programs serving TVIs versus face -to-face programs. |
| Project Red | 2012 | To explore successful strategies in one-to-one technology programs in the United States. | To create evidence-based strategies to be implemented in schools hoping to begin one-to-one technology programs |
| Zabala | 2012 | To define the most effective assistive technology implementation practices | Developed the Quality Indicators for Assistive Technology (QIAT) |
| Pogrund & Smith | 2012 | To explore the relationship between teacher development in a hands-on assistive technology workshop model | Developed evidence-based strategies for addressing the need to include hands on-application of assistive technology for TVIs |

In Table 2.4, the research cited helps provide a framework for evidence-based, professional development AT programs that positively influence teacher learning. These studies may have used primarily quantitative or qualitative methods. In qualitative research, several characteristics are inherently included. These represent both traditional perspectives and newly added perspectives such as self-reflexive and participatory qualitative research (Glesne, 1999). The characteristics include natural setting, researcher as a key instrument, and multiple forms of data. Qualitative methods will utilize inductive data analysis, working back and forth with data to establish a comprehensive set of themes and generate a grounded theory regarding best practices (Berg & Lune, 2011; Glesne, 1999). Often, qualitative studies are emergent in design. Defined by Creswell (2009), "…the initial plan for research cannot be tightly prescribed, and all phases of the process may change or shift after the researcher enters the field and begins to collect data" (p. 176). One key component of qualitative research is to find the research within the interview and data being collected from the participants. As a researcher, one can have hypotheses about what will be found but it will not override what the data are revealing as the researcher digs deeper into the research questions.

When the methods of quantitative and qualitative are brought together, the essential research tools found in each method complement each other and the result can be a richly full picture of the research phenomena under study (Creswell, 2009). In Walls and Palak (2009), the researchers indicated that previous studies did not delve deep enough into teacher beliefs, resulting in a lack of understanding around teacher implementation of technology when in technology-rich schools. Additionally, it was

argued that the previous studies completed about this topic did not provide adequate explanation and there is a hole in the research literature in this area. The authors noted that teacher belief is "messy" and other research studies have tried to create "empirical" evidence around teacher beliefs but they have failed due to the contextual factors regarding teacher beliefs being transformed into actual practice.

Additionally, Collins et al.'s (2006) rationale for mixing, the RAP model, explained the mixing of quantitative and qualitative methods further. The authors did not spell out the "RAP" acronym but stated the three categories of the model are "…(a) participant enrichment, (b) instrument fidelity, (c) significance enhancement…" (Collins et al., 2006, p. 128). These three areas can be summarized as a rationale (a) using both quantitative and qualitative methods to optimize the sample and potentially increase the participant number; (b) using the method that fits best as a study instrument during each phase; and (c) maximizing interpretations due to both qualitative and quantitative techniques and analysis. There is a clear foundation in the research literature recommending mixing methods, when applicable, to present a fuller impression regarding the research phenomena under investigation.

# CHAPTER III

# METHODS

## Research Purpose

The purpose of this sequential embedded mixed methods research study was to describe and explain the progression of teacher professional development around assistive technology. The study used the iTunes U software learning management system (LMS) to implement an online learning module for teachers of students with visual impairments (TVIs). The primary indicator of teacher growth from the professional development was generally defined as *transformative teaching,* which means teachers were redefining how technology is being used with students who have visual impairments. The study goals and objectives were to explore teacher development in the field of visual impairment and potentially make inferences regarding teacher attitudes and behavior (Babbie, 1990; Creswell, 2009). Secondly, the study intended to add foundational research showing the effectiveness of online learning modules being used as a medium for teacher professional development. The study was comprised of two phases: (a) a quantitative electronic survey of a large national sample of TVIs regarding TVI knowledge and skills related to using iPads, and (b) a mixed-method intervention study to promote professional development in the use of technology with a selected group drawn from the larger sample. The second phase sampled a smaller group who completed an intervention learning module on iTunes U, a free LMS used on mobile tablet devices.

## Research Methodology Rationale

This research study examined the most effective ways to implement and facilitate professional development for TVIs. The primary reason to use mixed methods was to present a more robust interpretation of effective instructional practices of students and teachers using mobile technologies in their educational programs. Punch (2005) suggested numerous rationale categories that help frame a mixed methods research study. Two rationales fit best into this sequential embedded research study and its purpose. First, Punch suggested mixed methods studies are warranted when the "quantitative research facilitates the qualitative research" (p. 247). In this study, the quantitative strand fulfilled two objectives: to narrow the sample size to 30 participants from a large national purposive sample and provide baseline information regarding a national group of TVIs iPad knowledge, skills and implementation. This phase helped broaden the response group geographically and helped define a more homogenous sample for the intervention phase of the study. In addition, the quantitative strand helped ensure that each study participant in the qualitative strand was at the same level of experience using iPads with students who have visual impairments. The criteria that were used to narrow the TVI sample were years of teaching experience, iPad proficiency, and teacher-reported iPad value for students with visual impairments. Secondly, Punch recommended mixed methods studies if "qualitative research may facilitate the interpretation of relationship between variable" (p. 247). For this study, this meant that the qualitative data would provide detailed evidence providing the *why* for any significant results found in the

quantitative survey. Some examples of evidence that were compared to survey results were the technology plans and student case study reports each TVI participating in the intervention submitted through e-mail.

## Research Questions

**Phase I**

1. What level of proficiency do TVIs have regarding use of iPads as assistive technology?
2. What are the perceived values teachers place on using iPads as assistive technology with students who have visual impairments?

**Phase II**

3. How will participation in this intervention using an online LMS (iTunes U) increase a teacher's sense of transformative teaching self-efficacy for using assistive technology?
    a. Was the intervention effective with regards to increasing the teacher's sense of transformative self-efficacy; why or why not?
    b. What were the challenges associated with completing the course and course assignments?

## Research Plan Summary

The study used a sequential embedded sequence of quantitative-quantitative/qualitative with the qualitative methodology embedded within the quantitative phase II. The two stages were pre-intervention-Phase I and intervention-Phase II, which included two subparts. The first phase was comprised of an electronic

survey that was distributed via e-mail with a goal of having a sample of 250 TVIs nationwide. The second phase was comprised of both quantitative and qualitative data collections. The quantitative surveying consisted of surveying pre- and post-self-assessment data around iPad knowledge, skills and self-confidence levels of a sample of 30 TVIs. The qualitative data collected were open-ended survey questions and scored learning module case study assignments. A small sample of qualitative data was examined using intensive case study with a sample of five TVIs. Figure 3.1 shows a visual representation of the research plan.

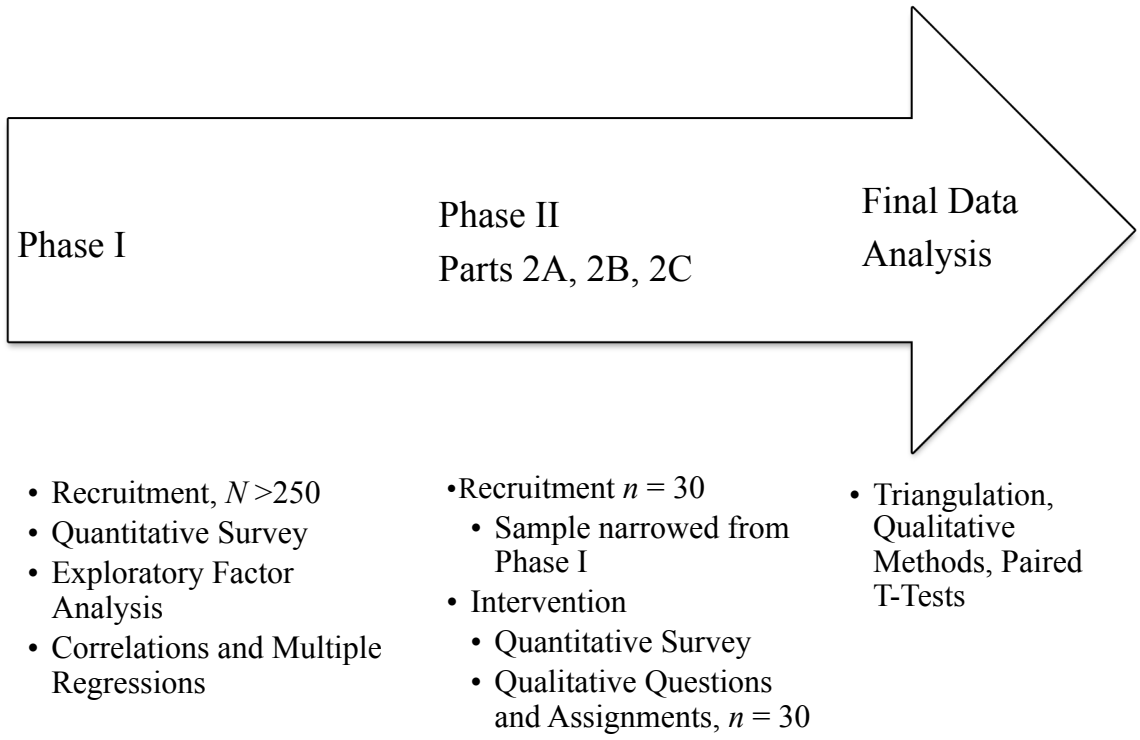



*Figure 3.1.* Research plan visual diagram.

## Research Plan Independent Variable, Dependent Variable, and Null Hypothesis

This study was quasi-experimental since it included an intervention-the independent variable (IV) and a group of participant TVIs' level of self-efficacy and technology implementation-the dependent variables (DV). It was quasi-experimental since there was no control group and the TVIs were compared using paired *t*-tests from each participant's pre- and post-self-assessment results. Essentially, this meant each TVI was evaluated only against himself or herself. Quasi-experimental studies are particularly useful in examining the effects of teacher professional development (Muijs, 2012). In this study, TVIs rated themselves in the areas of self-efficacy and proficiency; those rating scores were compared using paired *t*-tests and multiple regression. In addition to the TVIs' self-perception ratings, the qualitative data helped validate the accuracy of what each TVI reported. The final component of data analysis was an intensive case study of five of the participant iPad implementation plans and case study reports.

## Description of Learning Module, *Transforming iPads for TVIs (TiP for TVIs)*, on iTunes U

The learning module, *Transforming iPads for TVIs (TiP for TVIs*), used in this study was created and hosted on iTunes U. iTunes U is a free learning management system (LMS) for mobile tablets and smartphones. It is made by Apple™ but can be used on other non-Apple mobile devices when downloaded from the App Store. The *TiP for TVIs* includes several features in order to address numerous professional

development-training deficits in the field of visual impairment. For example, the module includes a checklist for rating a student's iPad skills and an iPad technology plan specific to the field of visual impairment. The additional features of the iTunes U learning module are

1. Quick reference sheets for over 20 apps for use with students who have visual impairments
2. iPad technology implementation guide with evaluation checklist
3. Specific strategies for particular visual impairments
4. Categories organized for students who are blind, have low vision, are multiply-impaired, and for the transformative teacher
5. Link to the nine areas of the Expanded Core Curriculum within each of the four categories of student or teacher need.

In the field of visual impairment, limited offerings of professional development workshops and e-books are associated with iPads and students who are visually impaired. This learning module was created collaboratively with consultants employed at a Southwestern school for the blind outreach department. Many TVIs are not in geographic locations where any hands-on workshops are being held or do not have the needed support at their local district to implement comprehensive iPad plans for their students. At present, there is no iTunes U learning module specifically training TVIs how to use iPads with students who are visually impaired. Perkins School for the Blind (2013) has published two iTunes U courses covering the topics of CVI and CHARGE, which can be completed for continuing education credit (CEUs) after passing a multiple

choice test.

## Pilot Study and Instrumentation

### Pilot Study Findings

A pilot study was conducted April through June, 2013 to validate the learning module and instruments used for the dissertation study. The study recruited TVIs who were in a city in the Southwestern United States. An expert TVI consultant in Canada also provided feedback regarding materials and survey instruments. The learning module had several unique features that were added due to the ideas and planning by the researcher with input provided by collaborating outreach staff. The consultants who participated in creating the learning module were employed at a school for the blind in the Southwestern United States outreach department and had worked in the field of visual impairment anywhere from 10-25 years. In the planning meetings with outreach staff, the group concluded that TVIs needed quick reference information, collaborative tools to help work with other educational team members using iPads, iPad technology evaluation and plans to determine what to do with iPads and caseload students, and iPad plans linked to the expanded core curriculum.

Eleven ($N = 11$) TVIs participated in the pilot of the learning module. The data collected from TVIs piloting the module used the *iPad Knowledge And Skills Survey* and the *Learning Module Feedback Survey* (see Appendix A). The survey data indicated the TVIs felt a mix of satisfaction and dissatisfaction with the technology training they had received (see Figure 3.2). Additionally, TVIs overwhelmingly agreed that students with visual impairments must have access to and instruction regarding assistive technology in

their educational programs (see Figure 3.3). There was clear "high value" of iPads in educational programs in this group of TVIs. The pilot study was conducted to create both content and face validity, which meant the panel of TVIs and expert TVI consultants evaluated the effectiveness of the learning module. The participants completed a feedback survey in order to provide for content and face validity. The instruments used in this pilot study were *iPad Knowledge and Skills Survey,* learning module assignments, and the *iPad Learning Module Feedback Survey*. The two surveys included both open- and closed-ended questions with rating scales. The assignments were reviewed by participants but were not completed due to the short pilot study timeframe.

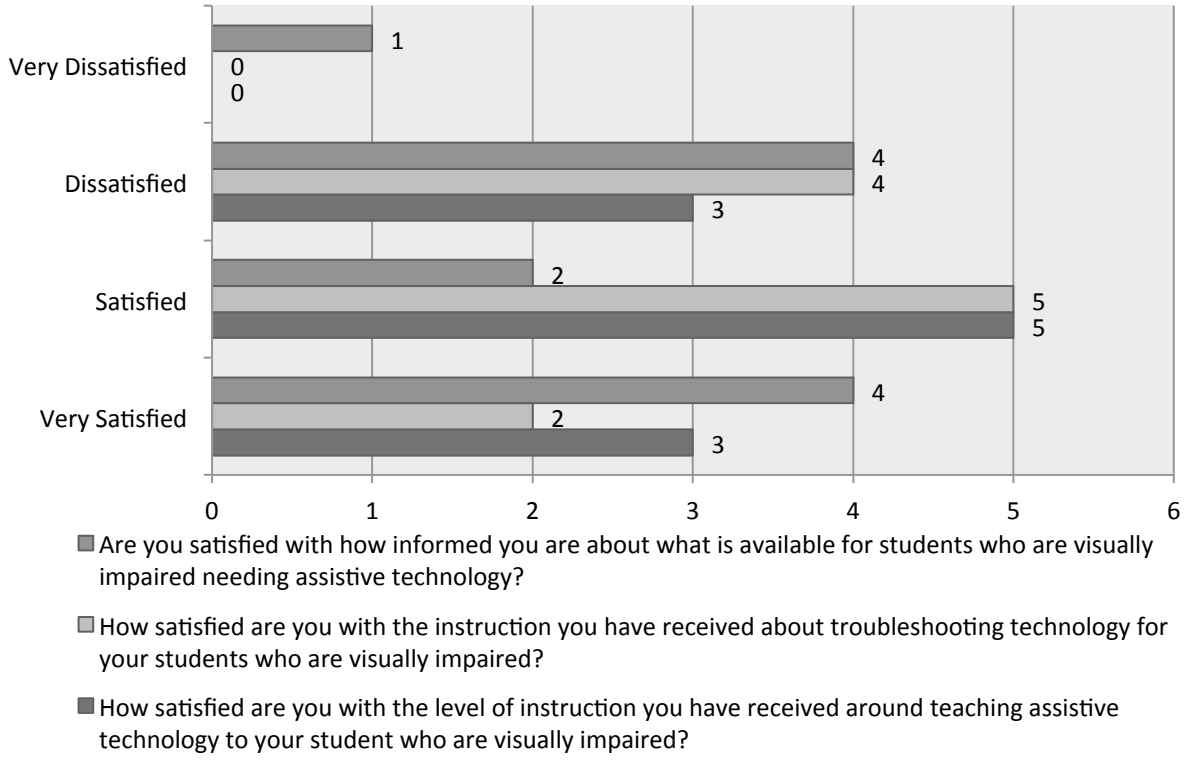



*Figure 3.2*. Summary of satisfaction of teachers of students with visual impairments regarding assistive technology professional development.

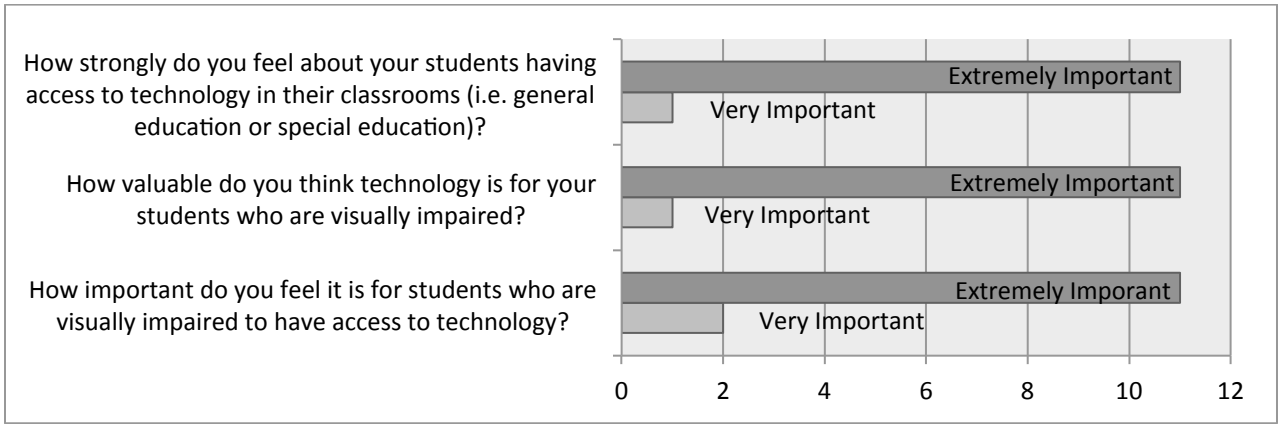



*Figure 3.3.* Summary of teachers of students with visual impairments perceived importance of student access to assistive technology.

In the areas of troubleshooting and instruction, TVIs were asked "how confident they felt troubleshooting and working with a student's educational team on assistive technology with their students with visual impairments." Only one of the 11 respondents felt *extremely confiden*t with iPads as assistive technology. The range of confidence in the area of implementing assistive technology decreased from *extremely confident*. Only one participant indicated he or she was *extremely confident* implementing assistive technology. The remaining participants indicated varying degrees of confidence: five participants, 45% of the pilot sample, responded they were *confident* implementing AT while five participants responded they were either *somewhat* to *not confident* implementing AT.

After completing the *iPad Knowledge and Skills Survey*, the pilot study indicated three areas for improvement regarding the instruments and the learning module. The revised survey instruments are attached in Appendix B. The pilot participants reviewed

the learning module and completed an *iPad Learning Module Feedback Survey*. A summary of pilot participant feedback is included below.

Overall, TVIs responded positively to the learning module with ratings of *extremely satisfied* for the module's ease of use and resources provided in an organized way. When asked whether the learning module provided comprehensive resources, three of the five respondents (60%) felt *extremely satisfied*. The other area of high satisfaction was the module's quick download capabilities on iTunes U since it was easy to save or download new apps with quick hyperlinks embedded in the module. Participant #1 (2013) noted, "I think generally it made me realize that there is a lot of things I could be using my iPad for in my teaching that I'm not. I also see potential for putting some of my lessons in an iTunes U format and giving my students access to them."

The learning module feedback posed specific questions regarding the unique tools created by outreach consultants and the researcher. The graph below summarizes the participant responses; none of the participant responses was in the *ineffective* or *very ineffective* categories. Participant #4 (2013) commented,

> The white pages are perfect for quick reference! There is no time to read instruction manuals to figure out how to operate technology, so having one-pagers to use at a glance will help use time more efficiently and to help not getting discouraged about using the technology.

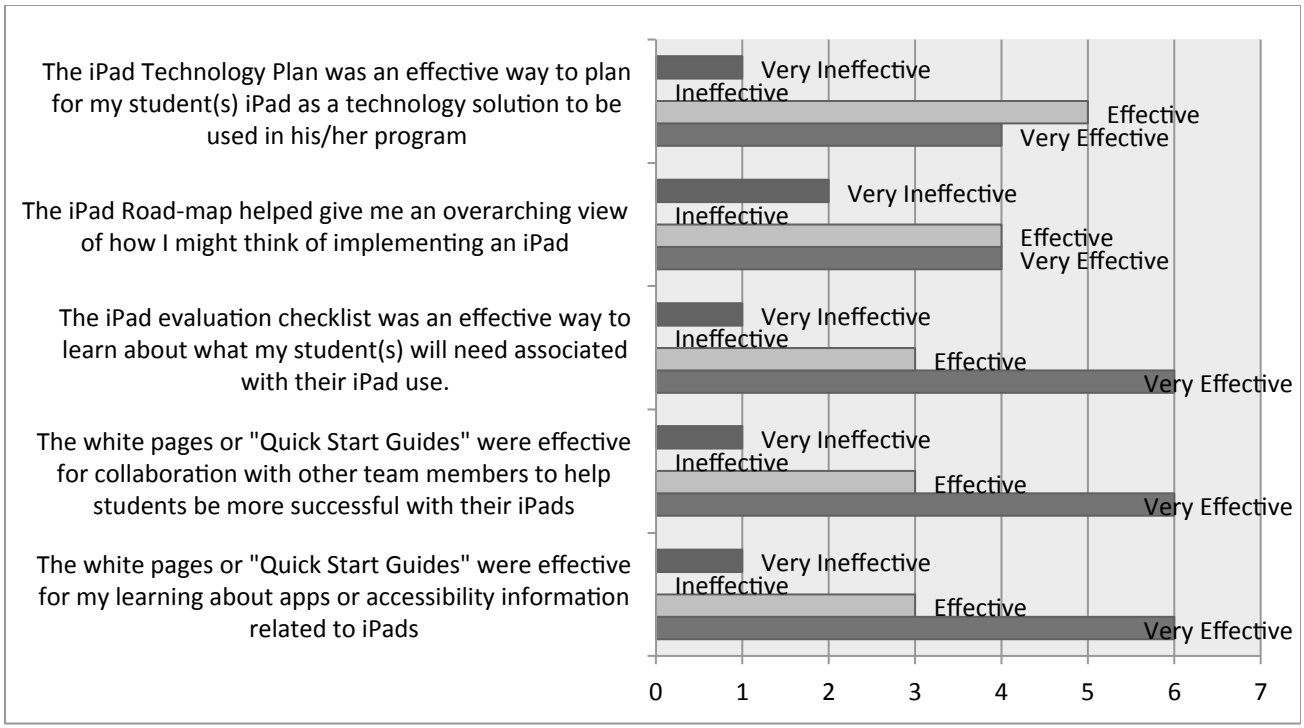



*Figure 3.4.* Summarizing effectiveness of Learning Module iPad tools.

The learning module feedback survey provided some excellent comments regarding changes to the module to increase its effectiveness. The changes are summarized below:

- Provide more organization to help module flow such as a narrated video walking learners through the learning module step-by-step
- Enhance explanations of module components tied to ECC such as explain the reasoning behind choosing apps that are tied to the ECC and the ease of use of each app for students
- Modify The Knowledge and Skills Survey and include ways to check multiple choices on questions that may have more than one answer

- Include a self-assessment survey to help learn about what TVIs know about iPads before and after the learning module.

Additionally, for content validity, the teacher development assessment instruments provided information to help participants know what to include in a highly effective technology implementation plan. An example plan was posted on the learning module. The pilot study feedback suggested a need to evaluate the comprehensive nature of the technology plan; this feedback led to an *iPad Technology Implementation Plan Rubric* that was created to allocate points to the completed technology plans. This rubric was used in the study to choose the intensive case study participants.

**Limitations of Pilot Study**

There was a 50% response rate on *the Learning Module Feedback Survey.* This response rate was acceptable for a pilot study since it provided enough feedback to improve upon the learning module. The primary limitation of the pilot study regarding feedback was due to the time of year the study was conducted. TVIs were just finishing up the school year and one TVI even noted,

> [I] have not spent enough time to comment on this. It is a nice collection of lots of information. The end of the school year was not a good time for me to spend much time with it. Would have had more time while on break for the summer. (Participant #4, 2013)

## Research Study Phases I-II

### Phase I: Design, Participants, Sampling, Instrumentation, and Analysis

**Research questions: Phase I.**

1. What level of proficiency do TVIs have regarding use of iPads as assistive technology?

2. What are the perceived values teachers place on using iPads as assistive technology with students who have visual impairments?

**Research design.** The first data collection and analysis came from the pre-intervention phase, which is a quantitative design (Creswell, 2009). Phase I, the pre-intervention phase of this study, employed descriptive statistical analysis to define a smaller purposive sample for the intervention and provided a snapshot of TVI iPad knowledge, skills, value, and self-advocacy as it related to iPads. The dependent variable was the level of teacher proficiency and perceived value related to technology use in working with students who have visual impairments. The independent variable to be manipulated was a professional development learning module hosted on iTunes U.

**Participants.** This phase employed a convenience sampling procedure in order to recruit greater than 250 voluntary participants. This sampling procedure was employed to ensure that the study recruited participants who were TVIs and provided a national snapshot of TVI iPad knowledge and skills. The participants completed an electronic survey in this phase of the study. The participants invited to participate in the intervention met various criteria in order to be as homogenous a group as possible. The recruitment strategy was to contact leaders in the following organizations: American Printing House for the Blind (APH), American Foundation for the Blind (AFB), schools for the blind, National Federation of the Blind (NFB), and Council for Exceptional Children-Division on Visual Impairment. In addition to contacting these large organizations, state's special education coordinators were contacted for each state (excluding U.S. territories). Each contact received a short blurb to be posted or e-mailed

to their electronic mailing list with a link to the *iPad Knowledge and Skills Survey.* After two weeks, each contact was asked to send a reminder e-mail blast with the survey link.

**Sampling.** In this study, the sampling methods involved the selection of participants for data analysis that maximized the researcher's ability to answer the posed research questions. After the initial convenience sample, a smaller group was requested to participate in the qualitative intervention phase of the study.

According to the American Foundation for the Blind (2013), there are approximately "…6,700 full-time-equivalent Teachers of the Visually Impaired (TVIs; including teachers of students who are deaf-blind) to serve nearly 100,000 students receiving special education services" (p. 3). The initial strand of this study using this data from AFB attempted to sample 5% of TVIs in the national population, which could have been as many as 350 teachers.

**Measures and instrumentation.** The first step was to pilot the learning module with a small group of Southwestern U.S. area TVIs, receive feedback, and revise the module. Van TeiJlingen and Hundley (2001) presented several reasons that illustrate the importance of a pilot study to test the adequacy of research implements. In addition, Chmiliar and Cheung (2007), responding to the need for professional development, created an online course about assistive technology that served as a model for the *Emergent Technology iPad Learning Module*.

Approval by the Human Research Protection Program of Texas Tech University, for the completed pilot study is included in Appendix C of this dissertation. The pilot study provided a test for the research instruments that was used in this study: two

electronic surveys and the learning module assignments. The *iPad Knowledge and Skills Survey* and the *iPad Self-Assessment Survey* both contained open- and closed-ended questions related to self-efficacy. The self-efficacy questions were modified from Bandura's (1982) teacher self-efficacy research in order to contain specific information regarding assistive technology for teachers working in the field of visual impairment. Askar and Davenport (2002) also modified self-efficacy probes in their study regarding computer science programming students. They emphasized the need to create specific survey items that are directly related to the study at hand when trying to learn about participant self-efficacy; "…because self-efficacy is based on self-perceptions regarding particular behaviors, the construct is considered to be situation specific or domain sensitive" (Askar & Davenport, 2009, p. 30).

The quantitative survey instrument (see Appendix B) format was guided by Bandura's (2006) validated teacher self-efficacy scale, *Guide for Constructing Self-Efficacy Scales*, and piloted by a group of TVIs to ensure reliability. The scale question probes were changed but the response scale (i.e., *not very much* to *very much*) remained consistent with Bandura's original self-efficacy scale. The reasoning behind changing question probes was to ensure the survey was aligned with the research questions pertinent to this study. In addition, the survey included questions such as "How much can you influence your students access to assistive technology?" or questions about iPad knowledge such as "What kinds of tasks or activities do you find your students are interested doing on their iPads (if applicable)?" The survey instruments were included in the pilot study by small group of Southwestern U.S. area teachers and visual impairment

field experts in order to ensure clarity and relevance (Creswell, 2009; Teddlie & Tashakkori, 2009).

As previously stated, the first steps toward Phase I, after successful approval by the TTU Human Research Protection Program, were to (a) send a recruitment letter to university visual impairment program coordinators (potentially up to 32 in the United States); (b) send a recruitment letter to organizations such as Council for Exceptional Children, Division on Visual Impairment, Association for Education and Rehabilitation of the Blind and Visually Impaired (AER); and (c) send recruitment letters to itinerant coordinators for states that had a staff member serving in this role. The goal for Phase I was to recruit at least 250 study participants for the initial quantitative survey. The electronic survey was created using Qualtrics, a robust survey software that creates a unique number for each completed survey with time-code information. Qualtrics contains sophisticated quantitative capabilities to ensure participants do not complete one submission of a survey multiple times and protects participants' privacy with unique codes attached to each survey (see Appendix B for survey questions). The participant sample completed this survey with identifying information including name and e-mail. At the end of the completed survey, each participant received a message with some information regarding possible participation in the next phase of the study if needed and a request for an email address to contact him or her. Participants were informed that the next phase would contain instructions and have a small financial incentive for participating.

**Data analysis.** In a mixed methods study, five steps summarize the data analysis

procedures: (a) preparing the data for analysis (i.e., organizing the data); (b) exploring the data (i.e., pondering what the data are reporting back); (c) analyzing the data (i.e., using a quantitative and/or qualitative data analysis procedure); (d) representing the data analysis (i.e., using tables or charts to visually display the findings); (e) interpreting the results (i.e., discovering new themes or truths); and (f) validating the data and results (i.e., explaining the measures taken to ensure data has been comparatively analyzed and objectively defined; Creswell, 2009; Teddlie & Tashakkori, 2009). In Phase I, the data analysis consisted of descriptive statistics on age, TVI service delivery model, caseload size, and geographical region to provide a snapshot of TVI iPad knowledge and skills nationwide; evaluation of correlations; and running of multiple regressions. The data were analyzed using SPSS Version 20 to first conduct an exploratory factor analysis. The exploratory factor analysis provided content validity. The pilot study done previously provided face validity with additional survey instrument revisions. The next step using those dependent variables indicated from the factor analysis was to conduct correlations and multiple regressions. The zero-order correlations reflected the direction and magnitude of the bivariate relationships between each two of TVI age, caseload size, and with reported iPad proficiency and value. Several components of iPad proficiency were separated further to compare in detail TVI perceptions and implementation of iPads to where they worked and lived, student ability, caseload size (i.e., how many students the TVI served each week or month), and geographic region. Spearman's Rho was used to provide the statistical significance of each correlation since some variables were ordinal (i.e., caseload size and age). The basic property of Spearman's Rho was that the range

would be from -1 to 1, with a 0 meaning there was no significant relationship. If the two items being correlated were $p < .05$ using a two tailed test, there would be a positive or negative correlation. A common path to measure the association of two variables is the correlation coefficient. A regression analysis was used to create a mathematical model in order to evaluate the relationships between variables in this study.

## Phase II: Design, Participants, Sampling, Instrumentation, and Analysis

### Research questions: Phase II.

3. How does participation in this intervention using an online LMS (iTunes U) increase a teacher's sense of transformative teaching self-efficacy for using assistive technology?
    a. Was the intervention effective with regard to increasing the teacher's sense of transformative self-efficacy; why or why not?
    b. What were the challenges associated with completing the course and course assignments?

## Phase II--2A: Quantitative Design, Participants, Sampling, Instrumentation, and Data Analysis

**Research design.** In Phase II-2A, the quantitative research design was the overarching methodology housing the qualitative data collections and analysis. In Phase II, the smaller homogenous sample of 30 TVIs was invited to participate in a four- to six-week intervention learning module. The TVIs completed several tasks associated with the learning module. The quantitative data collected were from the pre- and post-self-assessment surveys completed by TVIs at the beginning and upon completion of the

learning module. The TVIs also completed a *Transforming iPads for TVIs (TiP for TVIs) Feedback Survey* pertaining to the effectiveness of the learning module.

**Participants.** Participants completing the intervention-learning module met some specific inclusion criteria:

1. Needed to own or have access to an iPad
2. Indicated low iPad skills
3. Indicated high iPad value.

Each participant was provided a print binder of materials and a $10 iTunes card for intervention participants to purchase apps recommended in the learning module. Demographic information was gathered including age, years of teaching experience, iPad knowledge and skills, and perceived iPad value.

**Sampling.** In Phase II-2A, which was composed of quantitative and embedded qualitative data, collection methods began by selecting 30 participants from the initial quantitative survey and requesting their participation. This was purposive sequential sampling. Purposive sampling is predominantly used in qualitative-oriented studies. It can be defined as selecting participants based on specific purposes or values, (i.e., level of iPad proficiency and experience associated with answering this research study's questions). Maxwell (1997) defined it as a type of sampling in which "particular settings, persons, or events are deliberately selected for the important information they can provide that cannot be gotten as well from other choices" (p. 87). A request letter was sent to the 30 plus participants chosen to participate in the larger study. They initially fit the following criteria: low iPad proficiency and high iPad/assistive technology value as

measured by *the iPad Knowledge and Skills Survey*. Those 30 participants were enrolled into the iTunes U course (see Appendix D for screen shot example). Additionally, the researcher sent a packet of printed materials to the 30 participants to help with the potential technology roadblocks of participating in an online course for the first time (see Appendix E for Table of Contents).

**Measures and instrumentation.** In the intervention phase, participants first completed an *iPad Self-Assessment Survey* (see Appendix F). Next, participants completed the *Transforming iPads for TVIs (TiP for TVIs)* according to the iPad syllabus/steps of the module (see Appendix G for syllabus). The *iPad Self-Assessment Survey* instrument was derived from the piloted *iPad Knowledge and Skills Survey*. The *Self-Assessment Survey* was used to measure pre- versus post-skill level from TVIs completing the *TiP for TVIs* learning module. It was an electronic questionnaire with closed- and open-ended questions. This survey helped establish whether TVIs transformed their teaching using iPads with students who have visual impairments.

**Data analysis.** The data from the quantitative surveys were analyzed using SPSS Version 20. These data were entered into SPSS and analyzed using a repeated measure paired *t*-test to test the null hypothesis developed during Phase I. The projected null hypothesis was that there would be no significant effect for teachers who were high value, low proficiency iPad users for students with visual impairments. The paired sample *t*-test and other descriptive statistical tests were conducted, (e.g., geographic region, age, service delivery model, and caseload size). The data are represented in tables and charts that provide a graphic representation of the data and identify any trends or

patterns in the data collected. After running initial descriptive statistics, correlations were run in the previous pairings as completed in Phase I. The *t*-test identified whether there were any significant findings for each of the research questions in this study.

**Phase II--2B: Qualitative Design, Participants, Sampling, Instrumentation, and Data Analysis**

**Research design.** Phase II-2B was an embedded qualitative strand of the mixed methods research study. The key design characteristics were that the design was sequential with the initial quantitative phase (survey instrument) and that it would directly influence the sample participants of the qualitative phase (phase II) since the participant responses were used to narrow the sample participants. The qualitative phase data collection helped offer validating evidence linked to the levels of teacher self-efficacy and proficiency found in both the pre- and post-quantitative phases. The study was transformative in nature, (i.e., there was a theoretical lens that guided the study) (Creswell, 2009; Teddlie & Tashakkori, 2009). Within special education, the overarching theoretical lens is the belief and hope that each student with visual impairments is entitled to a free and appropriate education (FAPE) and assistive technology that will help him or her access his or her educational programs. Lastly, this study employed an embedded design since the qualitative data helped delve deeper into the quantitative findings. Since this study was embedded, it was important to note that the qualitative strand could not stand on its own, which is a key distinction of mixed methods (Collins et al., 2006; Teddlie & Tashakkori, 2009).

**Participants.** The participants in the embedded qualitative data collections, including both open-ended questions and learning module assignments, included the

entire intervention group, $N = 30$. These participants were the same group in the quantitative data collection included in Phase II.

**Sampling.** The qualitative Phase II included the same purposive sampling techniques of participants in the quantitative Phase II. The primary criteria for the purposive sample were that the TVIs must be similar in years of teaching experience and have low iPad proficiency levels and high iPad value levels. The sample size in the qualitative embedded phase was not large enough to produce significant statistical data to produce a generalizable study. This aspect of validity within a mixed qualitative and quantitative study was addressed through the larger sample in Phase I wherein the qualitative study was embedded. The sample size and uniqueness of teachers working in the field of visual impairment was a limitation of this study. Students with visual impairments are a low incidence population with much lower numbers recorded as compared to students with autism or learning disabilities (Erickson et al., 2013).

**Measures and instrumentation.** The qualitative data collection was gathered in two ways: open-ended questions on electronic surveys and participant written work. Participants submitted three assignments to the researcher through e-mail, which were part of the qualitative data collection and instrumentation. These assignments were used to evaluate the level of TVI transformative change indicated by action plans for implementing iPads and reflections on student progress and learning. The participants provided an example iPad implementation plan with evaluation steps and potential procedures in order to complete a similar plan for his or her case study student. The plans submitted were evaluated using the criteria provided on the sample plan. The

grading rubric (see Appendix H) was validated by three TVI pilot participants for its reliability and relevance to evaluating the iPad implementation plans. Thirty points were possible in six categories: collaborative team members were included, areas of accommodation were specific and detailed, ECC areas were addressed, plan goals were measureable and tied to ECC, collaboration and implementation were completed and followed up, and horizontal plan was complete and specific.

**Data analysis.** In this stage of research, several components were included to provide for interpreting the data and ensuring quality inferences. The open-ended questions data were analyzed using content analysis. The content analysis provided information about what was contained in the open-ended questions. The data analysis employed a categorical strategy of constant comparative method (Glaser & Strauss, 1967; Lincoln & Guba, 1985; Teddlie & Tashakkori, 2009). This procedure utilized the following steps: (a) comparing perceived categories, (b) integrating categories and creating tentative rules that apply to each one, (c) reducing the larger list of categories to ensure saturation of data for each category; and (d) creating a tentative theory.

Eventually, these findings were compared alongside the quantitative findings in a triangulated process. The study enlisted peer review strategies where two outside researchers were asked to agree with the thematic category findings (see Appendix K). To ensure trustworthiness of the findings, the researcher conducted intercoder agreement of .9 using Cohen's Kappa of the thematic categories from the sets of data included in Phase II. Cohen's Kappa was calculated using SPSS Version 20. In an effort to aid the peer review strategies, each reviewer was given the *iPad Technology Implementation*

*Plan Rubric* and the SAMR model (Puentedura, 2006) to evaluate the implementation plans being reviewed. Each reviewer was given a complete set of implementation plans to review with any accompanying student artifacts if available. The grading rubric was created after piloting the learning module and was reviewed by an expert TVI consultant in Canada. The intercoders were instructed how to use the *iPad Technology Implementation Plan Rubric* (see Appendix H) and the SAMR model (see Appendix I). The two intercoders were experienced TVIs with advanced degrees at the master's or doctoral levels. The team went through two implementation plans as a group and then graded the remaining plans separately, giving each participant a score and estimated value on the SAMR model, (i.e., Participant #1 reached a level of Modification on the SAMR model).

## Inference, Trustworthiness, and Reliability

### Theoretical Framework

This study used Puentedura's (2006, 2012) model to evaluate the effectiveness of teacher-reported transformative teaching. The SAMR Model can be summarized as Substitution-Technology acts as a direct tool substitute with no functional change, Augmentation-Technology acts as a direct tool substitute with functional improvement, Modification-Technology allows for significant task redesign, and Redefinition-Technology allows for the creation of new tasks previously inconceivable (Puentedura, 2006, 2012).

The SAMR model was used to categorize the data. For instance, did the teacher redefine the task and is there evidence the student completed something that had not been

previously conceivable? At the end of the intervention phase, the data collected included two *iPad Self-Assessment Surveys* (Qualtrics), three case study assignments that were graded and coded by the researcher, and the *Transforming iPads for TVIs (TiP for TVIs)Feedback Survey*.

**Quantitative Validity and Reliability Measures**

In both the pre-intervention and post-intervention phases, the study ensured internal and external validity of statistical results. First, it was important to establish that each assumption regarding paired *t*-tests had been met. The *t*-test assumptions were independent variables, continuous dependent variables, each case was independent of the other case, and the dependent variable had a normal distribution (Creswell, 2009; Field, 2009; Muijs, 2011). The assumptions of regression were variables that were normally distributed, there must be a linear relationship between independent and dependent variables, variables must have been measured reliably, and there was an assumption of homoscedasticity. Additionally, the study used Cronbach's alpha to ensure reliability in the exploratory factor analysis, as well as, Spearman's Rho in the multiple regression (See Tables 4.4, Tables 4.6-4.8).

**Qualitative Validity and Reliability Measures**

Creswell (2009) emphasized that qualitative validity is different in scope from quantitative validity. Additionally, qualitative validity means the researcher ensures accuracy in results; conversely, qualitative reliability means the researcher uses methods that are consistent with qualitative studies and procedures (Gibbs, cited in Creswell, 2009). In this study, validity was ensured by triangulating data including the open-ended

survey items and iPad technology artifacts completed by each TVI in the intervention. Validity was further scrutinized using peer debriefing and intercoder agreement of thematic codes of the intervention participants. As stated previously, the intercoder agreement of .9 using Cohen's Kappa had been calculated on SPSS Version 20. In contrast, the research study reliability was carefully monitored using systems to ensure no drift of definition codes when making meaning of the data; using thick, rich description of the findings (Creswell, 2009; Glesne, 1999); and identifying "…negative or discrepant information that runs counter to the themes" (Creswell, 2009, p. 193). If there were polarizing findings, as noted by Glesne (1999), the study provided thick, rich detail of both reported data.

## Limitations of Research Study

Several limitations are worth noting regarding this study. First, two of the survey instruments were piloted with a group of 11 TVIs, but the pre- and post-self-assessment surveys were not piloted. The survey instruments included questions regarding teacher self-efficacy modified from Albert Bandura (2006) but would not be considered a validated survey instrument determining teacher self-efficacy. Some limitations related to teacher attrition in the Phase II intervention might have been due to his/her caseload schedule or completing the study too close to the holiday break. Additionally, there might have been issues related to small sample sizes and unequal geographic distributions of survey responses in Phase I. Further, limitations regarding technology abilities of participants may have presented challenges for TVIs in Phase II.

## Conclusion

The methods for this study were a complex set of interwoven data collections and analyses to help tell a complete story of TVI professional development related to the use of iPads as assistive technology. Phases I and II built on each other and directly influenced the methods of the next. Phase I helped describe the practice and perceptions of TVIs regarding assistive technology, narrowed the sample size, and ensured a homogenous group of TVIs to participate in the intervention. The study was quasi-experimental since it included an intervention (i.e., independent variable). In Phase II, there were two data collections-quantitative and qualitative. These collections were gathered from the 30 TVI participants. Validity, reliability, and trustworthiness were addressed first by conducting a pilot study to validate instruments and improve the learning module. The researcher used peer debriefing and intercoder reliability rater agreement of the thematic categories allocated by the data collected.

# CHAPTER IV

# RESULTS

## Introduction

The purpose of this sequential, embedded, mixed methods research study was to describe and explain the progression of teacher professional development regarding assistive technology using iPads in an online learning format for TVIs. The study used the iTunes U software learning management system (LMS) to implement an online learning module for TVIs, which included multi-media resources and a comprehensive framework with steps toward iPad implementation. The primary indicator of teacher growth from the professional development is generally defined as *transformative teaching,* which means teachers are redefining how technology is being used with students who have visual impairments.

The study goals and objectives included the exploration of teacher development in the field of visual impairment regarding iPads and potentially made inferences regarding teacher attitudes and behavior. Secondly, the study intended to add foundational research showing the effectiveness of online learning modules being used as a medium for teacher professional development. The study was comprised of two phases: (a) a quantitative electronic survey of a large national sample of TVIs regarding TVI knowledge and skills related to using iPads, and (b) a mixed-method intervention study to promote professional development in the use of technology with a selected group drawn from the larger sample. The second phase sampled a smaller group who completed an intervention learning module on iTunes U, a free LMS used on Apple's mobile tablet devices. The

research study attempted to define transformative technology implementation using iPads for TVIs.

## Data Collection Methods

### Phase I

The data collection in this study was comprised of both qualitative and quantitative data collections. The Phase I online survey utilized Qualtrics software with a total of 27 questions in both open and closed question formats. The TVIs were asked for demographic information and questions regarding the value and proficiency of iPads in the TVIs teaching practice, level and type of student iPad use, and whether the participating TVI would be willing to complete an online learning module pertaining to iPads. The survey, *iPad Knowledge and Skills Survey,* contained open- and closed-ended questions related to self-efficacy (see Appendix B). The self-efficacy questions were modified from Bandura's (1982) teacher self-efficacy research in order to address specific information regarding assistive technology for teachers working in the field of visual impairment. The quantitative survey instrument format was guided by Bandura's (2006) validated teacher self-efficacy scale, *Guide for Constructing Self-Efficacy Scales*, and piloted by a group of TVIs to ensure reliability. The scale question probes were modified but the response scale (i.e., *not very much* to *very much*) remained consistent with Bandura's original self-efficacy scale. The reasoning behind changing question probes was to ensure the survey was aligned with the research questions pertinent to this study. In addition, the survey included questions such as "How much can you influence your students' access to assistive technology?" or questions about iPad knowledge such

as "What kinds of tasks or activities do you find your students are interested doing on their iPads (if applicable)?"

**Phase II**

The Phase II data collection was comprised of three electronic surveys with open and closed question formats utilizing Qualtrics software. In addition, several teacher artifacts were completed and returned via e-mail. The first survey distributed was the *TiP for TVIs iPad Self-Assessment Survey* (see Appendix F). Next, participants completed the *Transforming iPads for TVIs (TiP for TVIs)* learning module according to the course syllabus/steps of the module (see Appendix G). The *TiP for TVIs iPad Self-Assessment Survey* instrument was derived from the piloted *iPad Knowledge and Skills Survey*. The *Self-Assessment Survey* was used to measure pre- versus post-skill level from TVIs completing the *TiP for TVIs* learning module-an electronic questionnaire with closed- and open-ended questions. This survey helped establish whether TVIs transformed their teaching using iPads with students who have visual impairments. The Phase II participant group was further sorted into a small intensive case study group of five participants whose student assignments were graded using an evaluation rubric (see Appendix H) and analyzed for thematic consistencies. These themes were categorized and summarized by two additional researchers who confirmed the intercoder reliability of the thematic categories.

## Phase I Research Questions

### Phase I Research Questions

1. What level of proficiency do TVIs have regarding use of iPads as assistive technology?
2. What are the perceived values teachers place on using iPads as assistive technology with students who have visual impairments?

### Phase I Results

**Descriptive data**. Phase I was conducted from October through November of 2013. A total of 450 surveys were attempted with 371 surveys completed nationwide. All four of the U.S. geographic regions were included with the only major non-response area being the Pacific regions of Hawaii and Alaska. The participants were asked a series of demographic questions, such as age range and service delivery model, followed by their level of confidence implementing iPads, student interest in iPads, and perceived iPad value. The descriptive results are presented below.

The regional participation ($n$ = 356) was broken down into four total U.S. regions: 11% from the Northeast ($n$ = 38), 28% from the South ($n$ = 100), 20% from the West ($n$ = 69), and 41% from the Midwest ($n$ = 146; see Figure 4.1). There was considerable overrepresentation in some densely populated states versus less populated states. A table is provided with state participant tally's including the regional allocation with each state name (see Table 4.1). Surveys were sent via an electronic survey hyperlink through numerous listservs and visual impairment field postings. Participants were divided into

five age ranges from 20 to 70 years old. Of the responding participants, the primary age range was 50 to 59 (31%; see Figure 4.2).

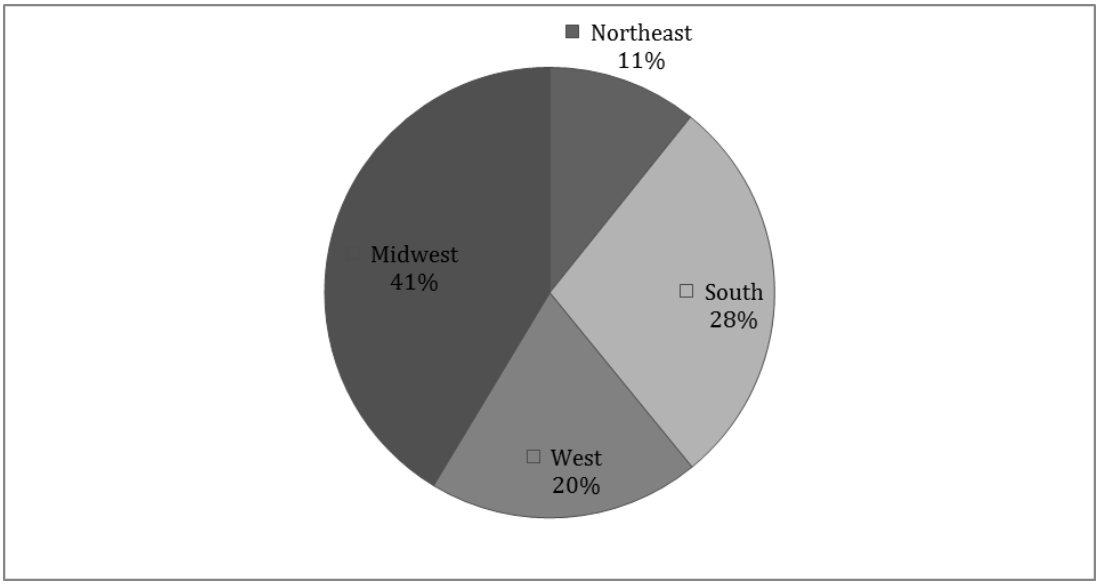



*Figure 4.1.* Phase I participant geographic location.

Table 4.1

*Phase I-Participant Tally for Each State.*

| State | Participant | State | Participant |
|---|---|---|---|
| AL Alabama - Montgomery (South) | 1 | NH New Hampshire - Concord (Northeast) | |
| AK Alaska - Juneau (West) | | NJ New Jersey - Trenton (Northeast) | |
| AZ Arizona - Phoenix (West) | 2 | NM New Mexico - Santa Fe (West) | |
| AR Arkansas - Little Rock (South) | 3 | NY New York - Albany (Northeast) | 9 |
| CA California - Sacramento (West) | 27 | NC North Carolina - Raleigh (South) | 3 |
| CO Colorado - Denver (West) | 9 | ND North Dakota - Bismarck (Midwest) | 1 |
| CT Connecticut - Hartford (Northeast) | 3 | OH Ohio - Columbus (Midwest) | 23 |

Table 4.1 Continued

| | | | |
|---|---|---|---|
| DE Delaware - Dover (South) | | OK Oklahoma - Oklahoma City (South) | 2 |
| FL Florida - Tallahassee (South) | 9 | OR Oregon - Salem (West) | 13 |
| GA Georgia - Atlanta (South) | 3 | PA Pennsylvania - Harrisburg (Northeast) | 16 |
| HI Hawaii - Honolulu (West) | | RI Rhode Island - Providence (Northeast) | |
| ID Idaho - Boise (West) | 2 | SC South Carolina - Columbia (South) | 10 |
| IL Illinois - Springfield (Midwest) | 10 | SD South Dakota - Pierre (Midwest) | 3 |
| IN Indiana - Indianapolis (Midwest) | 4 | TN Tennessee - Nashville (South) | 1 |
| IA Iowa - Des Moines (Midwest) | 8 | TX Texas - Austin (South) | 53 |
| KS Kansas - Topeka (Midwest) | 18 | UT Utah - Salt Lake City (West) | 1 |
| KY Kentucky - Frankfort (South) | 1 | VT Vermont - Montpelier (Northeast) | |
| LA Louisiana - Baton Rouge (South) | 1 | VA Virginia - Richmond (South) | 6 |
| ME Maine - Augusta (Northeast) | 3 | WA Washington - Olympia (West) | 12 |
| MD Maryland - Annapolis (South) | 2 | WV West Virginia - Charleston (South) | 4 |
| MA Massachusetts - Boston (Northeast) | 5 | WI Wisconsin - Madison (Midwest) | 23 |
| MI Michigan - Lansing (Midwest) | 2 | WY Wyoming - Cheyenne (West) | |
| MN Minnesota - Saint Paul (Midwest) | | International | 2 |
| MS Mississippi - Jackson (South) | 1 | | |
| MO Missouri - Jefferson City (Midwest) | 37 | | |
| MT Montana - Helena (West) | 3 | | |
| NE Nebraska - Lincoln (Midwest) | 9 | | |
| NV Nevada - Carson City (West) | | | |

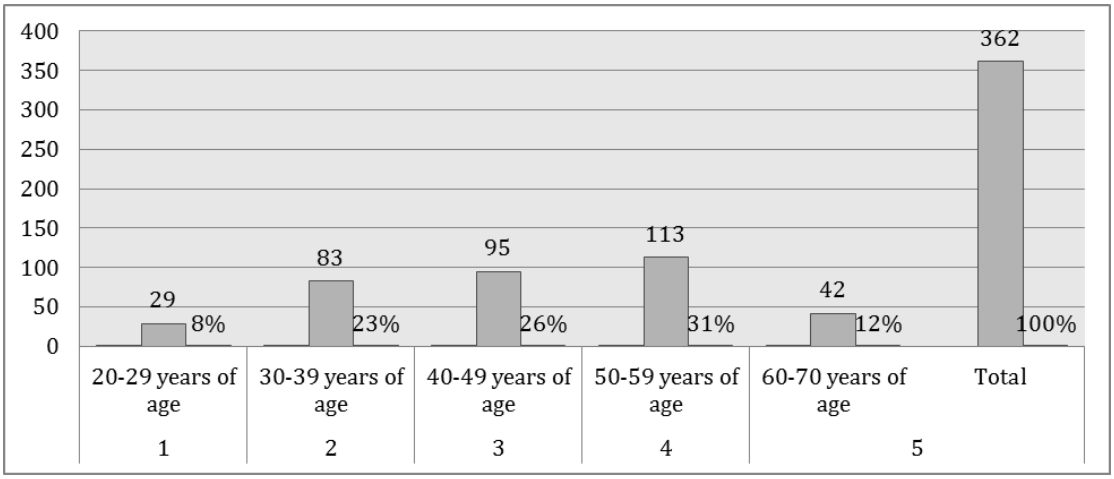



*Figure 4.2.* Phase I age range of participants.

The next set of demographic questions asked about caseload size and service delivery model. The TVIs working in a residential or self-contained setting might have answered the caseload question with the number of students in their classes each day. The participants reported "caseloads," (i.e., number of students they were responsible for reporting on an IEP or 504 Plan) were separated into seven categories of less than five students up to 31 students or more *(n*=362). The slightly larger group of responding participants was 22% of TVIs reporting a caseload of 11-15 students (*n* = 80; see Figure 4.3).

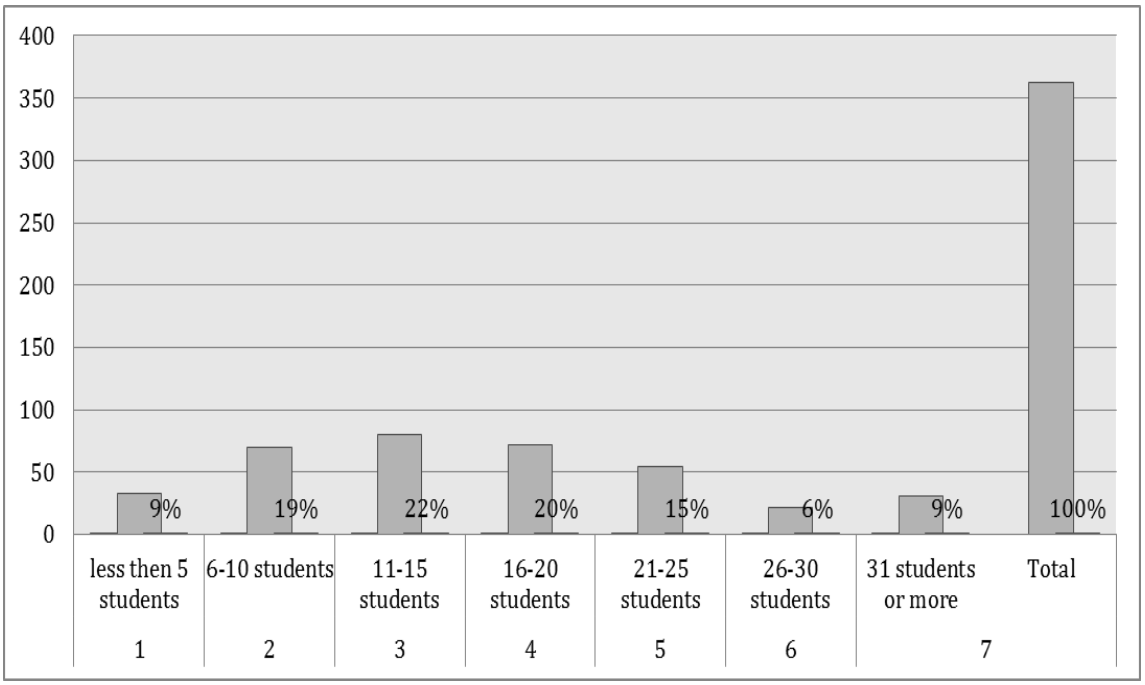



*Figure 4.3.* Phase I caseload size.

The itinerant service delivery model (*n*=362) was by far the majority at 80% of the TVIs responding to the electronic survey (*n* = 290). The following four categories were listed: resource room-17 (5%); self-contained classroom-9 (5%); residential school-30 (8%) and other roles-16 (4% of the participating sample; see Figure 4.4).

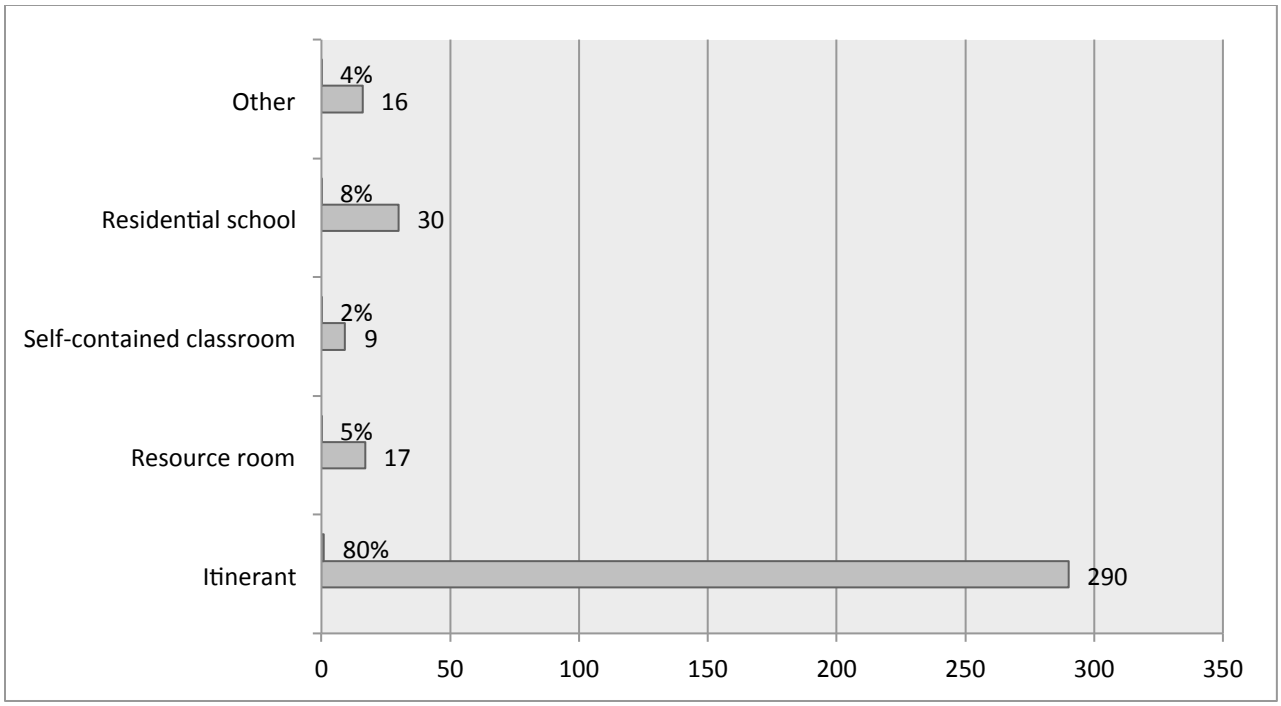



*Figure 4.4.* Phase I service delivery model.

Survey participants were asked about their level of satisfaction regarding the information, training, and instruction they received regarding AT in general (*n*=361, *n*= 359, *n*= 357). Participants were also asked how highly they valued technology and iPads as well as how confident they were instructing and implementing iPads with their students. In the area of satisfaction, participants could choose between *very dissatisfied*, *dissatisfied*, *satisfied*, and *very satisfied* (see Figures 4.5-4.7). The majority of participants were either dissatisfied or satisfied with the extremes being the smaller groups in each category.

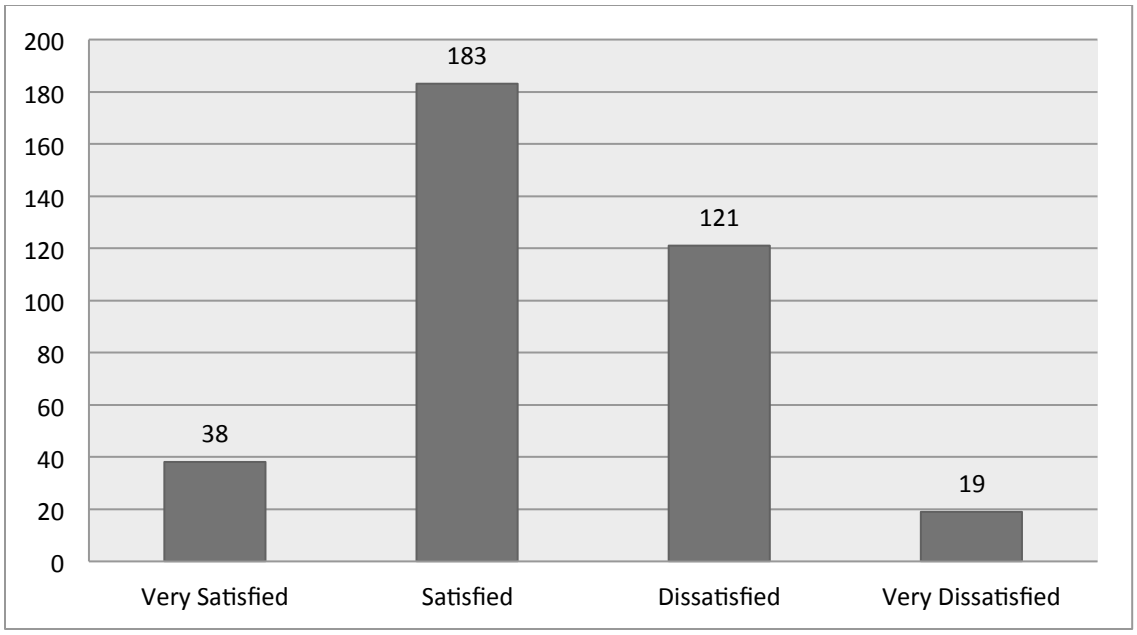



*Figure 4.5*. Phase I, level of satisfaction around teaching AT question #1.

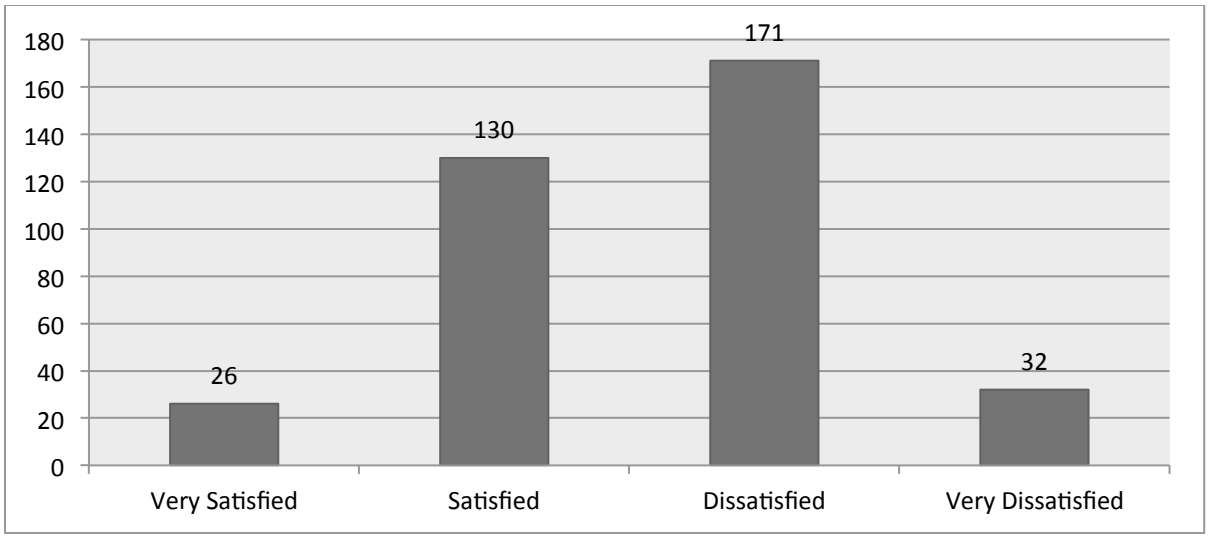



*Figure 4.6.* Phase I level of satisfaction regarding troubleshooting AT question #2.

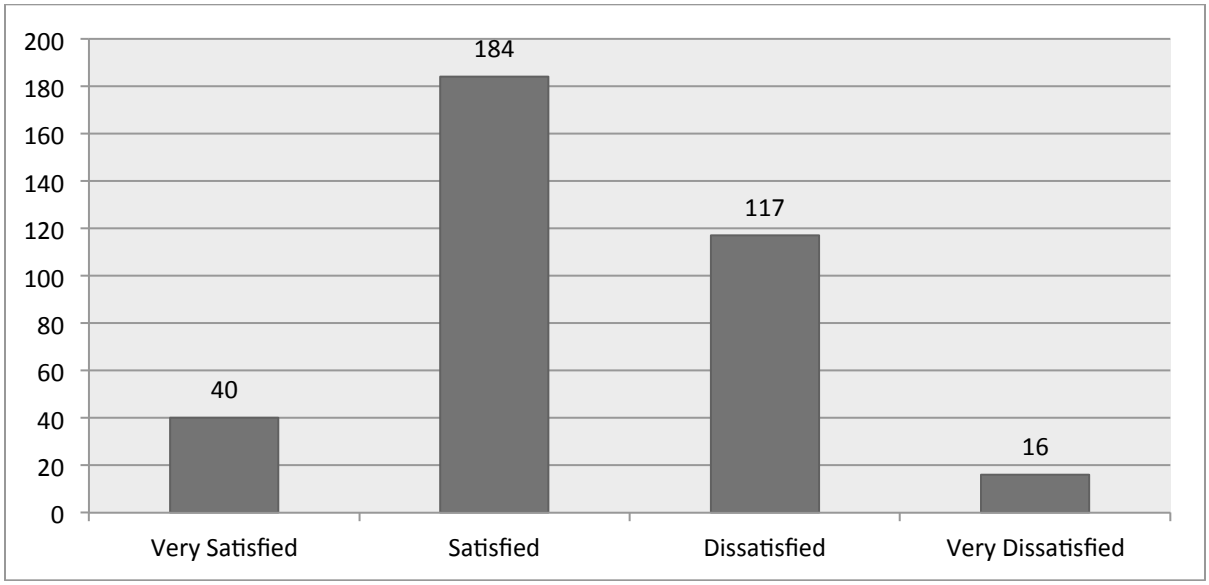



*Figure 4.7.* Phase I level of satisfaction related being informed about AT question #3.

The next two data sets suggested a larger disparity in confidence level regarding instructing about and implementing iPads when compared to the level of satisfaction

TVIs reported. When asked to rate iPad value and use for students with visual impairment (*n* = 362), the vast majority (98.5%) of the participant group felt that iPads were extremely or very important. Only four participants felt that iPads were neither important nor unimportant and one participant felt iPads were not at all important. Similar answers were noted with the question "How strongly do you feel about your students having access to technology in their classrooms (i.e., general education or special education)? On this question, 327 participants answered it was extremely important. The next question concerned how confident TVIs felt implementing assistive technology, such as iPads, with their students (*n*=358). The TVIs were nearly equally divided on this response category. Their responses were as follows: *Extremely confident*-10% (*n* = 37), *Confident*-39% (*n* = 141); *Somewhat confident*-40% (*n* = 142), and *Not confident*- 11% (*n* = 38; see Figure 4.8). There was almost an even distribution of confident versus less than confident. The data suggested that 98% of TVIs highly valued technology and thought it should be accessible for all students with visual impairments and approximately 50% felt confident implementing technology. The TVIs were asked when exiting the survey if they would be willing to be contacted regarding a Phase II iPad learning module that would require additional time and implementation with one case study student. The TVIs were given the answer choices of "yes" or "no" and 349 TVIs (96%) responded affirmatively to being contacted regarding an iPad learning module.

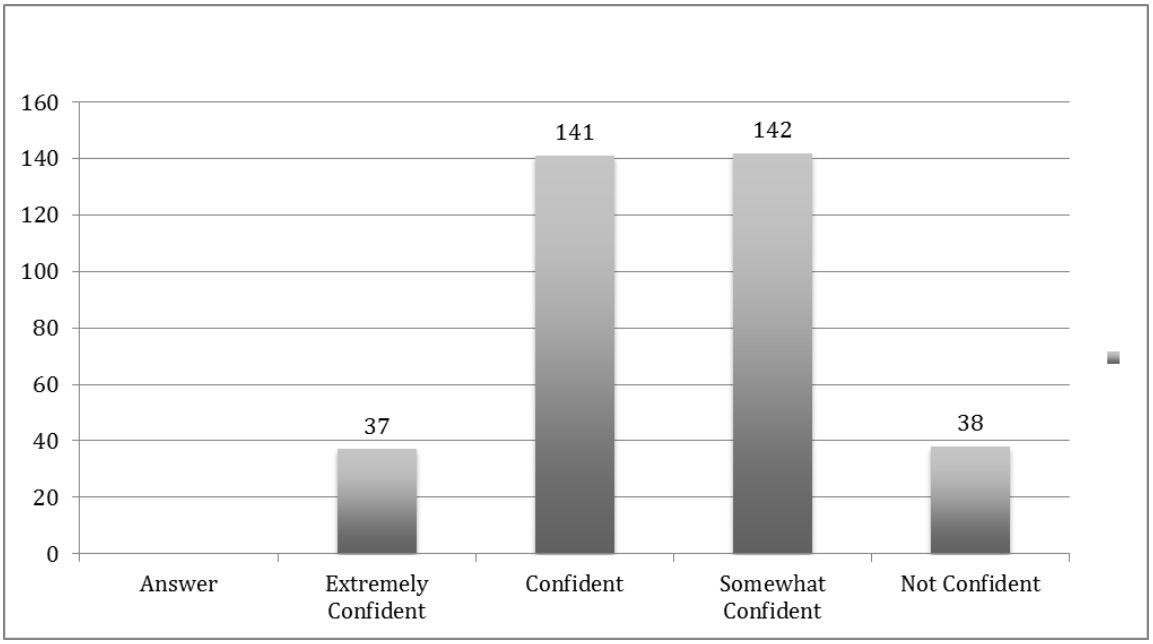



*Figure 4.8*. Phase I level of confidence.

The survey also asked TVIs to answer information both about what students with visual impairments were interested in doing with their assistive technology and more specifically what students with visual impairments were interested in doing using iPads. The categories listed were activities (e.g., to socialize, to play games, to access their homework, to access their schoolwork, to collaborate with peers or teachers, etc.) In the area of assistive technology, over 80% of TVIs agreed that students were interested in using their technology to play games, access their schoolwork, access materials using accessibility features on technology devices, and for reading (see Figure 4.9). On the question specifically regarding iPads, 80% of TVIs ($n$ = 289) agreed that students were interested in using iPads to play games and for reading (see Figure 4.10).

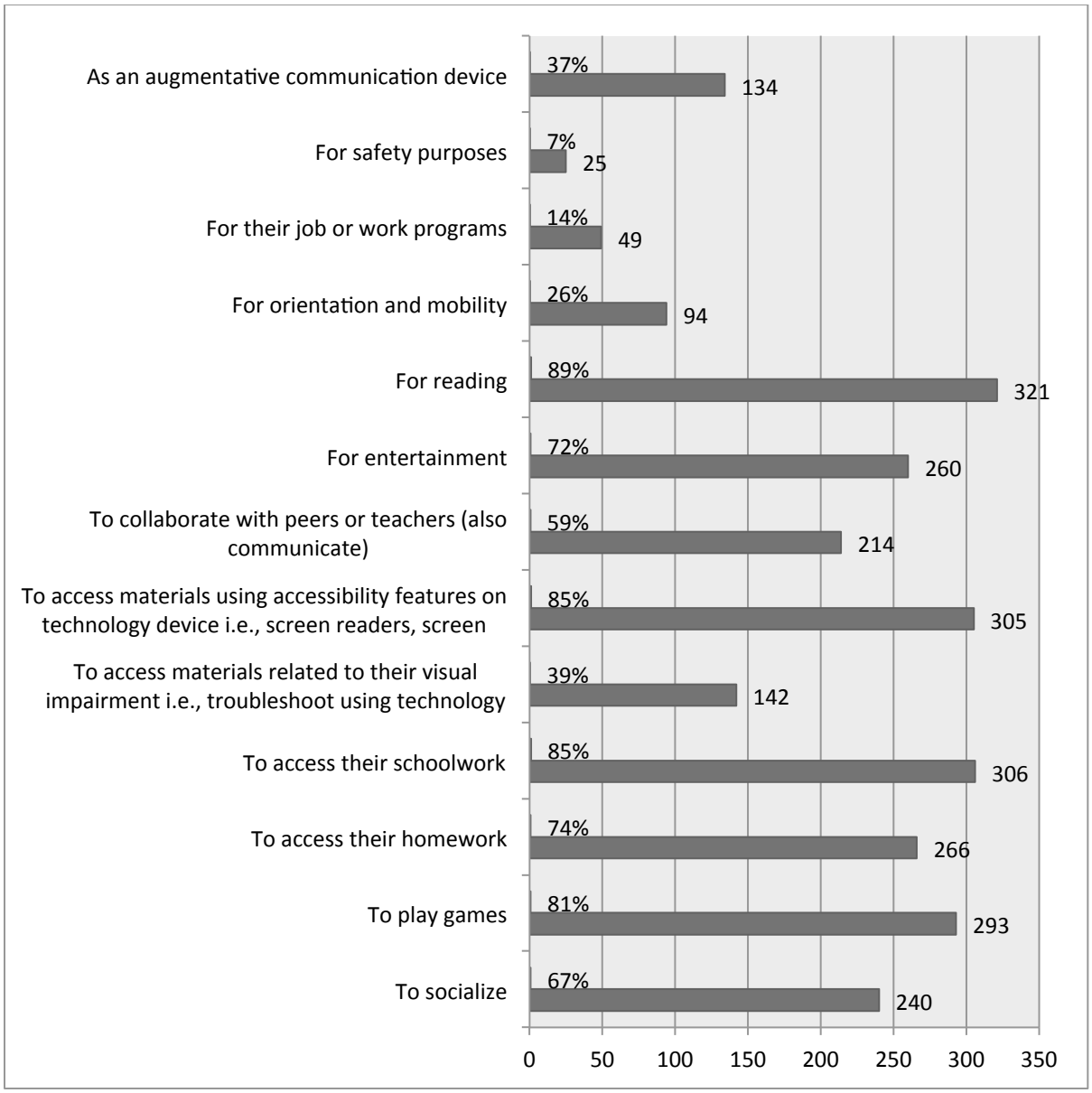
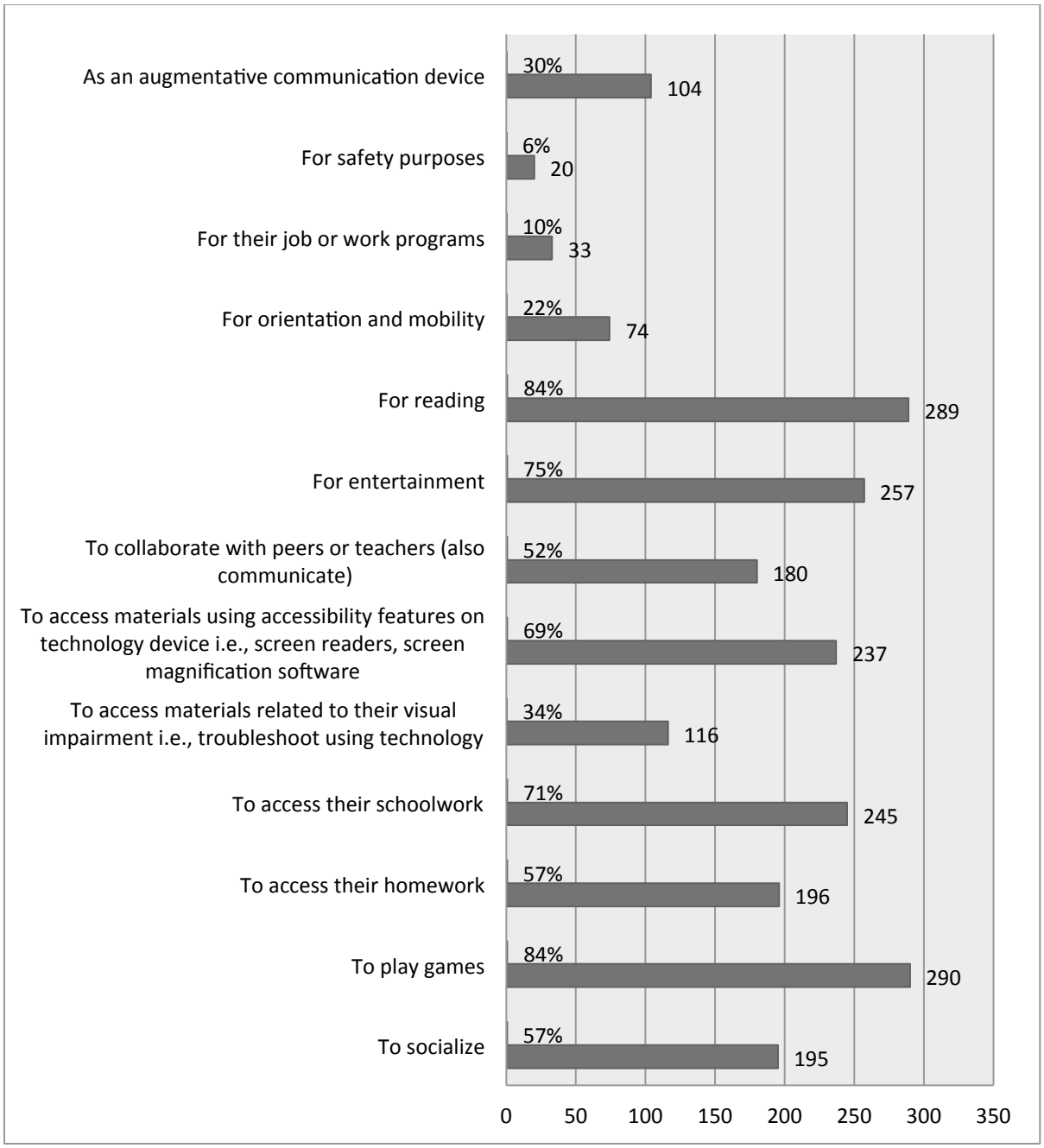



*Figure 4.9*. Phase 1 student activities using technology.




F*igure 4.10.* Phase I student activities using iPads.

The final survey item, apart from the question regarding willingness to participate in Phase II's learning module, included a rating scale of 1-10 with the rating prompts

ranging from 0-*Not at all* to 10-*A great deal*. The rating scale included questions such as "How much can you influence your students access to assistive technology?" or "How much can you freely advocate for your students' technology needs?" Any rating that received an average value greater than 6 was considered an area of concern for the participating group of TVIs (see Table 4.2). The only rating in this category greater than 6 was regarding the level of success for a TVI promoting technology with little support from home (Question #5). The other categories on the margin of some influence scoring low on this item were in the areas of how many technology materials TVIs could obtain, confidence levels implementing ECC using technology, and implementing technology with students who had multiple impairments.

Table 4.2

*Phase I-Level of Teacher Self Efficacy*

| Please rate items on sliding scale with 10 being the most to 1 being the least able. | | | | | | |
|---|---|---|---|---|---|---|
| # | Answer | Min Value | Max Value | Average Value | Standard Deviation | Responses |
| **1** | How much can you influence your students' access to assistive technology? | 1 | 10 | 7.65 | 1.85 | 360 |
| **2** | How much can you freely advocate for your students' technology needs? | 0 | 10 | 7.87 | 1.88 | 361 |
| **3** | How much can you obtain access to the technology instruction materials you need and other individualized technology accessories for your student? | 1 | 10 | 6.27 | 2.1 | 358 |
| **4** | How much can you influence your students' learning? | 2 | 10 | 8.01 | 1.59 | 361 |
| **5** | How much can you promote learning when there is a lack of support from home? | 0 | 10 | 5.82 | 1.86 | 357 |
| **6** | How confident are you implementing Expanded Core Curriculum using technology? | 0 | 10 | 6.39 | 2.36 | 357 |
| **7** | How confident are you implementing technology with your students who have multiple disabilities and a visual impairment? | 0 | 10 | 6.1 | 2.25 | 356 |
| **8** | How sure are you that you can learn a new technology skill if you needed to for your student? | 2 | 10 | 8.49 | 1.75 | 362 |
| **9** | How much can you influence your students' feelings of self-confidence around their school work? | 1 | 10 | 7.71 | 1.57 | 362 |
| **10** | How much confidence do you have in helping your students learn independent living skills? | 1 | 10 | 7.69 | 1.72 | 360 |

## Quantitative Results in Phase I: Research Questions, Factor Analysis, and Correlations

### Research questions #1 & #2.

1. What level of proficiency do TVIs have regarding use of iPads as assistive technology?

The sample of TVIs (*N*= 371) showed evidence of a 50/50 split when asked the level of proficiency regarding the use of iPads as assistive technology.

2. What are the perceived values teachers place on using iPads as assistive technology with students with visual impairments?

Of the sample of TVIs (*N*= 371), nearly 98% highly valued iPads being used as assistive technology for students with visual impairments.

To determine if there were correlations to the research question results, the data were analyzed using SPSS Version 20. The independent variables-caseload size, age of participant, and delivery model-were compared to the four dependent variables to examine what, if any, relationships existed in the areas of iPad knowledge, skill, value, and teacher self-confidence. Initially, the survey questions were analyzed using an exploratory factor analysis to ensure that the variables were categorized appropriately and provided for construct validity. The initial survey items were tested in the pilot study conducted in May 2013, providing for face validity and survey item revision. The factor analysis provided in Table 4.3 shows four variable categories: (a) Level of satisfaction, (b) Value and importance, (c) Teacher self-efficacy around achievement, and (d) Teacher self-efficacy around promoting assistive technology. A summary of the questions related

to each dependent variable is presented in Table 4.4. Table 4.5 presents the zero order correlation of variables.

Table 4.3

*Factor Analysis of Dependent Variables*

| Dependent Variable | Question Summary Relating to Dependent Variable |
|---|---|
| Level of Satisfaction | How satisfied are you with your iPad knowledge and skills? |
| Value and Importance | How much value and importance do you put on the use of iPads for students with visual impairments |
| Teacher self-efficacy around achievement | How much confidence do you have helping your students learn using iPads as assistive technology, and how much influence can you have in the learning process of your students? |
| Teacher self-efficacy around promoting assistive technology | How much can you freely advocate for your students access to have assistive technology implemented? |

Table 4.4

*Summary of Questions Related to Factor Analysis*

| Items | Rotated Factor Loadings | | | |
|---|---|---|---|---|
| | Factor #1: Satisfaction of iPad Knowledge and Skills | Factor #2: TVI value of iPads as Assistive Technology | Factor #3: Self Advocacy for Student Achievement with iPads | Factor #4: Self Advocacy for Implementing iPads |
| KS_2 iPad Knowledge and Skills-How satisfied are you with the instruction you have received about troubleshooting technology for your students who are visually impaired? | .859 | | | |
| KS_1 iPad Knowledge and Skills-How satisfied are you with the level of instruction you have received around teaching assistive technology to your student who are visually impaired? | .849 | | | |
| KS_3 iPad Knowledge and Skills-Are you satisfied with how informed you are about what is available for students who are visually impaired needing assistive technology? | .655 | | | |
| SF_1 How confident do you feel helping your students and other related professionals to troubleshoot and work with Assistive Technology? | .620 | | | |
| Q8_7 Please rate items on sliding scale.-How confident are you implementing technology with your students who have multiple disabilities and a visual impairment? | .405 | | | |
| VU_3 iPad Value and Use for Students with Visual Impairments-How strongly do you feel about your students having access to technology in their classrooms (i.e., general education or special education)? | | .938 | | |
| VU_2 iPad Value and Use for Students with Visual Impairments-How valuable do you think technology is for your students who are visually impaired? | | .908 | | |
| VU_1 iPad Value and Use for Students with Visual Impairments-How important do you feel it is for students who are visually impaired to have access to technology? | | .824 | | |

Table 4.4 Continued

| | Factor #1: Satisfaction of iPad Knowledge and Skills | Factor #2: TVI value of iPads as Assistive Technology | Factor #3: Self Advocacy for Student Achievement with iPads | Factor #4: Self Advocacy for Implementing iPads |
|---|---|---|---|---|
| Q8_9 Please rate items on sliding scale.- How much can you influence your students' feelings of self- confidence around their school work? | | | .762 | |
| Q8_4 Please rate items on sliding scale.- How much can you influence your students' learning? | | | .689 | |
| Q8_10 Please rate items on sliding scale.- How much confidence do you have in helping your students learn independent living skills? | | | .608 | |
| Q8_5 Please rate items on sliding scale.- How much can you promote learning when there is a lack of support from home? | | | .517 | |
| Q8_8 Please rate items on sliding scale.- How sure are you that you can learn a new technology skill if you needed to for your student? | | | .510 | |
| Q8_1 Please rate items on sliding scale.- How much can you influence your students' access to assistive technology? | | | | .828 |
| Q8_2 Please rate items on sliding scale.- How much can you freely advocate for your students' technology needs? | . | | | .819 |
| Q8_3 Please rate items on sliding scale.- How much can you obtain access to the technology instruction materials you need and other individualized technology accessories for your student? | | | | .453 |
| Extraction Method: Principal Axis Factoring. | 4.25 | 2.09 | 1.8 | .68 |
| % of Variance | 26.59 | 13.06 | 11.26 | 4.27 |
| Cronbach's a | .66 | .94 | .76 | .78 |

Table 4.5

*Zero Order Correlation of Variables*

| Variable | Zero-Order *r* | | | | | |
|---|---|---|---|---|---|---|
| | Age | Caseload | Knowledge and Skills | Value | Self - Advocacy, Factor 1 | Self- Advocacy, Factor 2 |
| Age | 1.000 | .032 | -.176** | -.149** | -.103 | -.114* |
| Caseload | | 1.000 | .050 | .012 | -.050 | -.040 |
| Knowledge and Skills | | | 1.000 | .466** | .259** | .457** |
| Value | | | | 1.000 | .338** | .513** |
| Self - Advocacy, Factor 1 | | | | | 1.000 | .665** |
| Self - Advocacy, Factor 2 | | | | | | 1.000 |

* Correlation is significant at the .05 level (2-tailed).
** Correlation is significant at the .01 level (2-tailed).

One of the survey questions related to the dependent variable categories within the area of self-advocacy showed double categorizations in the knowledge and skills and self-advocacy factors. For this reason, the item regarding TVI implementing assistive technology using the ECC was excluded from the data analysis of Phases I and II.

A multiple regression analysis was run in order to predict the participant response dependent on the four factors. The independent variables used in the regression analysis were age, caseload size, and delivery model. The fourth independent variable was geographic region, which was entered as a first predictor for Phase I participants due to previous research identifying regional differences (Kapperman et al., 2002). The

correlations presented were the significant predictors of the four dependent variables. Three variables were significantly predicted by the participants' age with coefficients of less than .05, exhibiting an inverse relationship. The correlation between iPad knowledge and skills and participant age was .007, which was statistically significant ($p < .05$). This finding meant that as participants became older, they were less likely to report a high level of iPad satisfaction in professional development. Additionally, age was a predictor of lowered self-efficacy around achievement and implementation. Of the four dependent variables, TVI age was a significant predictor of lowered skill, advocacy, and satisfaction. The multiple regression tables are presented below with explanations of significant findings.

**Factor 1: iPad knowledge and skills.** There were two significant findings in regression models 1 and 2 for the dependent variable of iPad knowledge and skills. First, a significant number of participants from Southern states exhibited a positive relationship of satisfaction of iPad knowledge and skills regardless of age, $p = .008$ ($n = 330$, $p < .05$). This finding means when comparing the four regions, the Southern region of the United States felt a significantly higher satisfaction with their level of iPad knowledge and skills than did the three other regions-Northeast, West, and Midwest (see Figure 4.1). Additionally, as participants became older, their level of satisfaction declined, $p = .007$ ($n = 330$, $p < .05$). Multiple regression results are presented in Table 4.6 regarding the level of satisfaction for geographical regions and Table 4.7 presents multiple regression correlations between age and caseload size in the area of level of satisfaction.

Table 4.6

*Level of Satisfaction for Geographical Regions*

| Level of Satisfaction (Model 1) | B | SEB | β |
|---|---|---|---|
| (Constant) | -.096 | | .227 |
| Northeast | .226 | .073 | .205 |
| South | .334 | .159 | .008* |
| West | -.073 | -.031 | .599 |

$R^2$ = .031, Adjusted $R^2$ = .022, ($N$ = 330, $p$ < .01). *$p$ < .05. ** $p$ < .01
*Note*. Midwest is coded as the comparison group.

Table 4.7

*Level of Satisfaction in the Areas of Age and Caseload Size*

| Level of Satisfaction (Model 2) | B | SEB | β |
|---|---|---|---|
| Age | -.123 | -.151 | .007* |
| Caseload | .006 | .012 | .839 |
| DM_RR | -.292 | -.067 | .238 |
| DM_SC | -.638 | -.111 | .050 |
| DM_RS | .047 | .012 | .820 |
| DM_Others | -.010 | -.002 | .970 |

$R^2$ = .073, Adjusted $R^2$ = .047, ($N$ = 330, $p$ < .01). *$p$ < .05. ** $p$ < .01
^coded as Itinerant (constant), DM_RR= Resource Room, DM_SC= Self Contained, DM_RS= Residential School, DM_Others= Other classroom model

Table 4.8 shows the reported levels of iPad value in all four regions, age, caseload, and service delivery model. Across all variables, iPad value was rated as important or highly important. Unlike the other three variables showing significant findings with participant age, participants who were older agreed that iPads were highly valuable. The only significant finding in this category was lowered iPad value for TVIs participating from residential school delivery models, p =.012 (*n*=330, p<.05).

Table 4.8

*Correlations among Region, Age, Caseload Size, and Delivery Model in Area of iPad Value and Importance*

| Value and Importance (Model 2) | B | SEB | β |
|---|---|---|---|
| (Constant) | .267 | | .198 |
| Northeast | .117 | .037 | .536 |
| South | .039 | .018 | .772 |
| West | -.136 | -.056 | .364 |
| Age | -.070 | -.083 | .139 |
| Caseload | .004 | .007 | .908 |
| DM_RR | -.022 | -.005 | .933 |
| DM_SC | -.442 | -.074 | .197 |
| DM_RS | -.547 | -.140 | .012* |
| DM_Others | -.256 | -.051 | .356 |

$R^2$ = .039, Adjusted $R^2$ = .012, ($N$ = 330, $p$ < .01). *$p$ < .05. ** $p$ < .01
^coded as Itinerant (constant), DM_RR= Resource Room, DM_SC= Self Contained, DM_RS= Residential School, DM_Others= Other classroom model

Table 4.9 reports the findings of the multiple regressions conducted to predict overall self-advocacy around student achievement. The first significant finding was Southern TVIs felt a significantly higher sense of ability to self-advocate for student achievement using assistive technology, $p = .036$ ($n = 330$, $p < .05$). The second significant predictor of lowered self-advocacy was for participants who were older, $p = .048$ ($n = 330$, $p < .05$). This result means that as participants became older, their confidence around self-advocacy decreased.

Table 4.9

*Correlations among Region, Age, Delivery Model, and Caseload Size in the Area of Self-Advocacy for Student Achievement*

| Self-Advocacy for Learning (Model 2) | B | SEB | β |
|---|---|---|---|
| (Constant) | .227 | | .235 |
| Northeast | .032 | .011 | .854 |
| South | .259 | .129 | .036* |
| West | -.001 | -.001 | .993 |
| Age | -.087 | -.112 | .048* |
| Caseload | -.011 | -.021 | .717 |
| DM_RR | .107 | .026 | .657 |
| DM_SC | .309 | .056 | .328 |
| DM_RS | .211 | .059 | .291 |
| DM_Others | -.192 | -.042 | .451 |

$R^2 = .04$, Adjusted $R^2 = .013$, ($N = 330$, $p < .01$). *$p < .05$. ** $p < .01$
^coded as Itinerant (constant), DM_RR= Resource Room, DM_SC= Self Contained, DM_RS= Residential School, DM_Others= Other classroom model

The last multiple regression was conducted regarding self-advocacy for implementing iPads with students. The only significant finding was regarding participant age with a significance level of $p = .032$ ($n = 330$, $p < .05$) in an inverse relationship. This finding means that as participants became older, their level of confidence regarding iPad implementation declined (see Table 4.10).

Table 4.10

*Correlations among Region, Age, Delivery Model, and Caseload Size in the Area of Self Advocacy for Student iPad Implementation*

| Self-Advocacy for Implementation (Model 2) | B | SEB | β |
|---|---|---|---|
| (Constant) | -.063 | | .422 |
| Northeast | .133 | .044 | .452 |
| South | .114 | .055 | .361 |
| West | .123 | .054 | .373 |
| Age | -.097 | -.122 | .032* |
| Caseload | -.012 | -.022 | .703 |
| DM_RR | -.333 | -.078 | .181 |
| DM_SC | -.272 | -.048 | .404 |
| DM_RS | .036 | .010 | .860 |
| DM_Others | -.043 | -.009 | .869 |

$R^2 = .027$, Adjusted $R^2 = .000$, ($N = 330$, $p < .01$). *$p < .05$. ** $p < .01$
^coded as Itinerant (constant), DM_RR= Resource Room, DM_SC= Self Contained, DM_RS= Residential School, DM_Others= Other classroom model

**Phase I--Quantitative results regarding research question #2.**

2. What are the perceived values teachers place on using iPads as assistive technology with students who have visual impairments?

Age did not show a significant relationship predicting lower value and importance of iPads for students with visual impairments. Participants across the entire Phase I sample group agreed that iPads were of high importance.

**Phase II Research Questions**

3. How will participation in this intervention using an online LMS (iTunes U) increase a teacher's sense of transformative teaching self-efficacy for using assistive technology?
    a. Was the intervention effective with regards to increasing the teacher's sense of transformative self-efficacy; why or why not?
    b. What were the challenges associated with completing the course and course assignments?

**Phase II Results**

In Phase II, there are three sub-phases-2A, 2B, and 2C-with qualitative data collections and analysis the dominant data in Phase II. This mixed methods study is an embedded type, meaning the qualitative data collections in Phase II are situated within the larger quantitative data collections. In Phase II, a smaller homogenous sample of 30 TVIs was invited to participate in a four- to six-week intervention learning module. The TVIs completed several tasks associated with the learning module. The quantitative data collected (Sub-phase 2A) is from the pre- and post-self-assessment surveys completed by

TVIs at the beginning and upon completion of the learning module. The TVIs completed a *Transforming iPads for TVIs (TiP for TVIs) Feedback Survey* pertaining to the effectiveness of the learning module, which is summarized at the end of the Phase II discussion. Purposive recruitment was based on logistical criteria and TVI self-reported knowledge and skill criteria needed for inclusion in Phase II. The TVIs needed to own or have access to an iPad and have had the time and willingness to participate in a learning module. Additionally, TVIs must have indicated low iPad skills and high iPad value when using iPads with students with visual impairments. Phase II recruitment began once the national Phase I survey reached 250 participants and over a time period of the following month. The TVIs were selected purposively by first meeting the above criteria; then age and regional location were considered to make the sample representative of the entire United States.

By November of 2013, 30 iPad module participants had completed the initial steps, pre-survey, enrollment in iTunes U module, and introductory webinar for the learning module. Each participant was provided a print binder of materials and a $10 iTunes card for intervention participants to purchase apps recommended in the learning module. The Phase II participant demographic summary is presented below.

**Phase II—2A Demographic Data**

The 30 Phase II participants were spread geographically to follow as closely as possible the national Phase I TVI sample: 14% participants from the Northeast, 25% participants from the South, 32% participants from the Midwest, and 29% participants from the Western United States (see Figure 4.11). Of the 30 Phase II TVIs, 28 completed

the *TiP for TVIs Pre-Module Survey*. Participants' age range was similar to the Phase I group with 11 participants (40%) being 20-39 years of age and 17 participants (60%) being 40-70 years of age (see Figure 4.12).

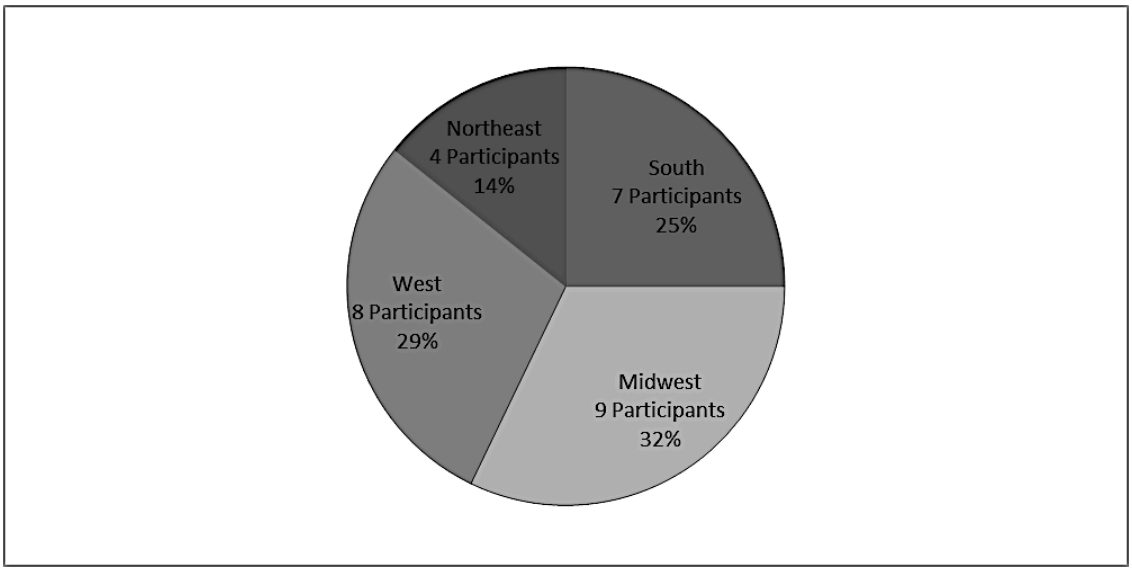



*Figure 4.11.* Phase II regional allocation of participants.

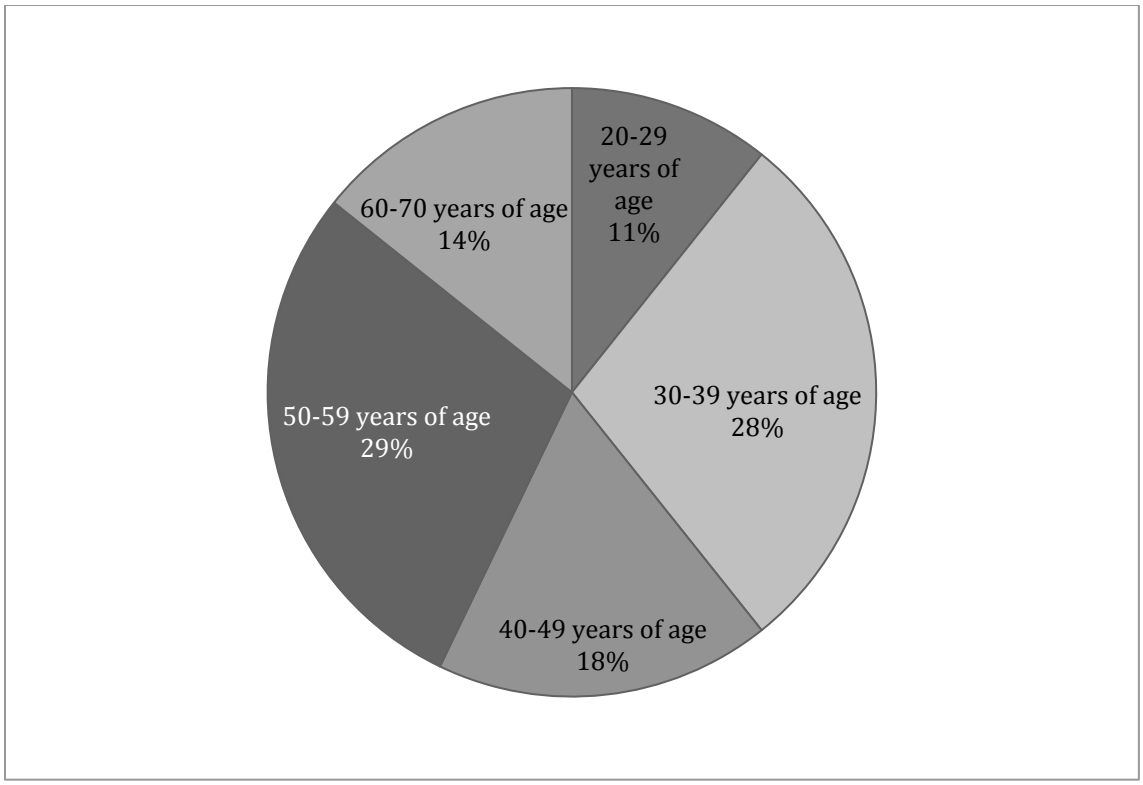



*Figure 4.12.* Phase II age range.

Phase II participants were also queried regarding caseload size and service delivery model. Of the 28 of 30 Phase II TVIs who completed the *TiP for TVIs Pre-Module Survey*, the majority, 65% of the participants, reported a caseload size of 11-25 students (see Figure 4.13). This proportion was similar to the national participant group from Phase I with 57% of participants reporting a caseload size of 11-25 students. The slightly larger group in Phase I, comprising 19% with a caseload of 6-10, was due to a larger group of self-contained and residential service model participants. Only a small number of TVIs with that kind of service model was included in Phase II due to the emphasis on itinerant TVI needs as related to assistive technology. In Phase II, 82% of

participating TVIs reported an itinerant service delivery model, which was only 2% points higher than the Phase I sample (see Figure 4.14).

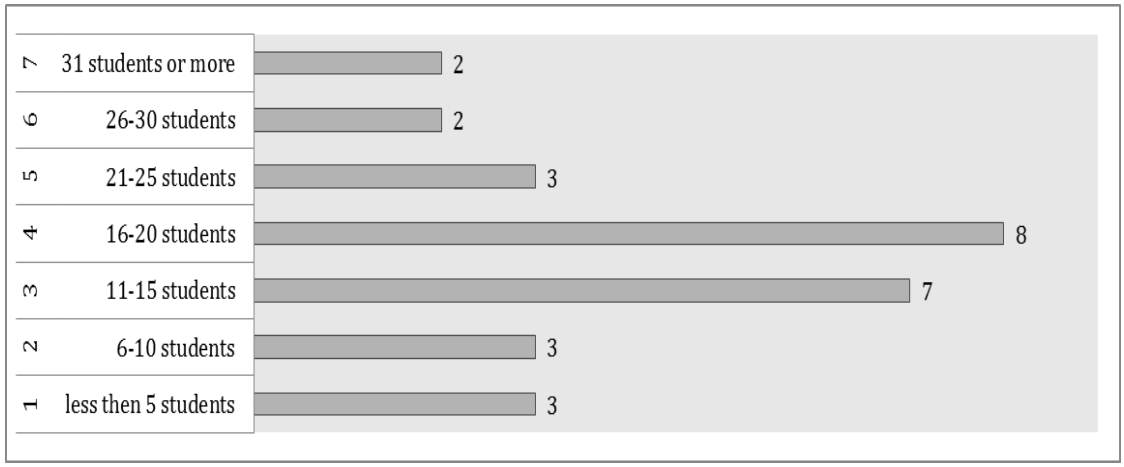



*Figure 4.13*. Phase II caseload size of *Transforming iPads* for teachers of students with visual impairments participants.

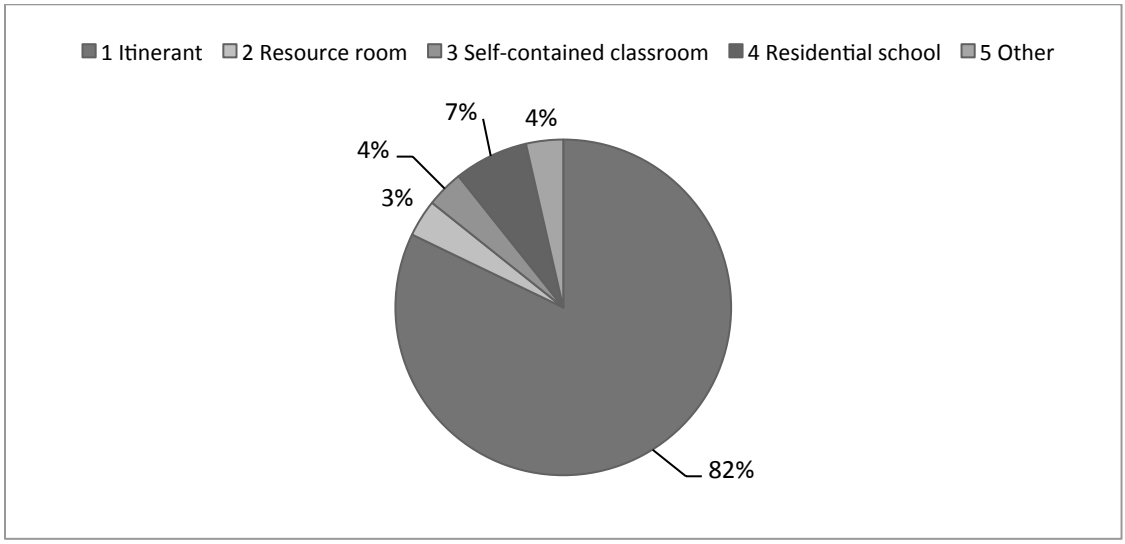



*Figure 4.14*. Phase II service delivery model of *Transforming iPads* for teachers of students with visual impairments participants.

The *TiP for TVIs Pre-Module Survey* asked a series of questions related to specific knowledge and skills needed to effectively use an iPad. The questions were basic operations, (i.e., "iPad Controls, The Setting Menu, (1) Turning on Wifi?") with answer choices of not-proficient, proficient, or instructional proficient. At the beginning of the assessment, TVIs were instructed to check "instructional proficient" if he or she felt confident enough executing the activity enough to teach his or her student to do it as well. An example question (*n*=28) has been summarized below (see Figure 4.15).

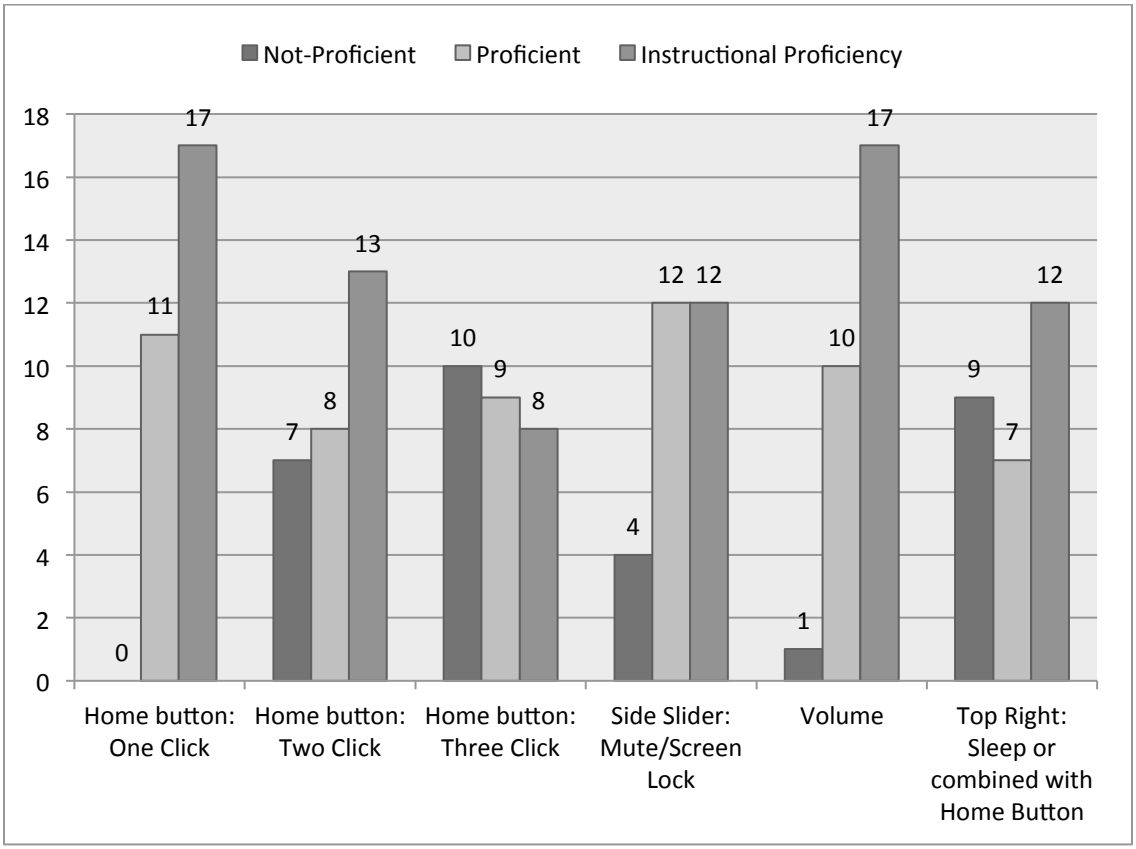



*Figure 4.15*. Phase II iPad controls proficiency.

Additionally, in Phase II-2A, TVIs were asked to rate their level of "self-efficacy" or confidence related to implementing iPads in their teaching with students who are visually impaired (see Figure 4.16). In Phase I, levels greater than 6 indicated areas of challenge for Phase II participating TVIs. This smaller sample indicated more areas greater than 6 as reported in Phase I, which might indicate areas of challenge for TVIs who reported being somewhat or not-at-all confident implementing iPads. The reported areas greater than 6 are reflected in the following questions:

- How much can you obtain access to technology instruction materials you need and other individualized technology accessories for your students? (Average value: 5.77; *SD*: 1.97)
- How confident are you implementing the Expanded Core Curriculum using technology? (Average value: 4.12; *SD*: 2.2)
- How confident are you implementing technology with your students who have multiple disabilities and a visual impairment? (Average value: 3.62: *SD*: 2.38)
- How much confidence do you have in helping your students learn independent living skills using assistive technology such as iPads? (Average value: 5.12; *SD*: 2.83)

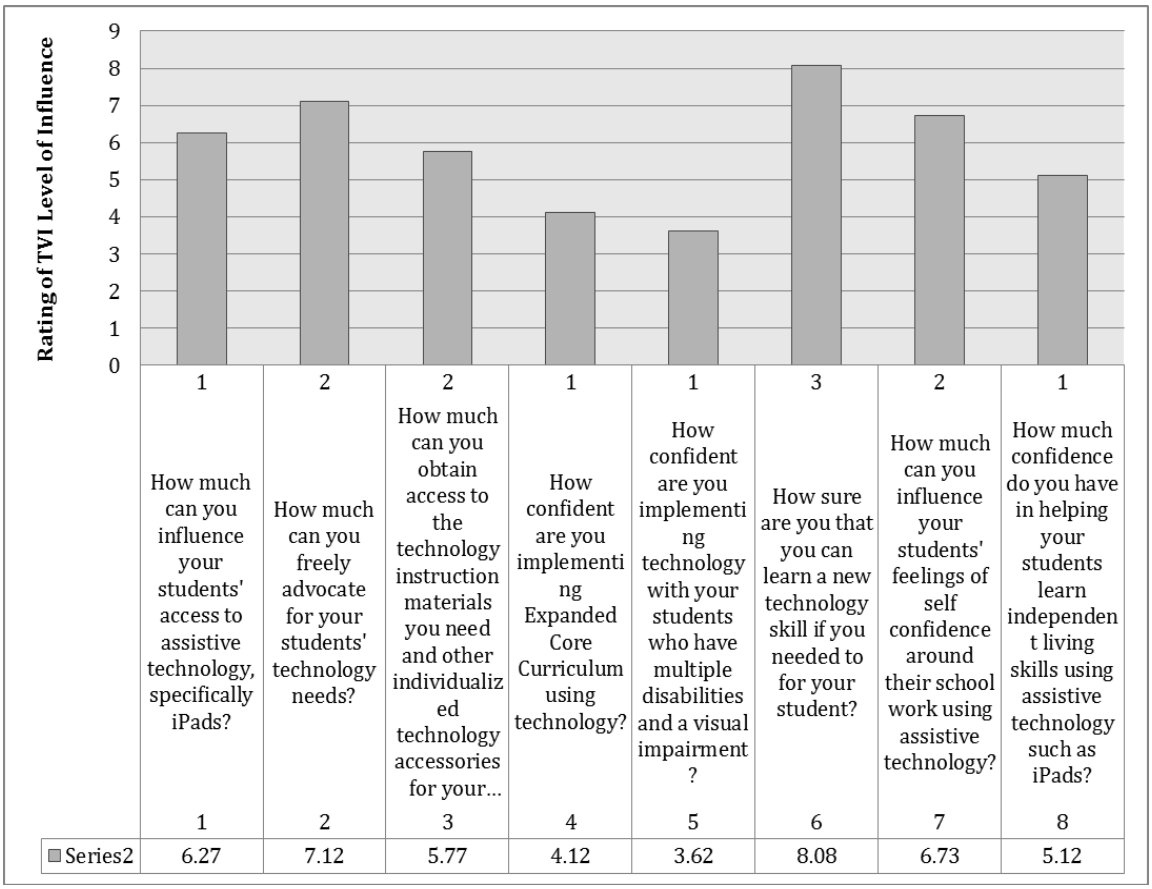



*Figure 4.16.* Phase II teachers of students with visual impairments self-efficacy and iPad implementation.

**Phase II--2A: Quantitative Data Pre- and Post-iPad Module Surveys**

Phase II was conducted over the months of November through January, 2013-2014. The initial group of 30 Phase II participants became incrementally smaller each week as the study continued through the holiday break. This was a study limitation reported both in the introductory delineation section and in the following Chapter V discussion and recommendations section of this dissertation research. The Phase II group participation is summarized in Table 4.11.

Table 4.11

*Phase II Group Participation*

| Phase II Recruitment, *N*=30 | November, *n*= | December, *n*= | January, *n*= | Total & Calculated "Participant Attrition" as it relates to case study assignments and post-surveys | |
|---|---|---|---|---|---|
| Completion of Consent Form | 30 | 0 | 0 | 30 | 0% attrition rate |
| *TiP for TVIs Pre-Module Survey* | 28 | 0 | 0 | 28 | 6% attrition rate of participant's who dropped before completing the pre-module survey |
| *TiP for TVIs* enrollment in iTunes U course | 25 | 0 | 0 | 25 | 16% attrition rate of participant's who dropped before enrolling on the course |
| *TiP for TVIs* completion of case study assignments: | 0 | 6 | 0 | 6 | 76% attrition rate of participant's who did not complete the three case study assignments* |
| *TiP for TVIs Post-Module Survey* | 0 | 8 | 4 | 12 | 50% attrition rate of participants' who did not complete the post-module survey* |
| *TiP for TVIs Feedback Learning Module Survey* | 0 | 7 | 1 | 8 | 68% attrition rate of participants who did not complete the post-module feedback survey* |

* Several *TiP for TVI* Phase II participants e-mailed during the month of December with reasons for attrition. Once participants indicated they would not finish their case study assignments, they might have determined it would not be appropriate to complete the post-module surveys.

**Phase II--2A: Quantitative Results**

In addition to the qualitative data results summarized below, the pre- and post-survey data were analyzed using SPSS Version 20. The previous factor analysis providing content validity of survey items was applied to Phase II quantitative data analysis. Data were analyzed using paired *t*-tests in order to examine the effectiveness of

the iPad learning module. The sample size being smaller than 30 did not provide the recommended statistical power and generalizability preferred in quantitative research. The statistical analysis is presented here, noting the smaller sample size. The data were organized on an Excel spreadsheet with paired participants inserted next to each other in order to conduct a paired sample *t*-test in SPSS. The three variables were coded in SPSS: Factor 1-Level of satisfaction, Factor 3-Teacher self-efficacy around achievement, and Factor 4-Teacher self-efficacy around promoting assistive technology. Factor 2, iPad value and importance, was not included on the pre- and post- survey instruments since all participants had previously reported high iPad value. Additionally, the survey item regarding the ECC was excluded due to being double loaded in self-efficacy and iPad knowledge and skills. Lastly, the survey item regarding TVI confidence implementing iPads was included in the self-advocacy items as in Phase I since the factor analysis showed it was included in self-efficacy categories versus iPad knowledge and skills.

There were 12 paired *t*-test participants in the Phase II data analysis. The mean, standard deviation, and *t*-tests are presented below for each pair. The categories, pairs one through three, can be summarized as Pair 1 = Factor #4-teacher self-efficacy around promoting assistive technology; Pair 2 = Factor #1-teacher satisfaction around iPad knowledge and skills, and Pair 3 = Factor #3-teacher self-efficacy around student learning using iPads as assistive technology. Table 4.11 presents 12 paired *t*-tests for Factor 1 and 10 paired *t*-test participants for Factors #3 and #4.

Table 4.12

*Results of Paired* t*-test and Descriptive Statistics for Phase II-2A*

| Outcome | Pre-Module *M* | Pre-Module *SD* | Post-Module *M* | Post-Module *SD* | *n* | 95% CI of Difference | sig | *t*-tests | *df* |
|---|---|---|---|---|---|---|---|---|---|
| Pair 1--Pre and Post Self-Advocacy for Assistive Technology Implementation | 6.0667 | 1.96136 | 7.1000 | 1.90548 | 10 | -.03139 | .045* | -2.333 | 9 |
| Pair 2--Pre and Post iPad Knowledge and Skills | 3.4167 | 1.86880 | 7.1667 | 2.77434 | 12 | -2.62886 | .000** | -7.362 | 11 |
| Pair 3--Pre and Post Self Advocacy for Student Achievement | 6.3333 | .98131 | 7.8333 | 1.41639 | 10 | -.12215 | .036* | -2.463 | 9 |

* $p < .05$, ** $p < .001$

Of those 12 TVI participants, all showed significant levels of learning module effectiveness in each of the three factors of iPad knowledge and skills, self-efficacy around student iPad achievement, and self-efficacy around student assistive technology implementation. Pair 1, teacher self-efficacy around promoting assistive technology, showed a positive effect of the learning module with a significance level of .015 ($n = 10$). Pair 2, teacher satisfaction around iPad knowledge and skills, showed the highest gains in *t*-test comparisons with a significance correlation of .003 ($n = 12$). Lastly, Pair 3, teacher self-efficacy around student learning using iPads as assistive technology, showed a positive correlation of .457 ($n = 10$), being the least significant of the three paired

samples. The statistical sample, although small, showed significant levels for each of the three factors. Small sample sizes do not typically have enough statistical power to show significant effects of interventions in research studies.

**Phase II--2B: Qualitative Data Collection from Open-Ended Survey Questions**

Participants were asked an open-ended question as a final response category on the *TiP for TVIs Pre-Module Survey*. The purpose of this question was two-fold. First, the paired responses, with participants also completing assignments, were to compare participant implementation plans in Phase II-2C with the hypothesized participant implementation plan suggestions. When comparing the implementation plan themes in Chapter V's discussion and recommendations, the differences between hypothesized and realized implementation plans will be explained further. Additionally, the Phase II-2B open-ended implementation plan question helped identify preliminary themes to be used as categories in Phase II-2C's data analysis. In this section, the qualitative responses are presented in loose thematic categories with direct quotations from participants. Participants were asked to use their birthdate (month/year) to protect anonymity; with this coding, the 28 of 30 *TiP for TVIs Pre-Module Surveys* were put in chronological order starting with the month of January. Participants were numbered 1-28 and are referred to as "Participant 1, 2, etc." The loose categories are Steps 1 and 2 of the qualitative data analysis presented in Chapter III.

The thematic categories are presented below with thick, rich description using direct quotations from responding participants 1-28. Of the 28 *TiP for TVIs Pre-Module*

*Surveys* two participants did not respond to this question, resulting in 26 total responses analyzed for initial qualitative themes.

**Phase II--2B: Initial thematic categories**. Fourteen initial thematic categories were found from the *TiP for TVIs Pre-Module Survey* responses to the open-ended question regarding hypothetical implementation plans. The open-ended responses were organized using a spreadsheet and categorized after multiple readings of each participant response. The following 14 thematic categories were counted by hand: Challenged (5), Resource-Dependent (1), Disability-Focused (7), Comprehensive (4), Collaborative (4), Device-Focused (2), ECC-Focused (15), Inclusive (2), Individualized (9), Desire to increase knowledge and skills (11), Structured and Systematic (6), Accessibility-Focused (8), Independent & Proficiency (7), and Narrowly-Focused (1). Thematic categories connected to five or less participant responses will not be described further. Categories with five or more connected responses are included in the following direct quotations of participants.

**Phase II--2B: Thematic rich, thick description**. The largest overarching category, which included the largest group of participant responses, was plans that were ECC-Focused, comprising 15 participant plans. This category included any plan that incorporated more than one area of the nine ECC areas, (i.e., if a plan only focused on visual efficiency with no other mention of academic support or independent living skills), then it might not been coded with "ECC-Focused." The ECC is the accepted set of instructional objectives used by TVIs in the field of visual impairment. Anything would have been coded as ECC if the content of participant plans was aligned with one or more

of the nine ECC curriculum and instructional objective areas. Some participant comments falling into this category are listed below. Participant #4 said, "

> I have a fifth grade student who is a braille reader in a general ed [education] classroom… We have an iPad2 and Refreshabraille 18 that she is teaching herself to use, with support of a very tech savvy local young woman who is blind…she is actually just finishing up a project in which she had to research info on a planet and make a "travel brochure." She used the iPad to find the info…"

Participant #13 explained,

> Depending on the student's level, these options [accessibility options] may have to be set up for the student. For a student who is intellectually on track, a book reading app would be important and helping the student set up an account for using the app… If appropriate, I would pair the iPad with a braille device… Teaching social media and games is helpful introducing the iPad and encouraging use.

The next category was called "Desire to increase knowledge and skills" and included 11 participants who all included goal statements regarding their teaching or learning, (i.e., these participants included future focused goals either for themselves or for their students). Some examples of this thematic category were when Participant #24 weighed the utility of the iPad versus her student's current assistive technology laptop: "She now carries a laptop, but the iPad may be an alternative that would not be as cumbersome for many uses…exploring this option… I would like to teach her to use Maps, browse the Internet, read e-mail, take notes and keep a calendar." Participant #10 felt, " …With my student on the IEP, I would like to teach him various apps that can be useful to him in his classes and with organization, which is a problem for him."

This category provided details in the implementation plans, which were individualized in nature. Nine participant plans were connected to the "individualized" theme. Participant #11 said,

> I have a real variety of abilities among my students. I really want to learn how to help my capable students become more proficient in using technology to access their books, the classroom, the Internet and to be independent in their learning and advocacy skills. My more severely involved students can use the iPad for functional literacy and recreation.

Participant #22 emphasized, "….Although my student is already quite proficient in the use of technology I would like to perfect her skills and abilities prior to entering high school."

The next overarching category in Phase II-2B included plans that were accessibility-focused, which comprised eight participant plans connected to this theme. The themes accessibility and disability focused were related to each other but differed in that accessibility-focused seemed to be more about what a student could do and disability-focused seemed to be more about what a student could not do. Participant #14 concisely suggested he/she would "teach Zoom and VoiceOver add apps such as Joinme." Participant #3 noted, "I have a large choice of apps to use with/for various other students. Teaching not the use of tech but using the tech to teach other concepts." Finally, Participant #16 explained, "Right now I have one student who has an iPad. We are mostly using it as a magnifying device, taking pictures of her book or the board so that she can enlarge it to read."

The next overarching theme, iPad plans being disability-focused, included seven participant responses. These responses tended to focus on the student disability and how the iPad might be able to provide disability-specific accommodations; these plans were predominantly focused on disabilities related to the student's visual impairment. Participant #20 asked, "Can they accurately read and copy down information from the

board?" Participant #9 suggested, "My goal is to learn all I can on how to implement an iPad in the educational setting of first grade low vision student." Further, Participant #5 asserted, "I mostly use my iPad to allow my VI students to play apps that require visual scanning, visual memory and/or visual attentiveness. I'm in this course to learn more."

Many of the plans were clearly organized with predetermined structure and systematic teaching; six participants had plans connected to this category. Participant #19 began, "First, I would do a needs assessment to see what ways the iPad might benefit the student…" Participant #12 outlined,

> For one of my students with low vision, I would show the basic accessibility features such as Zoom and VO. –Then, I would use an app that is of high interest with student such as Snap Guide. – Incorporate the various gestures to navigate the app. I've noticed that I need to get my student to buy into the technology by doing something engaging first then infuse instruction….

The overarching theme of Challenged had five Phase II participants indicating feelings of being challenged or not knowing what would be best when implementing an iPad assistive technology plan. Participant #21 noted, "I am not sure—that's why I'm taking this course" when asked what he/she would implement in an iPad plan. Participant #15 begin noting his/her student was using an iPad for homework and then said, "I am not sure of how this is going to work at this time. This is one of the main reasons for my initial interest in this course."

**Phase II-2C: Intensive Case Study**

Intensive case study participants were selected using convenience sampling and an evaluative grading rubric. Only a small fraction of the *TiP for TVI* participants completed the three case study assignments, which was the reasoning for the convenience

sampling. The six case study assignment packets were graded using the *iPad Assistive Technology Plan Evaluation Rubric* (see Appendix I). Of the six assignment packets graded, five participants were chosen to be evaluated (see Table 4.13) further with a final placement using the SAMR Model (see Table 4.14). A SAMR checklist was provided for each intercoder to evaluate and place each participant as well.

Table 4.13

*Intensive Case Study Participants*

| Participant Birthdate | Participant Age | Participant Region | Participant Caseload | Participant Confidence Level: Pre | Post |
|---|---|---|---|---|---|
| 01/14 | 30-39 years | West | 6-10 students | Somewhat Confident | Confident |
| 01/30 | 50-59 years | West | 16-20 students | Somewhat Confident | Confident |
| 03/17 | 40-49 years | South | 6-10 students | Not Confident | Somewhat Confident |
| 04/22 | 40-49 years | Midwest | 26-30 students | Somewhat Confident | Somewhat Confident |
| 08/04 | 30-39 years | Midwest | 11-15 students | Somewhat Confident | Confident |

Each intercoder was sent a packet with resources, instructions, and participant assignment packets. Their packets included:

- Example iPad implementation plan and iPad evaluation checklist (this is what the participants were asked to complete for a "case study student" with the help of the learning module).
- Substitution, Augmentation, Modification, and Redefinition (SAMR) model with short description. It is a model used to help explain the progress

toward becoming more "transformative" using and teaching with technology (see Appendix I).

- *iPad Assistive Technology Plan Evaluation Rubric* to be used to figure out how many points each participant received for their implementation plan
- The "five intensive case study plans" included two-page plan, two-page checklist, pre- and post-module survey, and one paragraph summary of their case study student.
- The intensive case study SAMR checklist results with three to five themes from the initial Phase II-2B categories were in five sealed envelopes. Intercoder responsibilities were to simply "agree or disagree" with the themes as presented for each case study participant.

The two intercoders completed each intensive case study packet. A summary of the thematic category agreement and approximate SAMR level are presented in Table 4.14. Both intercoder raters offered comments regarding some of the specific plans and survey data. For example, "Participant 1/14 still has a lot to learn according to the post-test… I would look for collaboration in horizontal plans…" (Intercoder RS). Additionally, regarding participant 4/22, "TVI clearly learned 'how' but I am not sure he/she will implement…very difficult to say…" (Intercoder RS). Further, details regarding the use of the iPad checklist and tools were thoroughly examined. For example, regarding participant 1/30, "I thought areas of accommodation were detailed and specific but they were not checked in the iPad checklist…" (Intercoder VD). The case studies were analyzed using additional intercoder data in order to list the agreed

upon thematic qualities that could describe the case study participant iPad implementation plans.

Table 4.14

*Intercoder Reliability Rater Agreement and Disagreement*

| Intensive Case Study Participant Birthdate | Thematic Codes Assigned | Percentage of Agreement | | Percentage of Disagreement | | SAMR Level |
|---|---|---|---|---|---|---|
| 1/14 | Collaborative, ECC-Focused, Individualized, Structured and Systematic, Independent & Proficiency, *Non-Comprehensive | 80% | 60% | 20% | 20% | Augmentation |
| 1/30 | Challenged, Device-Focused, ECC-Focused, Individualized, Independent & Proficiency, *Exclusionary | 100% | 60% | 0% | 40% | Modification |
| 3/17 | Comprehensive, Collaborative, ECC-Focused, Individualized, Independent & Proficiency, *Broad *Structured & Systematic | 100% | 100% | 0% | 0% | Modification |
| 4/22 | Challenged, Device-Focused, Accessibility-Focused, Narrowly-Focused | 100% | 100% | 0% | 0% | Substitution |
| 8/04 | Comprehensive, Collaborative, ECC-Focused, Individualized, Structured and Systematic, *Broad | 100% | 80% | 0% | 20% | Redefinition |

**Phase II-2A-2C: Results in Phase II Combined Results for Research Questions 3, a and b**

3. How does participation in this intervention using an online LMS (iTunes U) increase a teacher's sense of transformative teaching self-efficacy for using assistive technology?

The TVI participants showed increased levels of satisfaction and effectiveness on the three factors analyzed in Phase II-2A. In Phase II-2B, TVIs also showed inclusion of the highest found elements in iPad implementation plans: ECC-Focused (15), Desire to be… (11), Individualized (9), and Accessibility-Focused (8). Further, in Phase II-2C, intensive case study TVIs were rated on the SAMR model with thematic categories agreed or disagreed by two intercoder reliability raters (see Appendix K). Of those five intensive case study ratings, nine thematic categories were agreed upon. The SAMR model ratings with all five case study participants showed evidence of participants at levels across the SAMR model with only one participant being classified as redefinition. The thematic categories that met the 100% agreement criteria were ECC-Focused, Individualized, Independent & Proficiency, Comprehensive, Collaborative, Challenged, Device-Focused, Accessibility-Focused, and Narrowly-Focused. In the analysis, other thematic categories were listed on some case study plans and those are listed below indicated with an asterisk. Lastly, the approximate placement on the SAMR model was calculated by labeling participants with either the median or mode rating from all three researchers.

a. Was the intervention effective with regard to increasing the teacher's sense of transformative self-efficacy; why or why not?

From the paired *t*-tests and qualitative thematic data analysis, it appeared that the intervention iTunes U learning module was effective in promoting professional growth toward TVIs becoming more transformative technology users and teachers. The TVIs reported an increase in their levels of teacher self-efficacy in the two factor areas of teacher self-efficacy: student achievement as it related to iPads and advocating for assistive technology implementation. The intensive case study inter-reliability found progress in each participant's case study assignments and pre- and post-survey data.

b. What were the challenges associated with completing the course and course assignments?

There were numerous limitations to the iTunes U course reported on the iPad module feedback survey ($n$ =10) and with regard to completing the course for *TiP for TVIs* participants reported through e-mails. A discussion of the challenges and recommendations for negotiating challenges will be presented in Chapter V. The challenges noted by participant TVIs in e-mails were time constraints, workload issues, accessibility to Internet course, understanding of course organization and structure, and confusion around course materials and how they related to individualized students. Despite challenges, 8 of the 10 TVIs reported feeling they were better TVIs with the knowledge regarding iPads and accessibility ($n$ = 10). The feedback survey asked about various tools presented in the *TiP for TVIs* learning module. For example, Question #1 from the survey stated, "The learning module explained important concepts/ideas and answered questions in ways that I could understand." Eighty percent of the TVIs felt

either very satisfied or satisfied; one TVI reported some satisfaction and the final TVI reported dissatisfaction with the learning module in this regard (see Table 4.15).

The second table included from the feedback survey concerns the specialized materials created to specifically meet the needs of TVIs in the field of visual impairments: one page "quick start guides" (also called "white pages") and the evaluative iPad instruments, the iPad evaluation checklist, and iPad technology implementation plan. The white pages, implementation plans, and checklist were all rated as very effective or effective by 90% ($n$ = 9) of the responding surveyed TVIs ($n$ = 10). The questions are summarized in Table 4.16.

Table 4.15

*Learning Module Effectiveness Feedback*

| Question | Very Satisfied | Satisfied | Somewhat Satisfied | Neutral | Somewhat Dissatisfied | Dissatisfied | Total Responses |
|---|---|---|---|---|---|---|---|
| 1 | The learning module explained important concepts/ideas and answered questions in ways that I could understand. | 5 | 3 | 1 | 0 | 0 | 9 |
| 2 | The learning module stimulated my interest in using iPads for my students with visual impairments | 6 | 3 | 0 | 0 | 0 | 9 |
| 3 | Appropriate teaching techniques were used by the learning module to enhance my development | 6 | 3 | 0 | 0 | 0 | 9 |
| 4 | The learning module was well organized | 6 | 3 | 0 | 0 | 0 | 9 |
| 5 | Overall, the learning module effectively supported my learning | 5 | 4 | 0 | 0 | 0 | 9 |
| 6 | The learning module enrollment process was well organized. | 6 | 3 | 1 | 0 | 0 | 10 |
| 7 | The learning module organization in iTunes U was easy to follow on my mobile device (i.e., on your iPad) | 4 | 4 | 1 | 0 | 0 | 9 |
| 8 | The materials/handouts in the iTunes U module were easy to follow and download. | 7 | 1 | 0 | 2 | 0 | 10 |
| 9 | The suggested applications were helpful and organized | 8 | 1 | 0 | 0 | 1 | 10 |
| 10 | The format of the learning module being associated with the Expanded Core Curriculum was helpful to me in my job as a TVI | 8 | 1 | 0 | 0 | 1 | 10 |

Table 4.16

*Learning Module Materials: White Pages, iPad Evaluation, and Accessibility Tips and Strategies*

| # | Question | Very Effective | Effective | Ineffective | Very Ineffective | Total Responses |
|---|---|---|---|---|---|---|
| 1 | The white pages or "Quick Start Guides" were effective for my learning about apps or accessibility information related to iPads | 6 | 3 | 0 | 1 | 10 |
| 2 | The white pages or "Quick Start Guides" were effective for collaboration with other team members to help students be more successful with their iPads | 6 | 3 | 0 | 1 | 10 |
| 3 | The iPad evaluation checklist was an effective way to learn about what my student(s) will need associated with their iPad use. | 6 | 3 | 0 | 1 | 10 |
| 4 | The iPad Road-map helped give me an overarching view of how I might think of implementing an iPad | 4 | 4 | 0 | 2 | 10 |
| 5 | The iPad Technology Plan was an effective way to plan for my student's(s') iPad as a technology solution to be used in his/her program | 4 | 5 | 0 | 1 | 10 |

Participants who were unable to finish the learning module or struggled with completing the learning module reported various reasons via e-mail and on submitted surveys. Some examples of participant challenges communicated were that one participant reported a death in the family, and several other participants were unable to complete the learning module due to work constraints. Participant comments regarding the challenges associated with the module are summarized below.

Participant #3 noted that time was the primary factor for not finishing the module: "I honestly don't have any suggestions at this time. Unfortunately, I had a delay in utilizing the modules. I will devote more time to the modules in January." Participant #4 noted that it was overwhelming to know where to begin: "Just getting started was difficult." This comment was echoed by other participants. For example, Participant #5 said, "I was a little confused by the layout in the beginning and finding what I was supposed to be doing." Many of the participants who noted how much they wanted to work harder at the module did not have time or felt confused. Participant #8 said, "Time is needed to really focus on the modules. I found the information very interesting, and I wanted to do great job in understanding what I was reading and doing. The course is great, but time is needed to really apply the information being learned."

## Summary

This sequential mixed methods study found significant results in Phases I and II of this study. The survey instruments were first evaluated using a factor analysis, which provided four dependent variables: iPad knowledge and skills, iPad value, self-efficacy for student achievement using iPads, and self-efficacy for implementation of iPads with

students who are visually impaired. These four dependent variables were compared in order to obtain statistical data regarding whether one or more of the independent variables using multiple regression could predict the variables at $p < .05$. The independent variables were age, caseload size, service delivery model, and geographic region. The first factor, knowledge and skills, showed that Southern teachers felt more confident and TVIs who were older were less confident in this area. The second factor, iPad value, found only one significant correlation across all dependent variables: TVIs in residential schools did not value iPads as much as the other TVI groups. There were no other significant findings for this variable, showing that nearly all TVIs agreed iPads were highly valuable. The third factor, self-advocacy for student achievement using iPads, found that Southern teachers felt more confident in this area while age continued to be a predictor of less confidence around self-advocacy for achievement. The last factor, self-advocacy for implementation using iPads with students who have visual impairments, found that age was the only predictor of TVIs feeling less confident in this area.

Phase II showed significant findings for paired *t*-tests of the *TiP for TVI* learning module pre- and post-surveys. Statistically, a small number ($n = 12$ and $n = 10$ being very small sample sizes) would not have much statistical power. The only factor not surveyed was value since all TVIs in the module had reported high value. The paired *t*-test*s* for the remaining three factors were significant with TVIs improving in each area. Additionally, Phase II-2B and 2C provided thick, rich description of the qualitative results. Preliminary thematic categories were then tested using five intensive case study

participants and then evaluated for validity by two intercoder raters. The thematic categories that met the 100% agreement criteria were ECC-focused, individualized, independent and proficient, comprehensive, collaborative, challenged, device-focused, accessibility-focused, and narrowly-focused. The five intensive case study participants fell across the continuum of the SAMR model; each participant noted professional growth on their post-survey and intercoder agreement regarding each participant's growth.

# CHAPTER V

# RECOMMENDATIONS, SUMMARY, AND CONCLUSIONS

In this chapter, this iPad study regarding TVI levels of knowledge, skills, and self-advocacy is summarized with recommendations for future research. The purpose of this mixed methods research study was to describe and explain the progression of teacher professional development regarding assistive technology using iPads in an online learning format for TVIs. The learning module was piloted in the Spring of 2013 and the study was conducted during the Fall of 2013. The primary indicator of teacher growth from the professional development is generally defined as *transformative teaching,* which means teachers are redefining how technology is being used with students who have visual impairments. Puentedura's (2006) Substitution, Augmentation, Modification, and Redefinition (SAMR) model was used to describe teacher transformation.

The study was conducted in two phases. Significant results were found for each phase. In Phase I, 371 TVIs were compared in the areas of geographic region, age, caseload size, and service delivery model. A factor analysis was conducted in order to provide construct validity of the survey instrument. The four dependent variables were (a) level of satisfaction regarding iPad knowledge and skills, (b) value and importance of iPads being implemented with students who have visual impairments, (c) teacher self-efficacy around student achievement using iPads, and (d) teacher self-efficacy around promoting assistive technology with administration, parents, and educational teams. The following discussion summarizes and evaluates results for each of the research questions and offers recommendations for future research.

## Research Questions: Discussion and Evaluation

### Phase I: Research Question 1

What level of proficiency do TVIs have regarding use of iPads as assistive technology?

The initial research question concerned the level of TVI proficiency using iPads as assistive technology in a large national sample. The study hoped to survey a national sample of at least 250 TVIs in order to report significant findings that could be generalized to the estimated 6,500 TVIs nationwide (Academy for Certification of Vision Rehabilitation and Education Professionals, 2013). There was a larger response of 450 attempted surveys and 371 completed surveys nationwide. The largest TVI response came from the Midwest region of the United States, comprising 41% of the response group. The TVI sample was divided into five age categories from 20-70 years of age with 50-59 years composing the slightly highest group-31% of the participating TVIs. Additionally, the caseload size variable had a relatively even spread among participating TVIs; the largest group of respondents reported caseload sizes of 11-15 students, comprising 22% of the sample. The final independent variable was the TVI service model, which was mostly itinerant, comprising 80% of the survey respondents.

The two measures of TVI response, the self-reporting and statistical data analysis, allowed the study to report a summary of TVI knowledge and skills in the United States. Within the Phase I national TVI sample, 51% of TVIs reported not feeling confident implementing iPads as assistive technology, which could be compared to 98% of TVIs reporting that they highly valued iPads for students with visual impairments.

Additionally, TVIs were asked how satisfied they felt regarding the availability of information of assistive technology for students who are visually impaired; 35% reporting being dissatisfied with this information. When asked the question regarding troubleshooting technology, 54% reported being dissatisfied with the level of instruction in this area. There are several important issues to discuss with the preliminary self-reported data. First, TVIs reporting a lack of satisfaction and confidence using iPads and troubleshooting iPad issues could mean that TVIs were not implementing iPads with their students at all. Previous research has found TVIs who were not comfortable with technology did not implement it with their students (Johnstone et al., 2009). Further, if TVIs were only being exposed to assistive technology, potentially iPads, in their professional development or university teacher education programs at an awareness level (Smith & Kelley, 2007), then they were less likely to feel proficient enough to troubleshoot when problems arose. In turn, TVIs implementing iPads, despite their lack of expertise, might be quick to abandon the iPad when they hit challenges.

The statistical analysis showed an inverse relationship for the independent variable of age with TVI iPad knowledge and skills-the older participating TVIs were, the more likely it was they were dissatisfied and not confident of their iPad knowledge and skills. The TVI responses were highly significant in this area with one exception-TVIs in the South felt a significant level of satisfaction regarding iPad knowledge and skills. As initially posed in the introduction of this dissertation, in the small field of visual impairment (VI), it is difficult to find empirical evidence pertaining to best assistive technology strategies for this student population (Zhou et al., 2012). This issue could be

compounded if students are visually and multiply impaired, which describes 60% of the K-12 population of students with visual impairments (Sacks and Silberman, 1998). Students who are visually impaired with multiple impairments have a complex set of issues presented to a TVI around implementing technology such as accessibility issues, training of other teaching professionals and paraeducators, collaborating with family for assistive technology training, understanding the complexity of need around a set of disabilities, and being able to solve input and output issues with technology when troubleshooting a student's physical, cognitive, sensory, and behavioral abilities (Copley & Ziviani, 2004; Zhou et.al., 2012). Thus, it is especially important that TVIs feel confident and comfortable teaching about and implementing assistive technology. This national snapshot reported 98% of TVIs highly valuing iPads while only 49% reported feeling confident implementing them. In turn, if TVIs do not feel confident implementing iPads as assistive technology with students who are only visually impaired, then there may be even less likelihood they will introduce one to a student with multiple impairments. Furthermore, there is already anecdotal research being published promoting a division in the larger field of special education where academic students are using iPads for educational purposes and students receiving a functional academic program are reported as using iPads for recreation and leisure or choice time activities (Kagohara, 2011; Walls & Palak, 2009).

The practical implications of these results are many for the field of visual impairment. In the area of iPad knowledge and skills, more professional development needs to be linked to the needs of students who are visually impaired. Additionally, there

needs to be more access to professional development offerings in all regions. Lastly, researchers could examine what programs are being implemented in the South that are creating more confident TVIs in using iPads. The state-to-state table provides an overview of states with increased participation (See Table 4.1). Researchers could conduct multi-state comparative research to learn more about regional differences in professional development offerings and support. In the field, as in this study, a large group of TVIs is older (50-70 years of age) who will either continue teaching for five or more years or will retire within the same time. Regardless, the pressing need to help older TVIs feel more confident using iPads as assistive technology cannot have been more clearly stated. Coupled with the learning module feedback reporting confusion for many TVIs in Phase II as well as the high level of attrition in Phase II, researchers need to think about ways to engage older TVI audiences who are not as comfortable with technology. For instance, participant feedback suggested that a diversified, hands-on, and face-to-face set of professional development offerings is recommended for TVIs who are older and less comfortable with technology. Participant #1 noted,

> The organization was very difficult for me to understand. When I open the module, I have what appears to be a book with 79 messages in it. When I go in to that, I see 171 “messages” and truly have no idea where to start sifting through all of that. I've looked at the list of 67 apps and some of the documents, but there doesn't seem to be any kind of organization within that to help me. On the main page, there are posts and assignments. The posts are listed by date, but not by topic, so it's hard to sort through for me. The assignments don't appear to be assignments, but rather resources, so I have been somewhat confused by that.

In this feedback, the participant could have solved the organization issue with one simple change in the module viewing options. Participants who were more comfortable with the technology were able to quickly learn the viewing options and reported that they

had a positive experience with the module. Participant #6 explained, "[The learning module] seemed overwhelming at first, but beyond that it was well worth that initial leap of faith." The issues regarding TVI confidence using technology to access a professional development learning module was a complex challenge. On one hand, TVIs practicing the use of technology in order to access professional development regarding the same technology creates a valuable opportunity for experiential learning on the actual device. An alternative view is that the technology creates an additional barrier, becoming a counter-productive effort. Both the negative and positive aspects to this continuum were evident in this study. Research could provide a much-needed process to help improve the challenges associated with professional development being provided using technology.

Additionally, when searching for follow-up iPad-related studies to include in these concluding narratives, a search in a highly respected publication, *Journal of Visual Impairment & Blindness,* only located five records total with iPads included in the article content. More experimental and intervention-based studies are warranted to help build a foundation of best practices when using assistive technology in general with students who are visually impaired and, specifically, with regard to using iPads with this population.

**Phase I: Research Question #2**

What are the perceived values teachers place on using iPads as assistive technology with students who have visual impairments?

In Phase I's national survey, 98% of TVIs reported feeling iPads were of high value to students with visual impairments. Unfortunately, much of the information regarding the use of AT in visual impairment education is outdated, anecdotal, or merely

product reviews outlining what a device could do if implemented (Kelly & Wolffe, 2012; Smith & Kelly, 2007). There are significant positive outcomes for adults who have impairments when they have the increased independence of using assistive technology (Yeager et al., 2006). In K-12 educational programs serving students with visual impairments, researchers Kelly and Wolffe (2012) examined the percentage of transition-age students with visual impairments who were using the Internet regularly and found only 43% of transition-aged youth with visual impairments were using the Internet regularly to socialize, for research, or for any other everyday task. Primary determining factors that characterized 43% of participants using the internet were if they had a job, were in post-secondary training, or volunteered regularly in the community. In another study, Kelly (2011) found that only 46% of academically-oriented high school students with visual impairments were using high-tech AT in their classrooms. The iPad-related studies within the field of visual impairment by Spungin (2012), Campana (2013), Kuber et al. (2012), and Hong (2012) provided recommendations for more optimized use of the screen reader, anecdotal stories of adults using iPhones, and suggestions for apps that might be beneficial to early childhood students or K-12 students. There were not many studies regarding the systematic implementation or empirical benefits of students with visual impairments although 98% of the TVIs surveyed agreed that iPads were highly valuable to students.

Recommendations for further research in this area, apart from empirical research regarding the implementation and increased accessibility of iPads, is research validating the importance of iPads as a promising assistive technology device with a wide variety of

students who are visually impaired. The field of visual impairments, being as small as it is with such a high level of diversity of student ability, is hoping to find a device that can be accommodating to a large sample of the population. This could be one reason iPads are highly valued since there are so many accessibility features (Apple, 2013) and assistive technology producers are creating products to further ensure more accessibility with students who are multiply-impaired. The field of visual impairments is generally described as having the majority (60%) of students with visual and multiple impairments (Sacks and Silberman, 1998).

Demographic data collections related to TVI iPad knowledge, skills, and value were presented previously in Chapter IV. Many of the categories listed what students would like to do with their assistive technology and specifically using iPads could each be their own experimental study. The categories rated the highest were reading, entertainment, accessing materials using accessibility features, accessing their schoolwork and homework, playing games, and to socialize. In addition to the iPad-specific questions, teachers expressed interest in students using iPads as augmentative communication devices, for playing games, and to increase collaboration with teachers and peers.

**Phase II: Research Question #3**

How will participation in this intervention using an online LMS (iTunes U) increase a teacher's sense of transformative teaching self-efficacy for using assistive technology?

Paired *t*-test*s* showed significant results for all three of the four dependent variables surveyed in Phase II. The dependent variable regarding iPad value was not surveyed in Phase II since all participants included in Phase II had already agreed that iPads were of high value to the field of visual impairment. The learning module had a promising effect on TVIs' reported iPad knowledge and skills; reported ratings were 3 and 4 on a scale of 1-10 with 10 being the highest. These ratings rose to ratings of 7-8 after the learning module. Despite the post learning module feedback that provided a small set of participants with which to conduct paired *t*-tests, the data still provided a strong foundation of empirical evidence, showing that providing an intervention could be an effective development to further teacher knowledge and skills. An online learning module might not be as effective as a face-to-face professional development intervention, but it might be the next best alternative. Overall, the most effective teacher education programs and professional development are hands-on, active learning where co-teaching and learning while teaching is an integral part of the process (Avalos, 2011; Darling-Hammond & Richardson, 2009). However, in the field of visual impairment, online teacher education programs and professional development are commonplace. Bickford (2006) noted the importance of programs serving TVI candidates being online to help address the growing shortage of TVIs who are located in rural or urban areas with no access to a certification program. Ajuwon and Craig (2007) noted that 20 of the 32 programs offering TVI certification had an online component with many of the programs completely online. From the data provided in Phase II of this study, it is clear that an online learning module would be an effective option for teacher training in the field of

visual impairment. There are numerous recommendations for best practices in an online learning environment that might enhance positive outcomes for this online format (Ko & Rossen, 2004).

In contrast to the positive outcomes, the amount of attrition and TVI feedback regarding the online format that could provide useful feedback for the field of visual impairment must also be noted. On one hand, an online module is an effective intervention, but on the other hand, many TVIs struggled to understand the information and required extensive assistance in the asynchronous format. It becomes nearly impossible to provide a program with engagement, interaction, and hands-on learning if students are only able to log onto a Learning Management Software (LMS) in order to complete coursework (Dawley, 2007; Ko & Rossen, 2004; Svinicki & McKeachie, 2011). Additionally, the importance of ongoing, team-based, and experiential learning consistent with a teacher's caseload and/or classroom needs is important for learning to occur (Avalos, 2011; Cohen & Hill, 2001; Darling-Hammond & Richardson, 2009). Some potential recommendations for future research and interventions in this area might include online learning modules with discussion forums and weekly interactive class meetings (Bickford, 2006), online learning modules with a hybrid format that require a face-to-face workshop (Pogrund & Smith, 2012), and learning groups within school districts where teachers regularly meet and reflect on their practice. Additionally, due to TVI-reported high value in this research study, connecting learning development models to the thematic categories most included in TVI iPad implementation plans to increase TVI engagement and learning, (i.e., TVIs included ECC-focused and accessibility-

focused components in iPad plans and professional development could organize learning modules in these areas to increase engagement).

2a Was the intervention effective with regards to increasing teacher's sense of transformative self-efficacy; why or why not?

In Phase II-2b and 2c, the qualitative results were initially summarized with preliminary thematic categories that were then tested using five intensive case study participants and then evaluated for validity by two intercoder raters. The five intensive case study participants exhibited thematic categories that met the 100% agreement criteria in that they were ECC-Focused, Individualized, Independent & Proficient, Comprehensive, Collaborative, Challenged, Device-Focused, Accessibility-Focused, and Narrowly-Focused. Even though the participants fell across the continuum of the SAMR, one participant in particular reached redefinition, the highest level of the SAMR model, and could be considered as transforming his/her teaching practice using iPads. An intercoder rater noted when suggesting the reasoning behind choosing redefinition was that the participant "[was redefining their practice] especially in O&M [orientation and mobility] activities, iPad being used for previously inconceivable route-finding" (regarding participant 8/04). The other participants who fell lower on the SAMR model also made strides toward transformation, but the progression towards transformation takes time.

Challenges that TVIs might have felt about becoming more transformative with technology could have been numerous. Time constraints and holiday obligations might have prohibited TVIs from being able to complete the case study plans. Additionally,

teachers must feel open to the process of transforming and allow themselves to wonder, fail, and experiment. Clarke and Hollingsworth (2002) developed the Interconnected model, which is composed of four domains: the personal domain, the domain of practice, the domain of consequences, and the external domain. Potentially, TVIs in this study may not have felt enough desire in the domain of consequence or the external domains, which would have led to more collaboration or implementation. This model is a dynamic one, in which teachers progress in a non-linear way toward professional development. The SAMR model is more linear in its approach but allows teachers to rate their own transformation using specific apps or previous learning activities to compare to transformed activities. Oostveen et al. (2011) used the SAMR model to determine whether any of the 31 university students given a tablet would transform and redefine the way they used technology in a research study over the course of one academic year. They noted that there were no cases of students redefining their use of technology, although students increased their use of technology and diversified the ways in which technology helped promote their learning. Several studies and professional development guides have cited the SAMR model as helpful in decision-making regarding how to transform technology use for students (Mueller, Archer, & White, 2013; Oakley, Howitt, Garwood, & Durack, 2013). Despite the fact that only one TVI of the five intensive case study participants indicated he/she had transformed his/her teaching, each TVI increased his/her technology use and implementation more than had been done prior to the study. The SAMR model primarily describes teachers transforming instruction by including technology tasks that were previously inconceivable. It could be argued that nearly all

technology tasks implemented by TVIs with students who have visual impairments fall into this category since iPads are the first touch screen tablet devices to include a free screen reader, promoting access by users who are blind or visually impaired. Additionally, TVIs are already being asked to do a large continuum of tasks within the confines of one teaching job, and to add technology instruction to the list is already insurmountable to some TVIs. Griffin-Shirley et al. (2004) found:

> Teachers spent an average of 7 hours per week traveling, 8 hours engaging in nonteaching responsibilities, and 7 hours teaching compensatory or functional academic skills. They spent an average of 4 hours in assessment and program planning activities, 2 hours in usage of assistive technology, 2 hours on O&M skills, 2 hours on visual efficiency skills, and 2 hours on basic concepts. Sixty minutes or less per week were spent in each of the following areas: 0.3 hour in teaching recreation and leisure skills, 1 hour on social interaction skills, 1 hour on independent living skills, 0.8 hour on prevocational skills, 0.3 hour on communication skills to students with deafblindness, and 0.5 hour on providing direct care to students. (p. 7)

In the same research study, teachers reported teaching about CCTVs and using computers for word processing with regular or large print 65% of the time. The numbers were lower for using computers with synthesized speech (52%); the remaining two categories with numbers over 40% were using a printer and braille embosser. With this time allotment in mind, to spend more than two hours on assistive technology and include students with multiple impairments in assistive technology instruction could be considered transformative.

Two recommendations for future support for TVIs to focus on transforming their teaching using assistive technology, specifically iPads, would be more administrative support with professional development days provided and increased district support to troubleshoot and learn about assistive technology (Alper & Raharinirina, 2006; Darling-

Hammond & Richardson, 2009). Finally, TVIs need to feel enough desire and value in what they are learning in order to progress to higher levels of transformative teaching using technology. Since TVIs are ultimately responsible for implementing and teaching about assistive technology (Johnstone et al., 2009), it would help to create increased incentives, (e.g., additional licensures, professional development hours for assistive technology training, or salary increases for multiple competency areas). TVIs are being asked to take on another job when implementing assistive technology with their students. Unlike other areas of special education where there might be more assistance from technology professionals in the school district, with the exception of teachers working with students who are deaf and hard of hearing, TVIs are often on their own to develop, implement, and evaluate the effectiveness of assistive technology since the accommodations, such as screen readers, are so particular to the field of visual impairment (Johnstone et al., 2009).

2b What were the challenges associated with completing the course and course assignments?

There were numerous challenges associated with completing the *TiP for TVIs* learning module reported by participants. Many of the limitations were summarized in Chapter I: limited planning time, student and teacher resources, and administrative support for implementation and/or learning about iPads. Additionally, the study was conducted from the end of October until the first week of January. With the study being conducted over the fall holiday season, it was highly probable that Phase II would lose many participants due to family and holiday priorities. The last limitation known before

initiating the study was that the latest iOS update and new version of Apple's iPad would cause some of the learning module materials to be irrelevant for some of the study participants who had newer technology or updates. Although this last limitation did not come up in TVI feedback, it might have played a part in TVI confusion on aspects of the module since their iPad would have looked different than the iPad being used to demonstrate the skill or app. Such ongoing changes and updates in technology are a challenge for any assistive technology instruction.

Chapter IV noted the high level of attrition for TVIs participating in Phase II of the study. The 76% attrition rate of TVIs completing the *Tip for TVIs* module assignments might have led to the high levels of TVIs dropping out on the final module surveys as well. For many of the TVIs who were older and struggling with the fundamental concepts of using their iPad, having to access the course on their iPad might have been a barrier to completing the assignments. When reviewing the TVI log on the iTunes U course manager website, several TVIs had only logged onto the course once or twice. One TVI who completed the case study assignment did not appear to use the course since he/she only had one login at the very beginning of the study. A potential way to help mediate this barrier was to send participants a print packet of materials, which all 30 of Phase II participants received. Additionally, participants were welcome to call or e-mail the researcher if they encountered issues. Several notes on the feedback survey indicated the troubleshooting contact with the researcher was reassuring.

Despite the issues mentioned above, there are numerous ways to potentially mediate the problems associated with increasing teacher learning opportunities. The

participants might have benefitted more from a live webinar or face-to-face workshop that could walk them through using the learning module on their iPads. Additionally, technology will always require troubleshooting and workarounds since that is the nature of technology. The TVIs might have been in an unfortunate position in this regard if they did not feel technologically savvy. Since Apple's technology is a mainstream technology promoting ease of use, it might have caused teachers to become frustrated when it did not work smoothly each time. Helps and Herzberg (2013) built upon earlier studies using Apple's portable tablets and broke down steps into a task analysis for a case study student with visual and multiple impairments. More experimental studies such as this would help TVIs think about the steps needed to execute an activity for a student or teacher using an iPad. Lastly, professional development and university programs should ensure that they are building a higher level of assistive technology understanding beyond the awareness level, which does not provide enough hands-on and experiential learning for TVIs (Pogrund & Smith, 2012; Smith & Kelly, 2007).

## Recommendations for Future Researchers

This study provided a solid foundation of TVI iPad knowledge, skills, and self-efficacy at a national level. It also provided an intervention that was determined to be effective by those who completed the learning module. It was clear that TVIs working in the field of visual impairment highly valued iPads, and although iPads are not a perfect AT solution for every student, TVIs agreed iPads were valuable to the field of visual impairment. Many aspects of the study could be changed or modified that might help pave the way for more effective professional development for TVIs in the area of

assistive technology, specifically using iPads as assistive technology. The intervention learning module would be better if presented face-to-face or through a webinar in real time for participants just learning how to use iTunes U or iPads. Additionally, the learning module would be better if it was open for unlimited time and had an area for collaboration or discussion. Unfortunately, Apple's iTunes U does not provide a discussion option but there are apps available that provide this function such as Piazza. One item missing was that adult learners, just as K-12 learners, needed opportunities to reflect on their learning and adjust their pedagogy within a group of other learners (Darling-Hammond & Richardson, 2009; Meizrow, 1997; Svinicki & McKeachie, 2011; Zhou et al., 2011). Adults need opportunities to apply their learning in meaningful contexts just as students do (Dewey, 1938); in addition, adults need to feel what they are learning is valuable, important, and that they will be successful in learning it (Cohen & Hill, 2001; Wigfield & Eccles, 2000).

There are numerous research studies that could be conducted using this study. Researchers could conduct research on each area of the ECC using an iPad as the intervention AT tool for increased success and learning for students with visual impairments. Additionally, researchers could study both the teacher and student progression towards independence and proficient use of iPads in each area of the ECC. Research questions may be regarding whether one area of the ECC (e.g., career education and independent living) is more effectively adapted to iPad use than communication modes in the area of compensatory skills.

Apart from ECC-related studies, researchers could conduct studies of the effectiveness of online synchronous or asynchronous professional development modules regarding assistive technology using this study as a foundation for improved learning outcomes. *TiP for TVI* participants offered feedback regarding more interaction, different organization, and a clearer outline of module progression, which may lead to better outcomes for TVIs. The Academy for Certification of Vision Rehabilitation and Education Professionals (ACVREP, 2013; Ajuwon & Craig, 2007) reported that 20 of the 32 programs in the United States had online components to meet the needs of the TVI shortage and geographic challenges. As noted previously, Bickford (2006) examined the effectiveness of online programs serving TVIs, summarizing that university programs could increase effectiveness by providing for engagement with faculty who are flexible and responsive. Potential recommendations also came from Chmiliar and Cheung (2007) who created an entire online course instructing special education teachers about AT. The course had positive feedback and included a lending library, which would be a beneficial addition to any AT course. More research needs to be conducted on the effectiveness of using online learning modules to transform the levels of technology implementation for students who are visually impaired. Further, research focused on bridging the challenges associated with uncomfortable technology users using online formats to professionally develop.

Additionally, using learning module content similar to the *TiP for TVIs* collaborative and curriculum focused framework, researchers could conduct intervention studies examining the effectiveness of TVIs increased collaboration or planning for AT

implementation using researched intervention tools. There could be separate research studies examining TVI progress as it relates to any of the professional development models presented in this study (Puentedura, 2006; Wigfield & Eccles, 2000). Lastly, due to the high level of TVI feedback regarding high iPad value, there could be longitudinal studies of TVI progress as technology continues to evolve and become more accessible, specifically related to iPads. These studies could be coupled with longitudinal research regarding the increased level of student user with visual impairments to adult user with visual impairments adopting iPads as a personal device over other AT devices that come available.

Further, due to the high level of iPad value and potential use, research studies could lead to a greater level of evidenced-based curriculum and instruction which can help increase the effectiveness of iPad implementation in the field of visual impairment. TVIs can collaborate using online forums on lesson planning and accessibility tips regarding the most effective iPad practices. This research can create evidence-based resources, which can be included in updated assistive technology textbooks and articles improving the level of intervention-based research in the field of visual impairment related to assistive technology.

## Summary and Conclusions

It is clear that iPads are highly valued, and if teachers are not exposed or confident using Apple's mobile technology, they will not include it as a possible assistive technology device (Day & Huefner, 2003; Kelly, 2009) despite highly valuing them. Additionally, due to the lack of research, TVIs do not have evidence-based practices

(EBPs) to use when/if they choose to implement iPads as the assistive technology device in their students' programs (Zhou et al., 2012). This study provided a national snapshot of TVIs' perceptions of what students would like to do with their iPads. It would be beneficial to take that list a step further and implement experimental studies with each item provided in order to create a foundation of evidence-based practices.

This study hoped to address effective professional development practices using online formats, evidence-based practices using iPads for students with visual impairments, and growth patterns of TVIs attempting to become more proficient technology users and teachers. Numerous facets of the study addressed each of these items and also provided feedback regarding where more research was needed. More studies need to be conducted using experimental methods to build evidence-based practices using iPads with students who are visually impaired and/or multiply impaired. On the learning module feedback surveys, TVIs were asked specifically about the effectiveness of linking iPads to the ECC, which was highly rated. This approach might be a promising recommendation for the field of visual impairment to integrate assistive technology throughout the school day and connect it to the ECC.

Additionally, further study is needed to address the adult learning needs in online formats due to the high rate of online learning formats for TVIs both in university programs, as well as in post-graduate professional development offerings. Studies that provide empirical evidence regarding asynchronous and synchronous formats with and without discussion forums or interactive components would help university and professional development implementers create more effective learning activities.

The world is becoming more reliant on technology everyday with educational movements like flipping the classroom, where students learn about content at home using technology and come to school to collaborate and practice previously learned content. Additionally, school districts are exponentially moving towards one-to-one technology to student learning models (Project Red, 2012). What does that mean for students with visual impairments who might already be exponentially behind their peers in technology use? According to App Store Metrics (Scott, 2014) there are a total of 1,108,360 active apps available for download on iPhones. During the year this dissertation research was conducted each month, per day, 857 apps were published in the App store (2014). Of those apps, it is not reported how many will be accessible using VoiceOver or how many apps would increase the level of independence and proficiency as it relates to the ECC for students with visual impairments. However, if one or more of those 857 apps published per day addresses an AT need for a student with visual impairments, would it not benefit the field and more importantly, students, to have researched evidence-based practices supporting the use of those applications? The need to address assistive technology learning for both student and teacher in the field of visual impairment is a current and pressing issue needing solutions, support, and increased development.

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# APPENDIX A

Ipad Knowledge and Skills Survey and the Learning
Module Feedback Survey from Pilot Study

## iPad Knowledge and Skills Survey

**iPad Knowledge and Skills**

| | Very Satisfied | Satisfied | Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|
| How satisfied are you with the level of instruction you have received around teaching assistive technology to your student who are visually impaired? | ○ | ○ | ○ | ○ |
| How satisfied are you with the instruction you have received about troubleshooting technology for your students who are visually impaired? | ○ | ○ | ○ | ○ |
| Are you satisfied with how informed you are about what is available for students who are visually impaired needing assistive technology? | ○ | ○ | ○ | ○ |

**iPad Value and Use for Students with Visual Impairments**

| | Extremely Important | Very Important | Neither Important nor Unimportant | Very Unimportant | Not at all Important |
|---|---|---|---|---|---|
| How important do you feel it is for students who are visually impaired to have access to technology? | ○ | ○ | ○ | ○ | ○ |
| How valuable do you think technology is for your students who are visually impaired? | ○ | ○ | ○ | ○ | ○ |
| How strongly do you feel about your students having access to technology in their classrooms (i.e. general education or special education)? | ○ | ○ | ○ | ○ | ○ |

**How confident do you feel helping your students and other related professionals to troubleshoot anc use the technology that your student uses?**

Extremely Confident

://s.qualtrics.com/ControlPanel/Ajax.php?action=GetSurveyPrintPreview&T=2eO5jf

- Confident
- Somewhat Confident
- Not Confident

**What kinds of tasks or activities do you find your student's are interested in doing using technology?**

- To socialize
- To play games
- To access their homework
- To access their schoolwork
- To access materials related to their visual impairment i.e., troubleshoot using technology
- To access materials using accessibility features on technology device i.e., screen readers, screen magnification software
- To collaborate with peers or teachers (also communicate)
- For entertainment
- For reading
- For orientation and mobility
- For their job or work programs
- For safety purposes
- As an augmentative communication device

**What kinds of tasks or activities do you find your students are interested doing on their iPads (if applicable)?**

- To socialize
- To play games
- To access their homework
- To access their schoolwork
- To access materials related to their visual impairment i.e., troubleshoot using technology
- To access materials using accessibility features on technology device i.e., screen readers, screen magnification software
- To collaborate with peers or teachers (also communicate)
- For entertainment

- For reading
- For orientation and mobility
- For their job or work programs
- For safety purposes
- As an augmentative communication device

**What would you say is your greatest strength in implementing technology with your students?**

**What would you say is your greatest need area for implementing technology for your students with sensory impairments?**

**Please rate items on sliding scale.**

| | Not at all | | Very Little | | Some influence | | | Quite a bit | | A great deal | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| How much can you influence your students access to assistive technology? | | | | | | | | | | | |
| How much can you freely advocate for your student's technology needs? | | | | | | | | | | | |
| How much can you | | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| How much can you obtain access to the technology instruction materials you need and other individualized technology accessories for your student? | | | | | | | | | | |
| How much can you influence your student's learning? | | | | | | | | | | |
| How much can you promote learning when there is a lack of support from home? | | | | | | | | | | |
| How confident are you implementing Expanded Core Curriculum using technology? | | | | | | | | | | |
| How confident are you implementing technology with your students who have multiple disabilities and a visual impairment? | | | | | | | | | | |
| How sure are you that you can learn a new technology skill if you needed to for your student? | | | | | | | | | | |
| How much can you influence your student's feelings of self confidence around their school work? | | | | | | | | | | |
| How much confidence do you have in helping your student learn independent living skills? | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| How much can you obtain access to the technology instruction materials you need and other individualized technology accessories for your student? | | | | | | | | | | |
| How much can you influence your student's learning? | | | | | | | | | | |
| How much can you promote learning when there is a lack of support from home? | | | | | | | | | | |
| How confident are you implementing Expanded Core Curriculum using technology? | | | | | | | | | | |
| How confident are you implementing technology with your students who have multiple disabilities and a visual impairment? | | | | | | | | | | |
| How sure are you that you can learn a new technology skill if you needed to for your student? | | | | | | | | | | |
| How much can you influence your student's feelings of self confidence around their school work? | | | | | | | | | | |
| How much confidence do you have in helping your student learn independent living skills? | | | | | | | | | | |

## Learning Module Feedback Survey

**Learning Module Effectiveness Feedback**

| | Very Satisfied | Satisfied | Somewhat Satisfied | Neutral | Somewhat Dissatisfied | Dissatisfied |
|---|---|---|---|---|---|---|
| The learning module explained important concepts/ideas and answered questions in ways that I could understand. | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module stimulated my interest in using iPads for my students with visual impairments | ○ | ○ | ○ | ○ | ○ | ○ |
| Appropriate teaching techniques were used by the learning module to enhance my development | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module was well organized | ○ | ○ | ○ | ○ | ○ | ○ |
| Overall, the learning module effectively supported my learning | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module enrollment process was well organized. | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module organization in iTunes U was easy to follow on my mobile device (i.e. on your iPad) | ○ | ○ | ○ | ○ | ○ | ○ |
| The Materials/handouts in the iTunes U module were easy to follow and download. | ○ | ○ | ○ | ○ | ○ | ○ |
| The suggested applications were helpful and organized | ○ | ○ | ○ | ○ | ○ | ○ |
| The format of the learning module being associated with the Expanded Core Curriculum was helpful to me in my job as a TVI | ○ | ○ | ○ | ○ | ○ | ○ |

**Learning Module Materials: White Pages, iPad Evaluation and Accessibility Tips and Strategies**

| | Very Effective | Effective | Ineffective | Very Ineffective |
|---|---|---|---|---|
| The white pages or "Quick Start Guides" were effective | | | | |

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**How can the module be improved in your opinion?**

**What would you change about the learning module?**

**What applications, professional development supports, or information is missing from the learning module regarding using iPads for students who have visual impairments?**

**What was your favorite and least favorite aspect of the learning module?**

**Do you feel that you are a better teacher with this knowledge regarding iPads and accessibility?**

- Definitely yes
- Probably yes
- Probably not
- Definitely not

| | | | | |
|---|---|---|---|---|
| for my learning about apps or accessibility information related to IPads | ○ | ○ | ○ | ○ |
| The white pages or "Quick Start Guides" were effective for collaboration with other team members to help students be more successful with their IPads | ○ | ○ | ○ | ○ |
| The IPad evaluation checklist was an effective way to learn about what my student(s) will need associated with their IPad use. | ○ | ○ | ○ | ○ |
| The IPad Road-map helped give me an overarching view of how I might think of implementing an IPad | ○ | ○ | ○ | ○ |
| The IPad Technology Plan was an effective way to plan for my student(s) IPad as a technology solution to be used in his/her program | ○ | ○ | ○ | ○ |

**What was the most significant thing you learned from the iPad Learning Module?**

**What supports were the most helpful within the learning module to help you?**

**How will you apply what you learned in the iPad Module?**

**How important would it be for you to have Continuing Education credits associated with an online course like the iPad Learning Module on iTunes U?**

- ◯ Extremely Important
- ◯ Very Important
- ◯ Somewhat important
- ◯ Not at all Important

# APPENDIX B

## Revised iPad Knowledge and Skills Survey and the Learning Module Feedback Survey

### iPad Knowledge and Skills Survey

**iPad Knowledge and Skills-Final**

**Information regarding iPad Knowledge and Skills Survey**

**Instructions: This project is meant to learn more about your knowledge and skills regarding iPads for students with visual impairments. You are being asked to complete a short electronic survey inquiring about your perceived level of comfort and proficiency using iPads as assistive technology. Below is a set of frequently asked questions to give you more information regarding the project.**

**What is this project studying?**
**We want to learn more about the effectiveness of iPads for students who have visual impairments. We also want to learn how to help teachers use iPads to work with students with visual impairments.**

**What will I do if I participate?**
**You will be completing a short electronic survey. If you are open to participating in the iTunes U, Transform iPads for TVIs (TiP for TVIs) learning module please indicate that at the end of your survey. More information about the TiP for TVIs will follow and you can opt to complete it or not complete.**

**Can I quit if I become uncomfortable?**
**Yes, absolutely. Dr.Rona Pogrund, Tara Mason, and Texas Tech University's Human Research Protection Board have reviewed the activities, and they think you can perform them comfortably. However, you can stop participating at any time or change your mind or skip questions if needed. Participating is your choice.**

**How long will participation take?**
**Your participation will be 10-15 minutes for the electronic survey.**

**How are you protecting privacy?**
**Your privacy is very important to the researchers! The survey does ask for your name and e-mail in order to give you access to the iPad Learning Module (TiP for TVIs) if you are interested in completing it. Your name is only for the purposes of the iTunes U module; you will not be identified in any other way regarding your responses to the survey. Your feedback is completely private and will never be associated with your name.**

**I have some questions about this study. Who can I ask?**
**• The study is being conducted by Dr. Rona Pogrund and Tara Mason from the Special Education Program in the College of Education at Texas Tech University. If you have questions, you can call Tara at 281-703-8074.**
**• TTU also has a Board that protects the rights of people who participate in research. You can ask them questions at 806-742-2064. You can also mail your questions to the Human Research Protection Program, Office of the Vice President for Research, Texas Tech University, Lubbock, Texas 79409.**

**How will I benefit from participating?**
**There is no compensation for your participation. There is a small monetary incentive associated with completing the iTunes U course of a $10 iTunes card for apps and your increased iPad proficiency may benefit your students.**

**To complete this survey, please hit the next arrow below.**

**Contact Information: Name and E-mail**

**Please fill in the state in which you work.**

**Please indicate your age range from the options below.**

- 20-29 years of age
- 30-39 years of age
- 40-49 years of age
- 50-59 years of age
- 60-70 years of age

**Please indicate your caseload size.**

- less then 5 students
- 6-10 students
- 11-15 students
- 16-20 students
- 21-25 students
- 26-30 students
- 31 students or more

**Please indicate the service delivery model in which you work.**

- itinerant

- Resource room
- Self-contained classroom
- Residential school
- Other

**iPad Knowledge and Skills**

| | Very Satisfied | Satisfied | Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|
| How satisfied are you with the level of instruction you have received around teaching assistive technology to your student who are visually impaired? | ○ | ○ | ○ | ○ |
| How satisfied are you with the instruction you have received about troubleshooting technology for your students who are visually impaired? | ○ | ○ | ○ | ○ |
| Are you satisfied with how informed you are about what is available for students who are visually impaired needing assistive technology? | ○ | ○ | ○ | ○ |

**iPad Value and Use for Students with Visual Impairments**

| | Extremely Important | Very Important | Neither Important nor Unimportant | Very Unimportant | Not at all Important |
|---|---|---|---|---|---|
| How important do you feel it is for students who are visually impaired to have access to technology? | ○ | ○ | ○ | ○ | ○ |
| How valuable do you think technology is for your students who are visually impaired? | ○ | ○ | ○ | ○ | ○ |
| How strongly do you feel about your students having access to technology in their classrooms (i.e., general education or special education)? | ○ | ○ | ○ | ○ | ○ |

**How confident do you feel helping your students and other related professionals to troubleshoot and use the technology that your student uses?**

- ◯ Extremely Confident
- ◯ Confident
- ◯ Somewhat Confident
- ◯ Not Confident

**What kinds of tasks or activities do you find your student's are interested in doing using technology?**

- ☐ To socialize
- ☐ To play games
- ☐ To access their homework
- ☐ To access their schoolwork
- ☐ To access materials related to their visual impairment i.e., troubleshoot using technology
- ☐ To access materials using accessibility features on technology device i.e., screen readers, screen magnification software
- ☐ To collaborate with peers or teachers (also communicate)
- ☐ For entertainment
- ☐ For reading
- ☐ For orientation and mobility
- ☐ For their job or work programs
- ☐ For safety purposes
- ☐ As an augmentative communication device

**What kinds of tasks or activities do you find your students are interested doing on their iPads (if applicable)?**

- ☐ To socialize
- ☐ To play games
- ☐ To access their homework
- ☐ To access their schoolwork
- ☐ To access materials related to their visual impairment i.e., troubleshoot using technology
- ☐ To access materials using accessibility features on technology device i.e., screen readers, screen magnification software
- ☐ To collaborate with peers or teachers (also communicate)

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- ☐ For entertainment
- ☐ For reading
- ☐ For orientation and mobility
- ☐ For their job or work programs
- ☐ For safety purposes
- ☐ As an augmentative communication device

**What would you say is your greatest strength in implementing technology with your students?**

**What would you say is your greatest need area for implementing technology for your students with sensory impairments?**

**Please rate items on sliding scale.**

| | Not at all | | Very Little | | Some Influence | | Quite a bit | | A great deal | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| How much can you influence your students' access to assistive technology? | | | | | | | | | | | |
| How much can you freely advocate for your students' technology needs? | | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| How much can you obtain access to the technology instruction materials you need and other individualized technology accessories for your student? | | | | | | | | | | |
| How much can you influence your students' learning? | | | | | | | | | | |
| How much can you promote learning when there is a lack of support from home? | | | | | | | | | | |
| How confident are you implementing Expanded Core Curriculum using technology? | | | | | | | | | | |
| How confident are you implementing technology with your students who have multiple disabilities and a visual impairment? | | | | | | | | | | |
| How sure are you that you can learn a new technology skill if you needed to for your student? | | | | | | | | | | |
| How much can you influence your students' feelings of self confidence around their school work? | | | | | | | | | | |
| How much confidence do you have in helping your students learn independent living skills? | | | | | | | | | | |

**Thank you for your participation! Are you willing to be contacted regarding TiP for TVIs (iPad learning module)? There is no obligation at any time period. If you are open to finding out more about it, then I will send you information. You can, at any time, opt out of completing the iPad learning module.**

- ◯ Yes
- ◯ No

# Learning Module Feedback Survey

**Learning Module Effectiveness Feedback**

| | Very Satisfied | Satisfied | Somewhat Satisfied | Neutral | Somewhat Dissatisfied | Dissatisfied |
|---|---|---|---|---|---|---|
| The learning module explained important concepts/ideas and answered questions in ways that I could understand. | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module stimulated my interest in using iPads for my students with visual impairments | ○ | ○ | ○ | ○ | ○ | ○ |
| Appropriate teaching techniques were used by the learning module to enhance my development | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module was well organized | ○ | ○ | ○ | ○ | ○ | ○ |
| Overall, the learning module effectively supported my learning | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module enrollment process was well organized. | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module organization in iTunes U was easy to follow on my mobile device (i.e., on your iPad) | ○ | ○ | ○ | ○ | ○ | ○ |
| The materials/handouts in the iTunes U module were easy to follow and download. | ○ | ○ | ○ | ○ | ○ | ○ |
| The suggested applications were helpful and organized | ○ | ○ | ○ | ○ | ○ | ○ |
| The format of the learning module being associated with the Expanded Core Curriculum was helpful to me in my job as a TVI | ○ | ○ | ○ | ○ | ○ | ○ |

**Learning Module Materials: White Pages, iPad Evaluation and Accessibility Tips and Strategies**

| | Very Effective | Effective | Ineffective | Very Ineffective |
|---|---|---|---|---|
| The white pages or "Quick Start Guides" were effective | | | | |

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| | | | | |
|---|---|---|---|---|
| for my learning about apps or accessibility information related to iPads | ○ | ○ | ○ | ○ |
| The white pages or "Quick Start Guides" were effective for collaboration with other team members to help students be more successful with their iPads | ○ | ○ | ○ | ○ |
| The iPad evaluation checklist was an effective way to learn about what my student(s) will need associated with their iPad use. | ○ | ○ | ○ | ○ |
| The iPad Road-map helped give me an overarching view of how I might think of implementing an iPad | ○ | ○ | ○ | ○ |
| The iPad Technology Plan was an effective way to plan for my student(s) iPad as a technology solution to be used in his/her program | ○ | ○ | ○ | ○ |

**What was the most significant thing you learned from the iPad Learning Module?**

**What supports were the most helpful within the learning module to help you?**

**How will you apply what you learned in the iPad Module?**

**How can the module be improved in your opinion?**

**What would you change about the learning module?**

**What applications, professional development supports, or information is missing from the learning module regarding using iPads for students who have visual impairments?**

**What was your favorite and least favorite aspect of the learning module?**

**Do you feel that you are a better teacher with this knowledge regarding iPads and accessibility?**

- Definitely yes
- Probably yes
- Probably not
- Definitely not

**How important would it be for you to have Continuing Education credits associated with an online course like the iPad Learning Module on iTunes U?**

- ◯ Extremely Important
- ◯ Very Important
- ◯ Somewhat important
- ◯ Not at all Important

# APPENDIX C

## Institutional Review Board Approval for Pilot Study

TEXAS TECH UNIVERSITY
Vice President *for* Research

April 27, 2013

Rona Pogrund
Ed Psychology & Leadership
Mail Stop: 1071

Regarding: 503923 Transformative Teaching: Implementing Mobile Technology Learning Strategies in Serving Students with Visual Impairments

Dr. Rona Pogrund:

The Texas Tech University Protection of Human Subjects Committee has approved your proposal referenced above. The approval is effective from April 27, 2013 to March 31, 2014. This expiration date must appear on all of your consent documents.

We will remind you of the pending expiration approximately eight weeks before March 31, 2014 and to update information about the project. If you request an extension, the proposal on file and the information you provide will be routed for continuing review.

Sincerely,

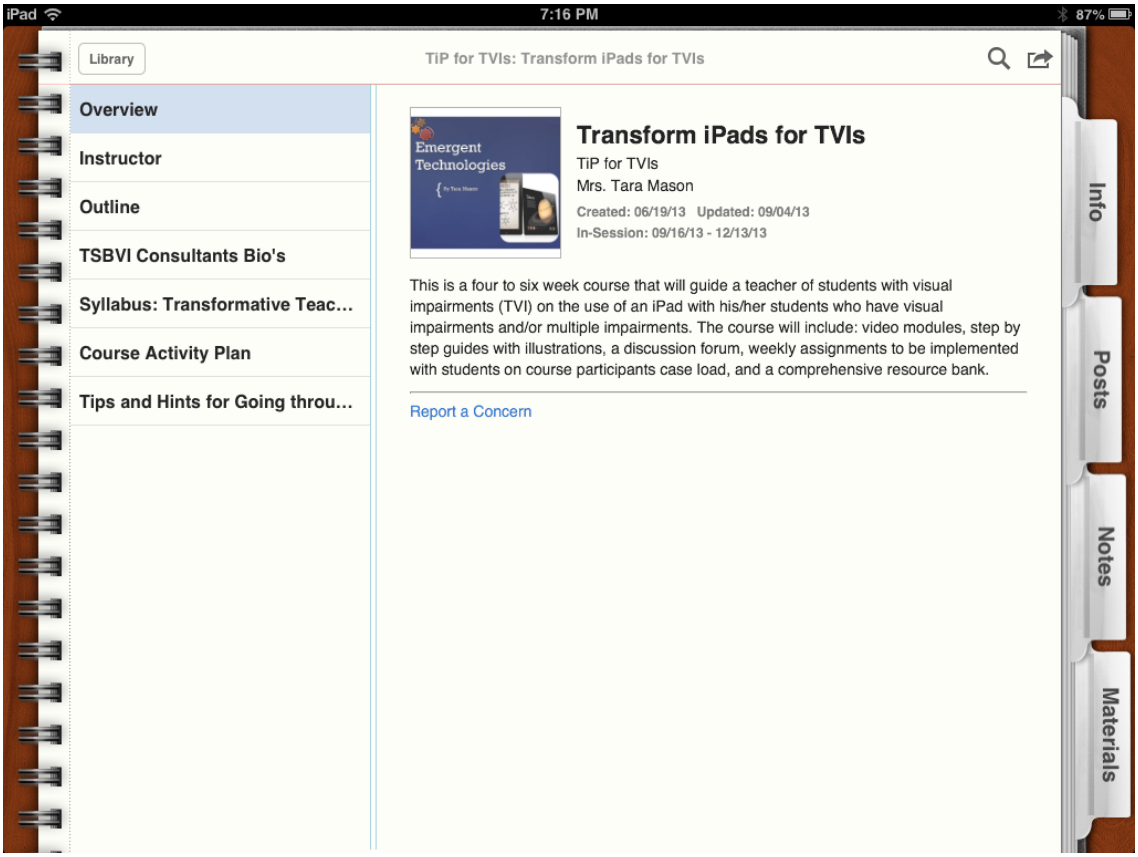
Rosemary Cogan

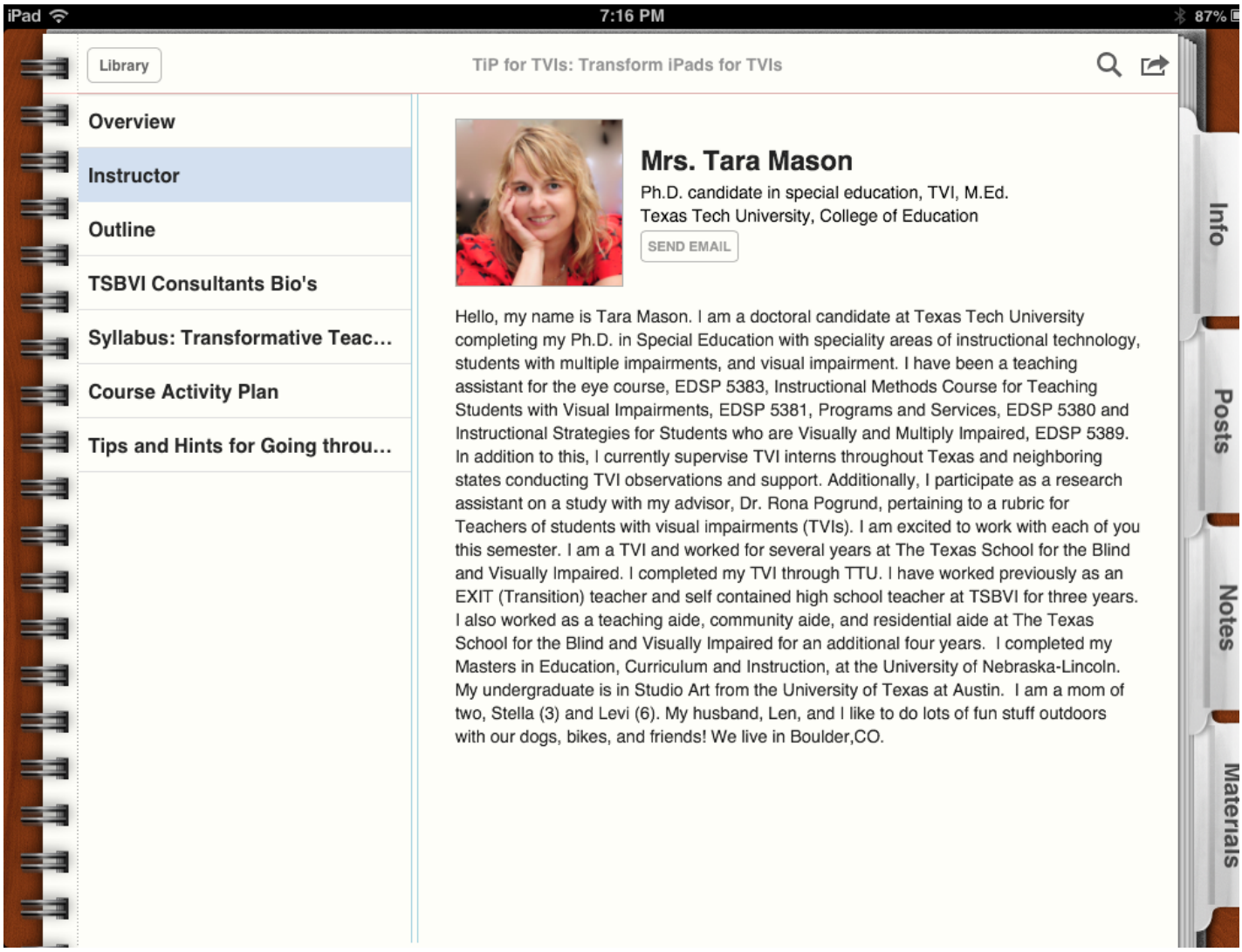
Rosemary Cogan, Ph.D., ABPP
Protection of Human Subjects Committee

Box 41075 | Lubbock, Texas 79409-1075 | T 806.742.3905 | F 806.742.3947 | www.vpr.ttu.edu
An EEO/Affirmative Action Institution

# APPENDIX D

## iTunes U Course Screen Shot Examples




iPad
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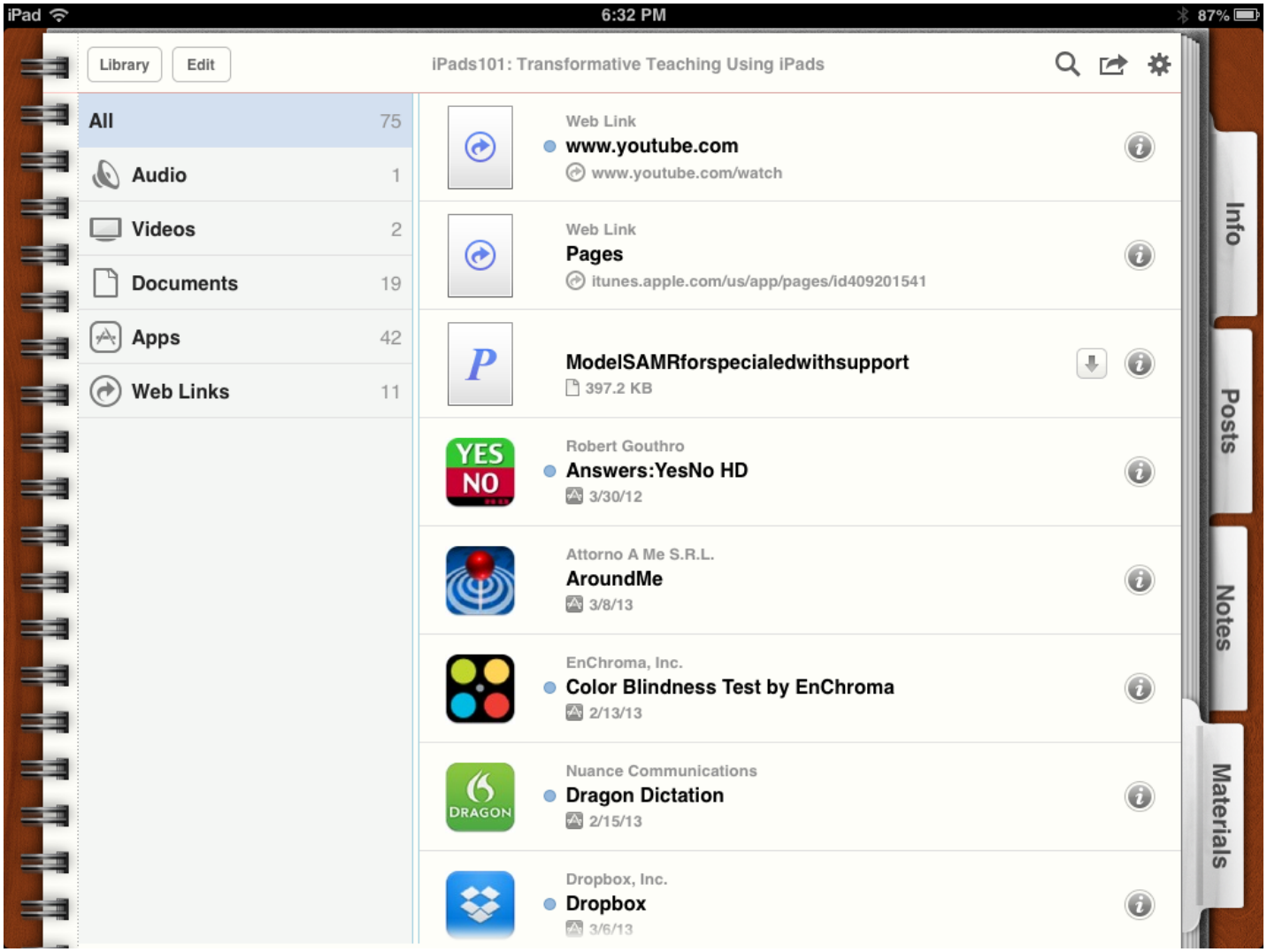
Library
TiP for TVIs: Transform iPads for TVIs
Overview
Instructor
Outline
TSBVI Consultants Bio's
Syllabus: Transformative Teac...
Course Activity Plan
Tips and Hints for Going throu...
Mrs. Tara Mason
Ph.D. candidate in special education, TVI, M.Ed.
Texas Tech University, College of Education
SEND EMAIL
Hello, my name is Tara Mason. I am a doctoral candidate at Texas Tech University completing my Ph.D. in Special Education with speciality areas of instructional technology, students with multiple impairments, and visual impairment. I have been a teaching assistant for the eye course, EDSP 5383, Instructional Methods Course for Teaching Students with Visual Impairments, EDSP 5381, Programs and Services, EDSP 5380 and Instructional Strategies for Students who are Visually and Multiply Impaired, EDSP 5389. In addition to this, I currently supervise TVI interns throughout Texas and neighboring states conducting TVI observations and support. Additionally, I participate as a research assistant on a study with my advisor, Dr. Rona Pogrund, pertaining to a rubric for Teachers of students with visual impairments (TVIs). I am excited to work with each of you this semester. I am a TVI and worked for several years at The Texas School for the Blind and Visually Impaired. I completed my TVI through TTU. I have worked previously as an EXIT (Transition) teacher and self contained high school teacher at TSBVI for three years. I also worked as a teaching aide, community aide, and residential aide at The Texas School for the Blind and Visually Impaired for an additional four years. I completed my Masters in Education, Curriculum and Instruction, at the University of Nebraska-Lincoln. My undergraduate is in Studio Art from the University of Texas at Austin. I am a mom of two, Stella (3) and Levi (6). My husband, Len, and I like to do lots of fun stuff outdoors with our dogs, bikes, and friends! We live in Boulder,CO.
Info
Posts
Notes
Materials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Library
Edit
iPads101: Transformative Teaching Using iPads
All 75
Audio 1
Videos 2
Documents 19
Apps 42
Web Links 11
Web Link
www.youtube.com
www.youtube.com/watch
Web Link
Pages
itunes.apple.com/us/app/pages/id409201541
ModelSAMRforspecialedwithsupport
397.2 KB
Robert Gouthro
Answers:YesNo HD
3/30/12
Attorno A Me S.R.L.
AroundMe
3/8/13
EnChroma, Inc.
Color Blindness Test by EnChroma
2/13/13
Nuance Communications
Dragon Dictation
2/15/13
Dropbox, Inc.
Dropbox
3/6/13
Info
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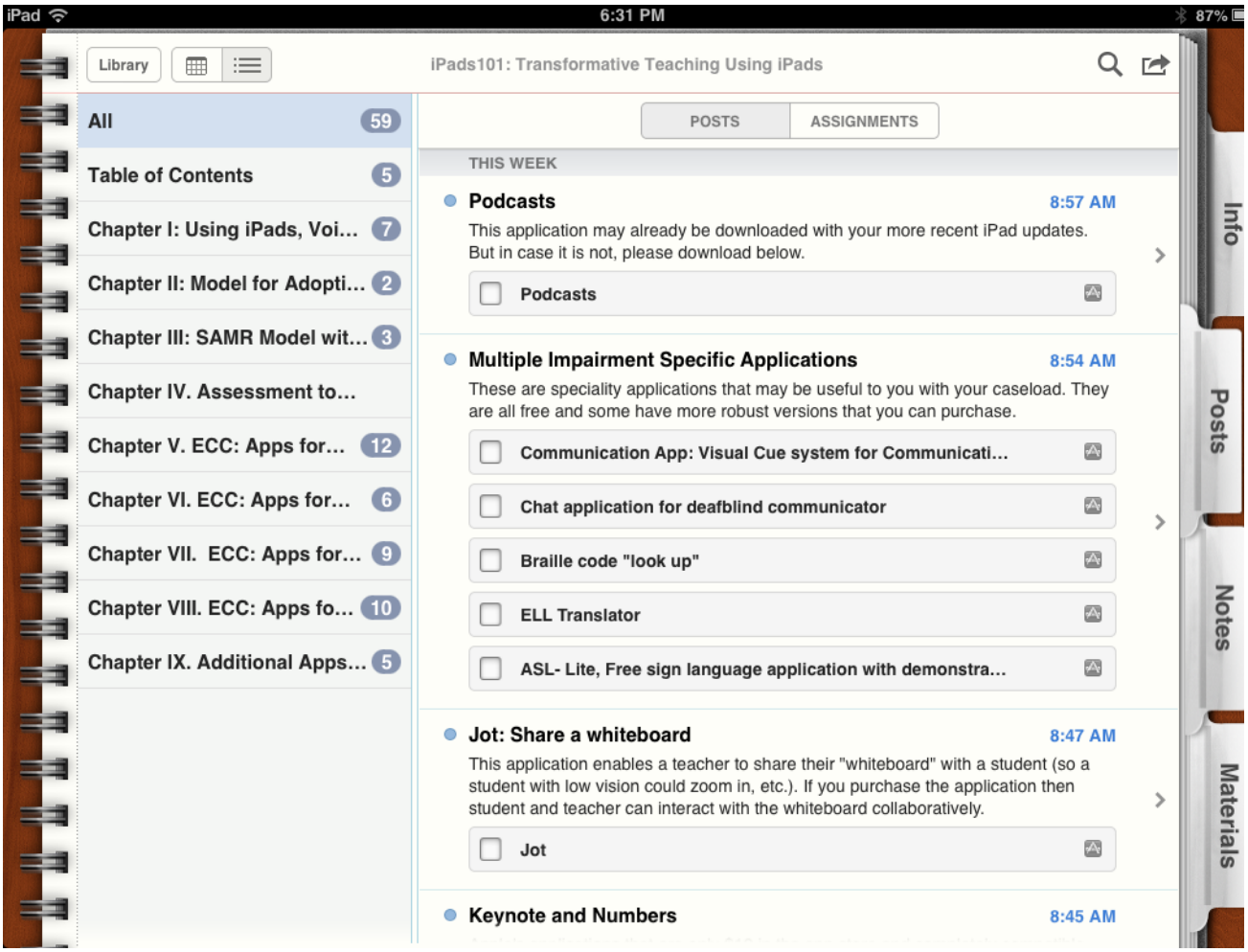
iPad
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Library
iPads101: Transformative Teaching Using iPads
All 59
Table of Contents 5
Chapter I: Using iPads, Voi... 7
Chapter II: Model for Adopti... 2
Chapter III: SAMR Model wit... 3
Chapter IV. Assessment to...
Chapter V. ECC: Apps for... 12
Chapter VI. ECC: Apps for... 6
Chapter VII. ECC: Apps for... 9
Chapter VIII. ECC: Apps fo... 10
Chapter IX. Additional Apps... 5
POSTS
ASSIGNMENTS
THIS WEEK
Podcasts 8:57 AM
This application may already be downloaded with your more recent iPad updates. But in case it is not, please download below.
Podcasts
Multiple Impairment Specific Applications 8:54 AM
These are speciality applications that may be useful to you with your caseload. They are all free and some have more robust versions that you can purchase.
Communication App: Visual Cue system for Communicati...
Chat application for deafblind communicator
Braille code "look up"
ELL Translator
ASL- Lite, Free sign language application with demonstra...
Jot: Share a whiteboard 8:47 AM
This application enables a teacher to share their "whiteboard" with a student (so a student with low vision could zoom in, etc.). If you purchase the application then student and teacher can interact with the whiteboard collaboratively.
Jot
Keynote and Numbers 8:45 AM
Info
Posts
Notes
Materials

# APPENDIX E

Table of Contents for *Transforming iPads for TVIs* (*TiP for TVIs*) Binder Materials

1) iTunes U Course Information
   a) iTunes U tutorial pdf
   b) iPad Learning Module Syllabus
   c) iPad Learning Module Post Outline
2) Expanded Core Curriculum Resources
   a) Application grids
      i) ECC and iPad for students who are blind
      ii) ECC and iPad for students who have low vision
      iii) ECC and iPad for students who are visually and multiply impaired
      iv) ECC and iPad for transformative teacher
3) Quick Start Guides
   a) Application quick start guides (30+)
4) iPad Evaluation Resources
   a) iPad Roadmap
   b) iPad Accessibility Flowchart
   c) iPad checklist
   d) iPad Implementation Plan
   e) iPad example checklist and implementation plan
   f) iPad example case study power point
5) iPad Module Assignments (to be completed with one case study student from your caseload)
   a) Case study student write up (template)
   b) iPad Checklist
   c) iPad Implementation Plan
   d) Notes and reflections on implementation plan (template provided)
   e) Examples of student artifacts (inclusion is optional)

# APPENDIX F

## iPad Self-Assessment Survey

**Instructions: Check off all items on this checklist you are proficient doing. Since you are TVIs there is an additional column labeled "Instructional proficiency," meaning that you are confident in your ability to teach your students how to do this on the iPad as well.**

**Please enter the month and date of your birthdate (to verify your paired self assessment survey and to ensure anonymity).**

**Please fill in the state in which you work.**

**Please indicate your age range from the options below.**

- ◯ 20-29 years of age
- ◯ 30-39 years of age
- ◯ 40-49 years of age
- ◯ 50-59 years of age
- ◯ 60-70 years of age

**Please indicate your caseload size.**

- ◯ less then 5 students
- ◯ 6-10 students
- ◯ 11-15 students
- ◯ 16-20 students
- ◯ 21-25 students
- ◯ 26-30 students
- ◯ 31 students or more

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**Please indicate the service delivery model in which you work.**

- ◯ Itinerant
- ◯ Resource room
- ◯ Self-contained classroom
- ◯ Residential school
- ◯ Other

**How confident do you feel helping your students and other related professionals to troubleshoot and use the technology that your student uses?**

- ◯ Extremely Confident
- ◯ Confident
- ◯ Somewhat Confident
- ◯ Not Confident

**iPad Controls: Location and basic function**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Home button: One Click | ◯ | ◯ | ◯ |
| 2. Home button: Two Click | ◯ | ◯ | ◯ |
| 3. Home button: Three Click | ◯ | ◯ | ◯ |
| 4. Side Slider: Mute/Screen Lock | ◯ | ◯ | ◯ |
| 5. Volume | ◯ | ◯ | ◯ |
| 6. Top Right: Sleep or combined with Home Button | ◯ | ◯ | ◯ |

**iPad Controls: The Settings menu**

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| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Turning on Wifi | ○ | ○ | ○ |
| 2. Turning on and using Bluetooth | ○ | ○ | ○ |
| 3. Where to go if you are running out of space on your iPad | ○ | ○ | ○ |
| 4. Adjusting brightness | ○ | ○ | ○ |
| 5. Adjusting settings to save battery life | ○ | ○ | ○ |
| 6. Adjusting privacy settings | ○ | ○ | ○ |

**Managing The Home Screen**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Creating Folders | ○ | ○ | ○ |
| 2. Deleting apps | ○ | ○ | ○ |
| 3. Moving apps from screen to screen | ○ | ○ | ○ |
| 4. Using multi-tasking bar | ○ | ○ | ○ |
| 5. Adding or closing background applications | ○ | ○ | ○ |

**Personalizing Your iPad**

| | Not-Proficient | Proficient | Instructional Proficient |
|---|---|---|---|
| 1. Changing background colors, pictures, etc. | ○ | ○ | ○ |
| 2. Creating personalized sounds | ○ | ○ | ○ |
| 3. Setting a pass code | ○ | ○ | ○ |
| 4. Using Twitter with your iPad | ○ | ○ | ○ |
| 5. Using Facebook with your iPad | ○ | ○ | ○ |
| 6. Sharing any media with your iPad (text or e-mail) | ○ | ○ | ○ |

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**Using the App Store**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Setting up an iTunes Account | ○ | ○ | ○ |
| 2. Downloading applications | ○ | ○ | ○ |
| 3. Creating more space if apps will not download | ○ | ○ | ○ |
| 4. Multi-tasking while using the App Store | ○ | ○ | ○ |
| 5. Controlled searches using the App Store | ○ | ○ | ○ |

**Accessibility on the iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Where to find accessibility features | ○ | ○ | ○ |
| 2. VI: VoiceOver Controls | ○ | ○ | ○ |
| 3. VI: VoiceOver Gestures | ○ | ○ | ○ |
| 4. VI: VoiceOver with keyboard shortcuts | ○ | ○ | ○ |
| 5. VI: VoiceOver with Rotar | ○ | ○ | ○ |
| 6. VI: Zoom | ○ | ○ | ○ |
| 7. VI: Speak Text | ○ | ○ | ○ |
| 8. VI: Large Font | ○ | ○ | ○ |
| 9. VI: Screen Contrast | ○ | ○ | ○ |
| 10. VI: CVI Considerations for the iPad (i.e., low clutter, changing backgrounds) | ○ | ○ | ○ |
| 11. AI: Monotone | ○ | ○ | ○ |
| 12. AI: Creating alerts and notification modifications | ○ | ○ | ○ |
| 13. AI: Captioning considerations | ○ | ○ | ○ |
| 14. Students with OI: Assistive Touch | ○ | ○ | ○ |
| 15. Students using Guided Access | ○ | ○ | ○ |

**Searching & Notifications on your iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Different ways of searching on your iPad | ○ | ○ | ○ |
| 2. Configuring your search | ○ | ○ | ○ |
| 3. Configuring notifications on your iPad | ○ | ○ | ○ |

**Auto-corrections and Shortcuts**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Configuring shortcuts in settings | ○ | ○ | ○ |
| 2. Configuring auto-correct in settings | ○ | ○ | ○ |
| 3. Not accepting auto-corrections | ○ | ○ | ○ |
| 4. Copy, Paste and Cut | ○ | ○ | ○ |
| 5. Keyboard shortcuts | ○ | ○ | ○ |

**iCloud and iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Setting up iCloud account | ○ | ○ | ○ |
| 2. Syncing wirelessly with iCloud account | ○ | ○ | ○ |
| 3. Configuring iCloud account | ○ | ○ | ○ |
| 4. Syncing with iTunes | ○ | ○ | ○ |
| 5. Syncing with USB cable | ○ | ○ | ○ |
| 6. Using Airplay and Mirroring on iPad | ○ | ○ | ○ |

**Safari on the iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|

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| | | | |
|---|---|---|---|
| 1. Web browsing | ○ | ○ | ○ |
| 2. Using Reader | ○ | ○ | ○ |
| 3. Using Reading List | ○ | ○ | ○ |
| 4. Adding web icons to home page | ○ | ○ | ○ |
| 5. E-mailing weblink | ○ | ○ | ○ |
| 6. Embedding web link in a text or e-mail | ○ | ○ | ○ |
| 7. Multi-tasking using Safari | ○ | ○ | ○ |
| 8. Troubleshooting with Safari webpages that are not working with VoiceOver | ○ | ○ | ○ |

**Calendar on the iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Adding events | ○ | ○ | ○ |
| 2. Setting alarms or reminders | ○ | ○ | ○ |
| 3. Calendar Views | ○ | ○ | ○ |

**Camera and Photo Roll**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Taking pictures | ○ | ○ | ○ |
| 2. Using camera with students who have low vision | ○ | ○ | ○ |
| 3. Editing photos | ○ | ○ | ○ |
| 4. Setting up photo stream | ○ | ○ | ○ |
| 5. Taking videos | ○ | ○ | ○ |
| 6. Editing videos | ○ | ○ | ○ |
| 7. Editing videos using iMovie | ○ | ○ | ○ |

**Other important apps**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1. Messages (text messaging) | ○ | ○ | ○ |
| 2. Facetime (on iPad) | ○ | ○ | ○ |
| 3. Podcasts (on iPad) | ○ | ○ | ○ |
| 4. Youtube (on iPad) | ○ | ○ | ○ |
| 5. Google apps | ○ | ○ | ○ |
| 6. Pages | ○ | ○ | ○ |
| 7. Maps (on iPad) | ○ | ○ | ○ |
| 8. AroundMe | ○ | ○ | ○ |
| 9. Dropbox | ○ | ○ | ○ |
| 10. Voice Memos (on iPad) | ○ | ○ | ○ |
| 11. Dragon | ○ | ○ | ○ |
| 12. Calculator (on iPad) | ○ | ○ | ○ |
| 13. Weather (on iPad) | ○ | ○ | ○ |
| 14. Reminders (on iPad) | ○ | ○ | ○ |

**Please rate items about your confidence level on the scale below. 0-1 are the lowest levels, meaning you do not feel confident at all, and 9-10 are the highest levels of self confidence.**

| | Not at all | | Very Little | | Some Influence | | Quite a bit | | A great deal | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| How much can you influence your students' access to assistive technology, specifically iPads? | | | | | | | | | | | |
| How much can you freely advocate for your students' technology needs? | | | | | | | | | | | |
| How much can you obtain access to the technology instruction materials you need and other individualized technology accessories for your student? | | | | | | | | | | | |

https://s.qualtrics.com/ControlPanel/Ajax.php?action=GetSurveyPrintPreview&T=19LMxg Page 7 of 9

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| How confident are you implementing Expanded Core Curriculum using technology? | | | | | | | | | | | |
| How confident are you implementing technology with your students who have multiple disabilities and a visual impairment? | | | | | | | | | | | |
| How sure are you that you can learn a new technology skill if you needed to for your student? | | | | | | | | | | | |
| How much can you influence your students' feelings of self confidence around their school work using assistive technology? | | | | | | | | | | | |
| How much confidence do you have in helping your students learn independent living skills using assistive technology such as iPads? | | | | | | | | | | | |

**If you were going to implement a technology plan using iPads with one of your caseload students, what would it look like? Please indicate what you would do with your student using the iPad and how you would teach it.**

APPENDIX G

iPad Syllabus

# Transformative Technologies

## iPads for Students with Visual and/or Multiple Impairments

Fall 2013
Instructor: Tara Mason
E-Mail: tara.mason.ttu@gmail.com
Phone: 281-703-8074
Office: None
Office Hours: Available for instant chatting, video chatting, e-mail, telephone conference by appointment

### Overview

This learning module will help you become a more transformative TVI using iPads with your students who are blind, visually impaired or multiply impaired. The module provides resources both for teacher and student using iPads for learning and life.

### Learning Goals and Outcomes

- ☐ TVIs will learn strategies and teaching tools for using iPads with students who are blind, visually impaired and multiply impaired
- ☐ TVIs will implement lessons aligned with the Expanded Core Curriculum addressing each area for their students who are blind or visually impaired
- ☐ TVIs will facilitate evaluation of iPad present levels of performance and create an iPad assistive technology plan addressing individualized needs of students
- ☐ TVIs will collaborate and coordinate with educational team members to ensure consistent implementation of iPad where applicable and appropriate
- ☐ TVIs will learn how to use iPad in more transformative ways to increase the effectiveness of his or her teaching with technology

### Requirements

You will need a high-speed wireless internet connection, an iPad (and potentially student iPads, if possible) and iTunes U (free software)

### Evaluation

This learning module is for your benefit. You will be asked to create a couple items associated with implementing an iPad with a case study student. It is your choice to do these things as they are there for your benefit. The more you put into completing the module the more you will gain!

### Materials

- iTunes: Transformative iPad as Assistive Technology Course

- Print materials- binder with tabs containing: syllabus, iPad checklist and plan template, one pagers, helpful "how to" guides, and curriculum examples.

### Milestones

**October 2013**
Complete first half of course.
- ☐ Choose case study student
- ☐ Write case study narrative
- ☐ Complete iPad evaluation and draft implementation plan

**November 2013**
Complete second half of the course.
- ☐ Reflect on progress and make predictions using implementation plan.
- ☐ Create a collection of student artifacts, i.e. screen shots, papers, documented learning outcomes or teacher feedback to add to your case study write up, if you wish.

**December 2013**
- ☐ Complete post survey
- ☐ Turn in homework assignments, student artifacts, implementation plan reflections

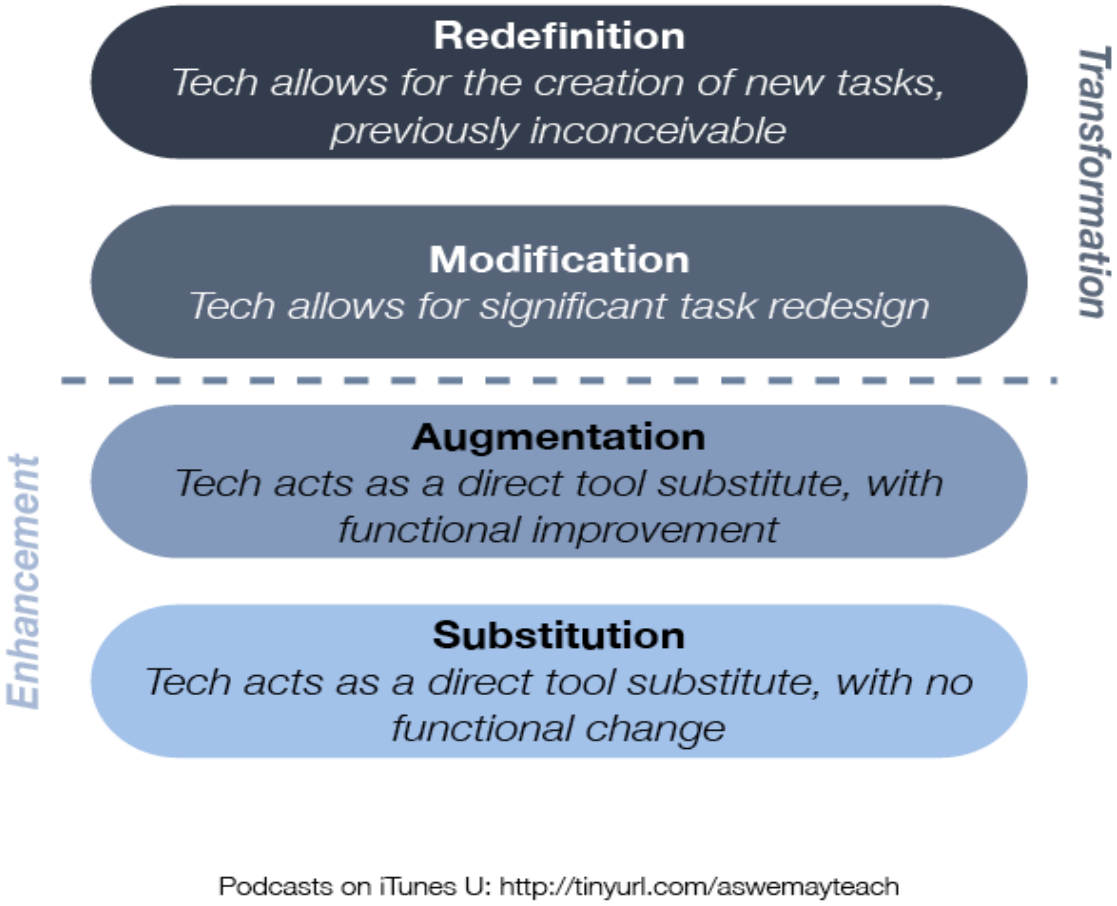
APPENDIX H

**iPad Assistive Technology Plan Evaluation Rubric**

| Plan Sections | Excellent 5 points | Emerging 3 points | Acceptable 1 point | Points |
|---|---|---|---|---|
| **Collaborative team members included (parent, related service, etc.)** | Team included, at least 4 members with parents | Team included, at least 3 members with parents | 1 or 2 other team members included | |
| **Areas of accommodation are specific and detailed** | At least 4 areas or accommodations listed from iPad checklist | At least 3 areas or accommodations listed from iPad checklist | 1 or 2 areas listed from iPad checklist | |
| **ECC areas** | Up to 9 areas of the Expanded Core Curriculum are included | At least 4 areas of the Expanded Core Curriculum are included | 1-3 areas of the expanded core curriculum are included | |
| **Plan goals are measureable and tied to ecc** | The plan includes at least 5-9 goals that are measureable and linked to the ECC | The plan includes at least 3-4 goals that are measureable and linked to the ECC | The plan includes 1 to 2 goals that are measureable and linked to the ECC | |
| **Collaboration implementation completed and followed up** | Team collaboration plan includes at least 5 members and TVI followed up with each | Team collaboration plan includes at least 3-4 members and TVI followed up with each | Team collaboration plan includes at least 1-2 members and TVI followed up with each | |
| **Horizontal plan complete and specific** | Horizontal plan is complete with up to 8-10 lessons and tied to the ECC | Horizontal plan is complete with up to 6-7 lessons and tied to the ECC | Horizontal plan is complete with up to 3-5 lessons and tied to the ECC | |
| | | | Total Points 30 Points Possible | |

APPENDIX I

Substitution, Augmentation, Modification, Redefinition Model (Puentedura, 2006)



APPENDIX J

Institutional Review Board Application for Proposal

PI: Rona Pogrund, Ph.D., and Co-PI, Tara Mason, Ph.D. Candidate

***Transforming Teaching: Implementing Mobile Technology Learning Strategies in Serving Students with Visual Impairments***

## I. Rationale

### Present Knowledge

In the small field of visual impairment (VI), it is difficult to find empirical evidence pertaining to best assistive technology strategies for this student population. Each student presents with a unique set of learning needs, and teachers of students with visual impairments (TVIs) need to be adept enough to gracefully problem solve technology challenges. At the university level, assistive technology courses may expose teacher candidates as to what is available and potentially how to use the technology themselves. What is missing is that adult learners, just as K-12 learners, need opportunities to reflect on their learning and adjust their pedagogy. Meizrow (1997) writes about the process of adult learning. He discusses how adult learning is about transforming ideas through critical reflection and that it is a process. In addition, there must be validation of thoughts or assumptions through conversation and debate.

There is little research on the effectiveness of using mobile technologies, specifically Apple's iPad, with students who have visual impairments (Parker & Smith, 2007). In addition, there is little research regarding how to help itinerant teachers who work with students that have visual impairments implement mobile technologies in their educational programs. The research that exists is typically case study, small sample sizes, and non-experimental based (Wong &Tan, 2012; Smith & Kelly, 2011). Lastly, there are several barriers to learning for both the student and teacher population in the visual impairment field. For students, accessibility is a primary roadblock to learning, and this problem can potentially have better results with a highly accessible technology device to access student learning materials. For teachers, there are barriers to learning with regard to time management and professional development when it comes to learning about and implementing high technology with their students. Despite the barriers to learning about assistive technology solutions, specifically Apple's iPad, students with visual impairments are reliant on their teachers who hold certifications in working with students with visual impairments to introduce, implement, and advocate for technology devices to be used as assistive technology (Johnstone, Altman, Tommons, & Thurlow, 2009).

**Past Research On The Problem And Deficiencies**

The basic question of previous research is: Are teachers preparing students to use access devices, low technology and high technology? If so, which devices are they introducing to their students? Koenig and Holbrook (2000) recommend a national call for more comprehensive training and implementation of TVI certification programs to implement assistive technology with little change in status quo (Smith & Parker, 2007). There are numerous deficiencies in the previous research discussing assistive technology for students with visual impairments. Firstly, Smith and Kelly (2011) reviewed literature over the past forty-five years that addressed assistive technology in the visual impairment field and found two hundred fifty-six studies addressing assistive technology. Of those studies, "…48% of the articles were discussions of a theory, belief, or practitioner-based concept, and 13% were discussions of product reviews or evaluations," (p. 77). This synthesis of research, confined by studies regarding K-12 programs serving students with visual impairments, found that only two studies of the 256 total presented data regarding the effectiveness of an intervention which included: a group of appropriate participants, an intervention, a control group, and a comparison group.

The research around Apple products for individuals with visual impairments is virtually non-existent and/or anecdotal (Spungin, 2012; Wong & Tan, 2011). Conversely, there is evidence that adults with visual impairments who are purchasing their own assistive technology devices after graduating from K-12 programs are often buying Apple devices due to the affordability and accessibility features which come with the device (National Federation of the Blind, 2012; Borodin, Bigham, Dausch, & Ramakrishnan, 2010). In addition, students with visual impairments are reliant on their TVIs to introduce, implement, and advocate for an iPad to be used as their assistive technology device. If teachers are not exposed or confident using Apple's mobile technology, they will not include it as a possible assistive technology device (Kelly, 2011; Day & Huefner, 2005). Lastly, due to the lack of research, TVIs do not have evidence-based practices (EBPs) to use when/if they choose to implement iPads as the assistive technology device in their students' programs. This study aims to address many of these issues by adding to the research base with an explanatory mixed methods research study and offering evidence-based strategies to use while implementing iPads as assistive technology devices for students with visual impairments.

**Purpose of Study**

The purpose of this sequential embedded mixed methods research study will be to describe and explain the progression of teacher professional development around assistive technology in an online learning format for teachers of students with visual impairments. The online learning format will be similar to a learning management system (LMS), and it will include multi-media resources and a comprehensive framework with steps towards iPad implementation. At this stage in the research, the teacher professional development will be generally defined as ***transformative teaching,*** which means teachers are progressing in their levels and expertise of technology implementation. Eventually, the transformative teacher is redefining how technology is being used with students who

have visual impairments by incorporating and implementing technology throughout a student's educational program. The study will sample from a large national group of teachers of student with visual impairments in order to implement the intervention iPad learning module, Transform iPads for TVIs (*TiP for TVIs*). The primary purpose is to explore teacher development in the field of visual impairment using an online learning module and potentially make inferences regarding teacher attitudes and behavior (Creswell, 2009).

The study will use an embedded sequence of quantitative-qualitative methodology with the qualitative methodology embedded within the quantitative phase II. The study is transformative in nature as it proposes to implement an intervention with the goal of impacting social change in the area of assistive technology for students who have visual impairments. Creswell (2009) contends that, "…transformative mixed methods procedures are those in which the researcher uses a theoretical lens as an overarching perspective within the design that contains both quantitative and qualitative data. This lens provides a framework for topics of interest, methods for collecting data, and outcomes or changes anticipated by the study," (p. 15).

The two stages of this study are pre-intervention Phase I and intervention Phase II. Newman, Ridenour, Newman, and DeMarco (2003) list nine categories that provide a list of the general purposes of social science research which are: predict, add to knowledge base, personal, social, institutional or organizational impact, measure change, understand complex phenomena, test new ideas, generate new ideas, inform constituencies, and examine the past (p.175). This inquiry is most closely aligned with adding to the knowledge base and measuring change. The first, adding to the knowledge base is an area that is clearly indicated through the lack of assistive technology research regarding both the implementation of high technology solutions for students with visual impairments and the effectiveness of professional development for teachers who work with students who are visually impaired. There is a research deficit in both student and teacher areas of interest. The second large category of measuring change is of particular importance in this study in order to evaluate the effectiveness of professional development on both technology implementation and teachers' sense of self-efficacy for transformative teaching in their instructional practice.

**Research Questions**

Phase I

1. What level of proficiency do TVIs have regarding use of iPads as assistive technology?
2. What are the perceived values teachers place on using iPads as assistive technology with students who have visual impairments?

Phase II

3. Will participation in this intervention using an online LMS (iTunes U) increase teachers' sense of transformative teaching self-efficacy for using assistive technology?
    a. Was the intervention effective with regard to increasing the teacher's

sense of transformative self-efficacy; why or why not?

b. What were the challenges associated with completing the course and course assignments?

**Potential Benefits**

At this time, the audiences that will profit from the study are: the community serving students and clients with visual impairments, special education community, researchers who study adult learning, university programs serving teacher certification candidates in special education and visual impairment, and students who are visually impaired. The learning module, Transform iPads for TVIs (*TiP for TVIs*), will fulfill a need in the visual impairment field to address the instructional challenges associated with implementing new technology. The participants in Phase II of the study will benefit from the resources provided in the module and are entitled to saving and using materials after completing participation in the study. In addition, each participant in Phase II will be provided a print binder of materials and a $10 iTunes card to purchase apps recommended in the learning module.

The TTU College of Education has committed to improving and enhancing the education of students with visual impairments, and the TVI program at TTU is continually searching for ways to improve service delivery to these students. This project will help to shape and support a wide level of increased technology proficiency with mainstream mobile technology devices, iPads, iPods, or iPhones, for TVIs and their students.

## II. Subjects

**Population Characteristics**

The sampling in this study will consist of teachers who work with students who have visual impairments. These teachers will range in age, experience, and instructional setting. The sample will also have varying levels of technology proficiency. The research sampling for Phase I will be a convenience sample from a voluntary group of TVIs nationwide, n > 250. In Phase II, 2A and 2B, which are both composed of quantitative and embedded qualitative data, collection methods will begin by selecting 30 participants from the initial quantitative survey and requesting their participation. This phase will use purposive sequential sampling. The 30 participants in Phase II will be from the larger group of n > 250. The inclusion criteria to be asked to participate in Phase II are:

1. Need to own or have access to an iPad
2. Indicated low iPad skills
3. Indicated high iPad value

**Recruitment**

Invitation to participate will be extended by an electronic letter and survey link to national and state level resources (Appendix A) to all TVIs that are accessible through these contact links. The recruitment strategy will be to contact leaders in organizations who may have connections to TVIs: American Printing House for the Blind (APH), American Foundation for the Blind (AFB), Council of Schools for the Blind (COSB) , Association for Education and Rehabilitation of the Blind and Visually Impaired (AER), and Council for Exceptional Children (CEC), Division on Visual Impairment. In addition to contacting these large organizations, states that have a visual impairment coordinator and programs training teachers of students with visual impairments (32 total) will be contacted. Each contact will receive a short announcement to be posted or e-mailed to their electronic mailing list with a link to the *iPad Knowledge and Skills Survey.* After two weeks, each contact will be asked to send a reminder e-mail blast with the survey link.

The *iPad Knowledge and Skills Survey* will include a thank you and information pertaining to the iPad Learning Module participation. TVIs will be asked for their name and e-mail contact if they are interested in potentially completing the Transform iPads for TVIs (*TiP for TVIs*). TVIs will be informed of a small financial incentive to complete the learning module. Purposive sampling will be used to determine which teachers of students with visual impairments (TVIs) will be asked to participate in the Phase II Intervention. Phase II will be comprised of two concurrent phases, 2A and 2B, all of which will draw from the same group of TVIs. The phases are: (2A) quantitative data collection (2B) qualitative data collection. The 30 TVI participants will complete the module in the same way.

## III. Procedures

### Step-by-Step Procedures

The study will involve recruiting a national group of TVIs who are willing to complete an electronic survey with a smaller group requested to participate in an intervention. A summary of the steps associated with the study are presented below.

STEPS:

1. Send electronic recruitment letter with posting announcement and survey link to Council for Exceptional Children, Division on Visual Impairment, Association for Education and Rehabilitation of the Blind and Visually Impaired (AER), American Printing House for the Blind (APH), Council of Schools for the Blind (COSB), and American Foundation for the Blind (AFB); send electronic recruitment letters to visual impairment coordinators for states that have a staff member serving in this role and to coordinators of personnel preparation programs in visual impairment. (Appendix A)
2. In addition, coordinators, organizations, and listservs will be requested to post the recruitment letter to teachers of students with visual impairments (TVIs) (Appendix B) (these postings are the same as the recruitment

announcement for organizations that would prefer a letter) and request they read the letter and complete the electronic survey which will take 10-15 minutes of their time, *iPad Knowledge and Skills Survey* (Appendix C) (n > 250).

3. From the survey respondents, a small group (n=30) of teachers of students with visual impairments (TVIs) will be sent an e-mail and/or paper informational recruitment letter requesting their participation in the iPad Learning Module (Appendix D). These teachers will meet specific criteria of low iPad skill and high iPad value, based on their survey responses.
4. TVIs will either respond to the e-mail or paper letter with a stamped self-addressed envelope with the consent form (Appendix E) indicating their willingness to participate.
5. Upon receipt of acceptance to participate in the learning module, TVIs will receive a confirmation letter with packet sent by mail of learning module materials The confirmation letter will include a survey link for the iPad self-assessment (Appendix F). (Learning Module materials: Appendix G, Appendix H Appendix I & Appendix J).
6. A confirmation code will be given to teachers upon completion of the survey in order to be enrolled in the iTunes U Course (Example screen shots, Appendix I).
7. Teachers will be enrolled by receiving a course link and "enrollment code" through e-mail. Once they enroll, they will be given a pop-up message of "Awaiting Instructor Approval."
8. The iTunes U course (Appendix I) will provide a small red number in the right-hand corner and an e-mail alerting me that participants are waiting for my approval. Each person will be enrolled in the course as these warnings are received.
9. When enrolled, participants will be presented with an organizational video to help them get started with the iTunes U course and will go through the module, chapters I-X The course syllabus will guide participants in the major course milestones (Appendix H).
10. Within two weeks of enrollment, participants will be sent a check-in e-mail (Appendix K).
11. Participants will receive an additional reminder e-mail (Appendix K) to complete the iPad checklist (Appendix L) and iPad implementation plan with their case study student (Appendix M).
12. Participants will receive a final reminder to complete the iTunes U course and assignments 4 weeks after enrollment (Appendix N). In this e-mail, there will be a link to the post self-assessment survey (Appendix O) with a link to the learning module feedback survey (Appendix P).
13. Participants will receive a final thank you and reminder e-mail (Appendix Q) with a link to the learning module feedback survey (Appendix P).
14. Data analysis will be conducted with all surveys and iTunes U course artifacts. The thematic trends identified will be presented to two additional

researchers for intercoder reliability. The two intercoders will be given a complete packet containing the 30 participant implementation plans, student write-up, and checklist. They will use the *iPad Technology Implementation Plan Rubric* (Appendix R) and the SAMR model (Appendix S) to grade and confirm thematic findings.

**This project adds no risks or benefits beyond what is usual for teachers.**

## IV. Adverse Events and Liability

The proposed research does not increase risks for subjects more than minimally beyond the ordinary risks of daily life, and no liability plan is offered.

## V. Consent Forms

See attached (Appendix B & E)

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**Appendix A**
**Recruitment Letter to Organizations, State Coordinators, and Listservs**

Date:

Hello, my name is Tara Mason, and I am a Ph.D. candidate at Texas Tech University studying special education. I would like to invite TVIs to participate in an electronic survey regarding iPads being used with students who have visual impairments. iPads are offering so many accessibility and exciting possibilities for our students. I hope you will consider emailing this survey link to your members or constituencies or posting this survey link to your listserv. The posting announcement is below for you to copy/paste to your email, listserv, or website announcement section.

If you are able to post this survey, please use the link below. There is a consent form attached to the survey letting TVIs know their rights regarding the electronic survey. After the survey link has been posted or sent, please respond to this e-mail letting me know I do not need to follow up with you. Thank you in advance for your time.

*Posting/Email Announcement:*

*I would like to invite TVIs to participate in an electronic survey regarding iPads being used with students who have visual impairments. iPads are offering so many accessibility and exciting possibilities for our students. I am hoping to learn about how often and in what ways iPads are being used with students who are visually impaired in the United States. At the end of the survey you will be given the option to participate in a learning module I created to help address the training needs for TVIs regarding iPads. Thank you in advance for your time. The survey should only take 10-15 minutes, and if you see this post in multiple places, please only take the survey one time.*

*Survey:*

https://educttu.qualtrics.com/SE/?SID=SV_6sWOEdZSXcdg31X

*Sincerely,*
*Tara*

*Tara Mason, TVI, M.Ed.*
*Ph.D. Candidate in Special Education*
*Research Assistant and University Supervisor for TVI Certification Candidates*
*Texas Tech University*
*tara.mason@ttu.edu*
*(281) 703-8074*

**Appendix B**
**Recruitment Letter for Non-Internet Posting**

Date:

Dear TVI,

Hello, my name is Tara Mason, and I am a Ph.D. Candidate at Texas Tech University in Special Education. I am specializing in visual impairment and assistive technology. I am particularly interested in iPads being used with students who are visually and/or multiply impaired.

I would like to invite you to participate in an electronic survey regarding iPads being used with students who have visual impairments. iPads are offering so many accessibility and exciting possibilities for our students. I am hoping to learn about how often and in what ways iPads are being used with students who are visually impaired in the United States. At the end of the survey you will be given the option to participate in a learning module I created to help address the training needs for TVIs regarding iPads. Thank you in advance for your time. The survey should only take 10-15 minutes, and if you see this post in multiple places, please only take the survey one time.

Survey:
https://educttu.qualtrics.com/SE/?SID=SV_6sWOEdZSXcdg31X

Sincerely,
Tara

Tara Mason, TVI, M.Ed.
Ph.D. Candidate in Special Education
Research Assistant and University Supervisor for TVI Certification Candidates
Texas Tech University
tara.mason@ttu.edu
(281) 703-8074

# Appendix C
# iPad Knowledge and Skills Survey

**iPad Knowledge and Skills-Final**

**Information regarding iPad Knowledge and Skills Survey**

**Instructions: This project is meant to learn more about your knowledge and skills regarding iPads for students with visual impairments. You are being asked to complete a short electronic survey inquiring about your perceived level of comfort and proficiency using iPads as assistive technology. Below is a set of frequently asked questions to give you more information regarding the project.**

**What is this project studying?**
**We want to learn more about the effectiveness of iPads for students who have visual impairments. We also want to learn how to help teachers use iPads to work with students with visual impairments.**

**What will I do if I participate?**
**You will be completing a short electronic survey. If you are open to participating in the iTunes U, Transform iPads for TVIs (TiP for TVIs) learning module please indicate that at the end of your survey. More information about the TiP for TVIs will follow and you can opt to complete it or not complete.**

**Can I quit if I become uncomfortable?**
**Yes, absolutely. Dr.Rona Pogrund, Tara Mason, and Texas Tech University's Human Research Protection Board have reviewed the activities, and they think you can perform them comfortably. However, you can stop participating at any time or change your mind or skip questions if needed. Participating is your choice.**

**How long will participation take?**
**Your participation will be 10-15 minutes for the electronic survey.**

**How are you protecting privacy?**
**Your privacy is very important to the researchers! The survey does ask for your name and e-mail in order to give you access to the iPad Learning Module (TiP for TVIs) if you are interested in completing it. Your name is only for the purposes of the iTunes U module; you will not be identified in any other way regarding your responses to the survey. Your feedback is completely private and will never be associated with your name.**

**I have some questions about this study. Who can I ask?**
**• The study is being conducted by Dr. Rona Pogrund and Tara Mason from the Special Education Program in the College of Education at Texas Tech University. If you have questions, you can call Tara at 281-703-8074.**
**• TTU also has a Board that protects the rights of people who participate in research. You can ask them questions at 806-742-2064. You can also mail your questions to the Human Research Protection Program, Office of the Vice President for Research, Texas Tech University, Lubbock, Texas 79409.**

**How will I benefit from participating?**
**There is no compensation for your participation. There is a small monetary incentive associated with completing the iTunes U course of a $10 iTunes card for apps and your increased iPad proficiency may benefit your students.**

**To complete this survey, please hit the next arrow below.**

**Contact Information: Name and E-mail**

**Please fill in the state in which you work.**

**Please indicate your age range from the options below.**

- ◯ 20-29 years of age
- ◯ 30-39 years of age
- ◯ 40-49 years of age
- ◯ 50-59 years of age
- ◯ 60-70 years of age

**Please indicate your caseload size.**

- ◯ less then 5 students
- ◯ 6-10 students
- ◯ 11-15 students
- ◯ 16-20 students
- ◯ 21-25 students
- ◯ 26-30 students
- ◯ 31 students or more

**Please indicate the service delivery model in which you work.**

- ◯ Itinerant

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- Resource room
- Self-contained classroom
- Residential school
- Other

**iPad Knowledge and Skills**

| | Very Satisfied | Satisfied | Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|
| How satisfied are you with the level of instruction you have received around teaching assistive technology to your student who are visually impaired? | ○ | ○ | ○ | ○ |
| How satisfied are you with the instruction you have received about troubleshooting technology for your students who are visually impaired? | ○ | ○ | ○ | ○ |
| Are you satisfied with how informed you are about what is available for students who are visually impaired needing assistive technology? | ○ | ○ | ○ | ○ |

**iPad Value and Use for Students with Visual Impairments**

| | Extremely Important | Very Important | Neither Important nor Unimportant | Very Unimportant | Not at all Important |
|---|---|---|---|---|---|
| How important do you feel it is for students who are visually impaired to have access to technology? | ○ | ○ | ○ | ○ | ○ |
| How valuable do you think technology is for your students who are visually impaired? | ○ | ○ | ○ | ○ | ○ |
| How strongly do you feel about your students having access to technology in their classrooms (i.e., general education or special education)? | ○ | ○ | ○ | ○ | ○ |

**How confident do you feel helping your students and other related professionals to troubleshoot and use the technology that your student uses?**

- ◯ Extremely Confident
- ◯ Confident
- ◯ Somewhat Confident
- ◯ Not Confident

**What kinds of tasks or activities do you find your student's are interested in doing using technology?**

- ☐ To socialize
- ☐ To play games
- ☐ To access their homework
- ☐ To access their schoolwork
- ☐ To access materials related to their visual impairment i.e., troubleshoot using technology
- ☐ To access materials using accessibility features on technology device i.e., screen readers, screen magnification software
- ☐ To collaborate with peers or teachers (also communicate)
- ☐ For entertainment
- ☐ For reading
- ☐ For orientation and mobility
- ☐ For their job or work programs
- ☐ For safety purposes
- ☐ As an augmentative communication device

**What kinds of tasks or activities do you find your students are interested doing on their iPads (if applicable)?**

- ☐ To socialize
- ☐ To play games
- ☐ To access their homework
- ☐ To access their schoolwork
- ☐ To access materials related to their visual impairment i.e., troubleshoot using technology
- ☐ To access materials using accessibility features on technology device i.e., screen readers, screen magnification software
- ☐ To collaborate with peers or teachers (also communicate)

- ☐ For entertainment
- ☐ For reading
- ☐ For orientation and mobility
- ☐ For their job or work programs
- ☐ For safety purposes
- ☐ As an augmentative communication device

**What would you say is your greatest strength in implementing technology with your students?**

**What would you say is your greatest need area for implementing technology for your students with sensory impairments?**

**Please rate items on sliding scale.**

| | Not at all | | Very Little | | Some Influence | | Quite a bit | | A great deal | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| How much can you influence your students' access to assistive technology? | | | | | | | | | | | |
| How much can you freely advocate for your students' technology needs? | | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| How much can you obtain access to the technology instruction materials you need and other individualized technology accessories for your student? | | | | | | | | | | |
| How much can you influence your students' learning? | | | | | | | | | | |
| How much can you promote learning when there is a lack of support from home? | | | | | | | | | | |
| How confident are you implementing Expanded Core Curriculum using technology? | | | | | | | | | | |
| How confident are you implementing technology with your students who have multiple disabilities and a visual impairment? | | | | | | | | | | |
| How sure are you that you can learn a new technology skill if you needed to for your student? | | | | | | | | | | |
| How much can you influence your students' feelings of self confidence around their school work? | | | | | | | | | | |
| How much confidence do you have in helping your students learn independent living skills? | | | | | | | | | | |

**Thank you for your participation! Are you willing to be contacted regarding TiP for TVIs (iPad learning module)? There is no obligation at any time period. If you are open to finding out more about it, then I will send you information. You can, at any time, opt out of completing the iPad learning module.**

- ◯ Yes
- ◯ No

**Appendix D**
**Recruitment Letter for Learning Module to TVI**

Date:

Dear TVI:

Hello, my name is Tara Mason, and I am a Ph.D. candidate at Texas Tech University studying special education. I would like to invite you to participate in using a learning module regarding iPads to be used with students who have visual impairments. Thank you for completing the electronic survey and for your willingness to participate in the learning module phase of my study. The learning module, Transform iPads for TVIs (*TiP for TVIs*), contains professional development regarding tips, tricks, and strategies for iPad use with students who have visual impairments. The Texas School for the Bind and Visually Impaired Outreach and I have collaborated to create an iPad Learning Module on iTunes U (an application on your iPad) to address these professional development needs. I hope you will consider enrolling in the learning module, *TiP for TVIs*.

If you are open to participating in the study of the iPad learning module, please reply to this e-mail at tara.mason@ttu.edu with a confirmatory or not at this time response, in order to receive the consent form with further information regarding the learning module. If you are willing to be a participant, your time commitment will be over four to six weeks and could be anywhere from a total of 5-15 hours. There are a few activities you will be asked to complete associated with the learning module that will help you apply what you are learning with a particular student using an iPad. I hope to hear from you and appreciate your willingness to participate! There is no charge for this professional development, and the learning module offers tools for using iPads with students who are blind, who have low-vision, and who are multiply impaired. Additionally, the iPad module will help you improve your own use of an iPad for teaching with instruction regarding apps like iMovie, spreadsheet, e-mail, etc. If you choose to participate, you will receive a packet of materials and an iTunes card worth $10. Please sign the consent form attached to this e-mail and send it back to me to move forward. Thank you!

Sincerely,
Tara

Tara Mason, TVI, M.Ed.
Ph.D. Candidate in Special Education
Research Assistant and University Supervisor for TVI Certification Candidates
Texas Tech University
tara.mason@ttu.edu
(281) 703-8074

# Appendix E
# Consent Letters

## TVI Consent Form To Participate In Learning Module

**What is this project studying?**
We want to learn more about the effectiveness of iPads for students who have visual impairments. We also want to learn how to help teachers use iPads to work with students with visual impairments.

**What would I do if I participate?**
You will be asked to: (1) Complete this consent form with your signature and your address where you would prefer me to send the material packet; (2) Scan or photograph your consent letter and send it back to me to get started; (3) Complete pre-intervention module survey (5-10 minutes); (4) Keep a look out for an e-mail with iTunes U course instructions and your materials coming in the mail; (5) Work through the course, Transform iPads for TVIs (*Tip for TVIs*), on iTunes U; (6) Complete three "homework" assignments in the learning module which are: a write-up regarding a "case study student," an iPad accessibility checklist on that student, and an iPad implementation plan for that student (over the course of several of weeks); (7) Finish going through the iTunes U module; (8) Turn in your assignments in to me; (9) Complete post-module survey (5-10 minutes); and (10) Complete final learning module survey so I can improve the module (5-10 minutes).

**Can I quit if I become uncomfortable?**
Yes, absolutely. Dr.Rona Pogrund, Tara Mason, and Texas Tech University's Human Research Protection Board have reviewed the activities, and they think you can perform them comfortably. However, you can stop participating at any time. You will keep all the benefits of participating even if you stop. Participating is your choice.

**How long will participation take?**
Your participation will be 5-15 hours total time. It may take you time with your case study student to implement iPad lessons, but the development is meant to be connected to what you already may be doing with your student and to help you implement evidence-based iPad strategies

**How are you protecting privacy?**
Your privacy is very important to the researchers! We will take your name off of your homework responses. Your address, name, or e-mail will never be associated with any of the information you provide us regarding the iPad module. Your case study student should be a pseudonym, and there is an example provided on the module.

**I have some questions about this study. Who can I ask?**

• The study is being run by Dr. Rona Pogrund and Tara Mason from the Special Education Program in the College of Education at Texas Tech University. If you have questions, you can call Tara at 281-703-8074.

• TTU also has a Board that protects the rights of people who participate in research. You can ask them questions at 806-742-2064. You can also mail your questions to the Human Research Protection Program, Office of the Vice President for Research, Texas Tech University, Lubbock, Texas 79409.

**How will I benefit from participating?**

You will be compensated with a $10 iTunes card, and hopefully you and your students will benefit form your increased proficiency in using the iPad. We hope you will find the material interesting and helpful. At the end of the research study associated with the iPad module, it will be kept up-to-date and be free and open to anyone who wants to complete it anywhere in the world.

_____ _____

Signature Date

_____

Printed Name

Address to send materials and iTunes U card:

_____

Street Name, Attention to (if applicable)

_____

City, State, Zip

This consent form is not valid after 05 /31/2014.

Appendix E

**E-mail with iTunes U enrollment and Survey Link**

Dear TVI,

Thank you for completing your consent form and returning it to me. Please click on the survey link below to complete the i*Pad Self-Assessment Survey:*

https://educttu.qualtrics.com/SE/?SID=SV_5dKPQwIHxUDau33

The survey will help get you started on your journey to iPad proficiency! You will complete a similar survey at the end of the module and will be able to see your proficiency in numerous areas go up. I will use the surveys to help me include more information pertaining to need areas noted on each survey to help target iPad tutorials as well. The enrollment information is located below in order to enroll in the iTunes U, Transform iPads for TVIs (*Tip for TVIs*) course. You are free to download and use any and all the materials on the iTunes U course, *Tip for TVIs*. They are there to help you. The syllabus is attached to this e-mail to help give you an overview of the course. You will also be receiving a packet of materials in the mail including a $10 iTunes card for your participation. If you have not returned your consent form with an address to send materials, please see the consent form attached.

If you need to download iTunes U, where the iPad Learning Module, *Tip for TVIs* is being offered, on your iPad, please follow this link from the iTunes store (it is a free application).

https://itunes.apple.com/us/app/itunes-u/id490217893?mt=8

If you need a quick step-by-step tutorial on how to access the course on iTunes U, please paste this YouTube video tutorial to your browser window (viewing time- 2 minutes):

http://www.youtube.com/watch?v=EjOTmW2CxfA

You must have an Apple ID in order to enroll in an iTunes U course. If you need an Apple ID here is the link from Apple to do so:

https://appleid.apple.com/cgi-bin/WebObjects/MyAppleId.woa/wa/createAppleId

iTunes U information from Apple
http://www.apple.com/education/itunes-u/

Enrollment code for iPad Learning Module:
https://itunesu.itunes.apple.com/enroll/DDD-48A-SVC
Enrollment Code:

DDD-48A-SVC

Thank you for being a part of this study!

Sincerely,
Tara

Tara Mason, TVI, M.Ed.
Ph.D. Student in Special Education
Research Assistant and University Supervisor for TVI Certification Candidates
Texas Tech University
tara.mason@ttu.edu
(281) 703-8074

# Appendix F
## *iPad Self-Assessment Survey*

**Instructions: Check off all items on this checklist you are proficient doing. Since you are TVIs there is an additional column labeled "Instructional proficiency," meaning that you are confident in your ability to teach your students how to do this on the iPad as well.**

**Please enter the month and date of your birthdate (to verify your paired self assessment survey and to ensure anonymity).**

**Please fill in the state in which you work.**

**Please indicate your age range from the options below.**

- ◯ 20-29 years of age
- ◯ 30-39 years of age
- ◯ 40-49 years of age
- ◯ 50-59 years of age
- ◯ 60-70 years of age

**Please indicate your caseload size.**

- ◯ less then 5 students
- ◯ 6-10 students
- ◯ 11-15 students
- ◯ 16-20 students
- ◯ 21-25 students
- ◯ 26-30 students
- ◯ 31 students or more

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**Please indicate the service delivery model in which you work.**

- ◯ Itinerant
- ◯ Resource room
- ◯ Self-contained classroom
- ◯ Residential school
- ◯ Other

**How confident do you feel helping your students and other related professionals to troubleshoot and use the technology that your student uses?**

- ◯ Extremely Confident
- ◯ Confident
- ◯ Somewhat Confident
- ◯ Not Confident

**iPad Controls: Location and basic function**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Home button: One Click | ◯ | ◯ | ◯ |
| 2. Home button: Two Click | ◯ | ◯ | ◯ |
| 3. Home button: Three Click | ◯ | ◯ | ◯ |
| 4. Side Slider: Mute/Screen Lock | ◯ | ◯ | ◯ |
| 5. Volume | ◯ | ◯ | ◯ |
| 6. Top Right: Sleep or combined with Home Button | ◯ | ◯ | ◯ |

**iPad Controls: The Settings menu**

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| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Turning on Wifi | ○ | ○ | ○ |
| 2. Turning on and using Bluetooth | ○ | ○ | ○ |
| 3. Where to go if you are running out of space on your iPad | ○ | ○ | ○ |
| 4. Adjusting brightness | ○ | ○ | ○ |
| 5. Adjusting settings to save battery life | ○ | ○ | ○ |
| 6. Adjusting privacy settings | ○ | ○ | ○ |

**Managing The Home Screen**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Creating Folders | ○ | ○ | ○ |
| 2. Deleting apps | ○ | ○ | ○ |
| 3. Moving apps from screen to screen | ○ | ○ | ○ |
| 4. Using multi-tasking bar | ○ | ○ | ○ |
| 5. Adding or closing background applications | ○ | ○ | ○ |

**Personalizing Your iPad**

| | Not-Proficient | Proficient | Instructional Proficient |
|---|---|---|---|
| 1. Changing background colors, pictures, etc. | ○ | ○ | ○ |
| 2. Creating personalized sounds | ○ | ○ | ○ |
| 3. Setting a pass code | ○ | ○ | ○ |
| 4. Using Twitter with your iPad | ○ | ○ | ○ |
| 5. Using Facebook with your iPad | ○ | ○ | ○ |
| 6. Sharing any media with your iPad (text or e-mail) | ○ | ○ | ○ |

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**Using the App Store**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Setting up an iTunes Account | ○ | ○ | ○ |
| 2. Downloading applications | ○ | ○ | ○ |
| 3. Creating more space if apps will not download | ○ | ○ | ○ |
| 4. Multi-tasking while using the App Store | ○ | ○ | ○ |
| 5. Controlled searches using the App Store | ○ | ○ | ○ |

**Accessibility on the iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Where to find accessibility features | ○ | ○ | ○ |
| 2. VI: VoiceOver Controls | ○ | ○ | ○ |
| 3. VI: VoiceOver Gestures | ○ | ○ | ○ |
| 4. VI: VoiceOver with keyboard shortcuts | ○ | ○ | ○ |
| 5. VI: VoiceOver with Rotar | ○ | ○ | ○ |
| 6. VI: Zoom | ○ | ○ | ○ |
| 7. VI: Speak Text | ○ | ○ | ○ |
| 8. VI: Large Font | ○ | ○ | ○ |
| 9. VI: Screen Contrast | ○ | ○ | ○ |
| 10. VI: CVI Considerations for the iPad (i.e., low clutter, changing backgrounds) | ○ | ○ | ○ |
| 11. AI: Monotone | ○ | ○ | ○ |
| 12. AI: Creating alerts and notification modifications | ○ | ○ | ○ |
| 13. AI: Captioning considerations | ○ | ○ | ○ |
| 14. Students with OI: Assistive Touch | ○ | ○ | ○ |
| 15. Students using Guided Access | ○ | ○ | ○ |

**Searching & Notifications on your iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Different ways of searching on your iPad | ○ | ○ | ○ |
| 2. Configuring your search | ○ | ○ | ○ |
| 3. Configuring notifications on your iPad | ○ | ○ | ○ |

**Auto-corrections and Shortcuts**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Configuring shortcuts in settings | ○ | ○ | ○ |
| 2. Configuring auto-correct in settings | ○ | ○ | ○ |
| 3. Not accepting auto-corrections | ○ | ○ | ○ |
| 4. Copy, Paste and Cut | ○ | ○ | ○ |
| 5. Keyboard shortcuts | ○ | ○ | ○ |

**iCloud and iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Setting up iCloud account | ○ | ○ | ○ |
| 2. Syncing wirelessly with iCloud account | ○ | ○ | ○ |
| 3. Configuring iCloud account | ○ | ○ | ○ |
| 4. Syncing with iTunes | ○ | ○ | ○ |
| 5. Syncing with USB cable | ○ | ○ | ○ |
| 6. Using Airplay and Mirroring on iPad | ○ | ○ | ○ |

**Safari on the iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|

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| | | | |
|---|---|---|---|
| 1. Web browsing | ○ | ○ | ○ |
| 2. Using Reader | ○ | ○ | ○ |
| 3. Using Reading List | ○ | ○ | ○ |
| 4. Adding web icons to home page | ○ | ○ | ○ |
| 5. E-mailing weblink | ○ | ○ | ○ |
| 6. Embedding web link in a text or e-mail | ○ | ○ | ○ |
| 7. Multi-tasking using Safari | ○ | ○ | ○ |
| 8. Troubleshooting with Safari webpages that are not working with VoiceOver | ○ | ○ | ○ |

**Calendar on the iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Adding events | ○ | ○ | ○ |
| 2. Setting alarms or reminders | ○ | ○ | ○ |
| 3. Calendar Views | ○ | ○ | ○ |

**Camera and Photo Roll**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Taking pictures | ○ | ○ | ○ |
| 2. Using camera with students who have low vision | ○ | ○ | ○ |
| 3. Editing photos | ○ | ○ | ○ |
| 4. Setting up photo stream | ○ | ○ | ○ |
| 5. Taking videos | ○ | ○ | ○ |
| 6. Editing videos | ○ | ○ | ○ |
| 7. Editing videos using iMovie | ○ | ○ | ○ |

**Other important apps**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1. Messages (text messaging) | ○ | ○ | ○ |
| 2. Facetime (on iPad) | ○ | ○ | ○ |
| 3. Podcasts (on iPad) | ○ | ○ | ○ |
| 4. Youtube (on iPad) | ○ | ○ | ○ |
| 5. Google apps | ○ | ○ | ○ |
| 6. Pages | ○ | ○ | ○ |
| 7. Maps (on iPad) | ○ | ○ | ○ |
| 8. AroundMe | ○ | ○ | ○ |
| 9. Dropbox | ○ | ○ | ○ |
| 10. Voice Memos (on iPad) | ○ | ○ | ○ |
| 11. Dragon | ○ | ○ | ○ |
| 12. Calculator (on iPad) | ○ | ○ | ○ |
| 13. Weather (on iPad) | ○ | ○ | ○ |
| 14. Reminders (on iPad) | ○ | ○ | ○ |

**Please rate items about your confidence level on the scale below. 0-1 are the lowest levels, meaning you do not feel confident at all, and 9-10 are the highest levels of self confidence.**

| | Not at all | | Very Little | | Some Influence | | Quite a bit | | A great deal | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| How much can you influence your students' access to assistive technology, specifically iPads? | | | | | | | | | | | |
| How much can you freely advocate for your students' technology needs? | | | | | | | | | | | |
| How much can you obtain access to the technology instruction materials you need and other individualized technology accessories for your student? | | | | | | | | | | | |

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| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| How confident are you implementing Expanded Core Curriculum using technology? | | | | | | | | | | | |
| How confident are you implementing technology with your students who have multiple disabilities and a visual impairment? | | | | | | | | | | | |
| How sure are you that you can learn a new technology skill if you needed to for your student? | | | | | | | | | | | |
| How much can you influence your students' feelings of self confidence around their school work using assistive technology? | | | | | | | | | | | |
| How much confidence do you have in helping your students learn independent living skills using assistive technology such as iPads? | | | | | | | | | | | |

**If you were going to implement a technology plan using iPads with one of your caseload students, what would it look like? Please indicate what you would do with your student using the iPad and how you would teach it.**

**Appendix G**
**Confirmation Letter with Packet Instructions**

Dear TVI,

Thank you for choosing to be part of the Transform iPads for TVIs (*Tip for TVIs*) learning module study! I hope it is beneficial to you. Please do not hesitate to get in touch with me if you have any questions, concerns, or do not want to continue participating. You are free to stop participating at any time. What are your next steps:

1. If you have not already enrolled in the iTunes U course, please follow enrollment instructions (Side two of this confirmation page includes the e-mail with instructions for enrolling and helpful tutorial links).
2. Read through the items in this packet. I have included the iPad Learning Module Syllabus and a smaller binder with dividers containing paper copies of many of the digital resources available to you on the iTunes U course. These paper copies of some of the digital materials are meant to be helpful since many of the iPad Module course participants are just getting started using iPads and working with iTunes U!
3. Get started by going through the module starting with the introductory materials and then chapter-by-chapter. I highly recommend you check off each "assignment" as you read through it. On iTunes U, everything is called an "assignment" whether it be a video resource, document, podcast, etc. If you check off items as you work through them, it will help you stay organized with materials.
4. Take a look at the last divider in your notebook. You will need to complete the three items in that section: case study student write up, iPad checklist, and iPad implementation plan for that student. There is also a note page provider to keep updates on how the plan is going. The intention of this assignment is for you to have hands on practice with the skills you are learning about using iPads. The more notes you take regarding your implementation successes and need areas, the more your instructional proficiency and student success with iPads will improve. These three items (the note page is encouraged but optional) will be turned into me. Please keep student names anonymous and any other identifying information changed (i.e., parents name, school name, etc.). The specifics of your case study student's disability would be important to describe in your case study write up.

Please see attached syllabus and binder. Do not hesitate to get in touch with me if you have any questions or concerns. I am here to help you.

Sincerely,
Tara

Tara Mason, TVI, M.Ed.
Ph.D. Candidate in Special Education
Research Assistant and University Supervisor for TVI Certification Candidates
Texas Tech University
tara.mason@ttu.edu
(281) 703-807

**Appendix H**
**iPad Syllabus**

# Transformative Technologies

## iPads for Students with Visual and/or Multiple Impairments

Fall 2013
Instructor: Tara Mason
E-Mail: tara.mason.ttu@gmail.com
Phone: 281-703-8074
Office: None
Office Hours: Available for instant chatting, video chatting, e-mail, telephone conference by appointment

### Overview

This learning module will help you become a more transformative TVI using iPads with your students who are blind, visually impaired or multiply impaired. The module provides resources both for teacher and student using iPads for learning and life.

### Learning Goals and Outcomes

- ☐ TVIs will learn strategies and teaching tools for using iPads with students who are blind, visually impaired and multiply impaired
- ☐ TVIs will implement lessons aligned with the Expanded Core Curriculum addressing each area for their students who are blind or visually impaired
- ☐ TVIs will facilitate evaluation of iPad present levels of performance and create an iPad assistive technology plan addressing individualized needs of students
- ☐ TVIs will collaborate and coordinate with educational team members to ensure consistent implementation of iPad where applicable and appropriate
- ☐ TVIs will learn how to use iPad in more transformative ways to increase the effectiveness of his or her teaching with technology

### Requirements

You will need a high-speed wireless internet connection, an iPad (and potentially student iPads, if possible) and iTunes U (free software)

### Evaluation

This learning module is for your benefit. You will be asked to create a couple items associated with implementing an iPad with a case study student. It is your choice to do these things as they are there for your benefit. The more you put into completing the module the more you will gain!

### Materials

- iTunes: Transformative iPad as Assistive Technology Course

- Print materials- binder with tabs containing: syllabus, iPad checklist and plan template, one pagers, helpful "how to" guides, and curriculum examples.

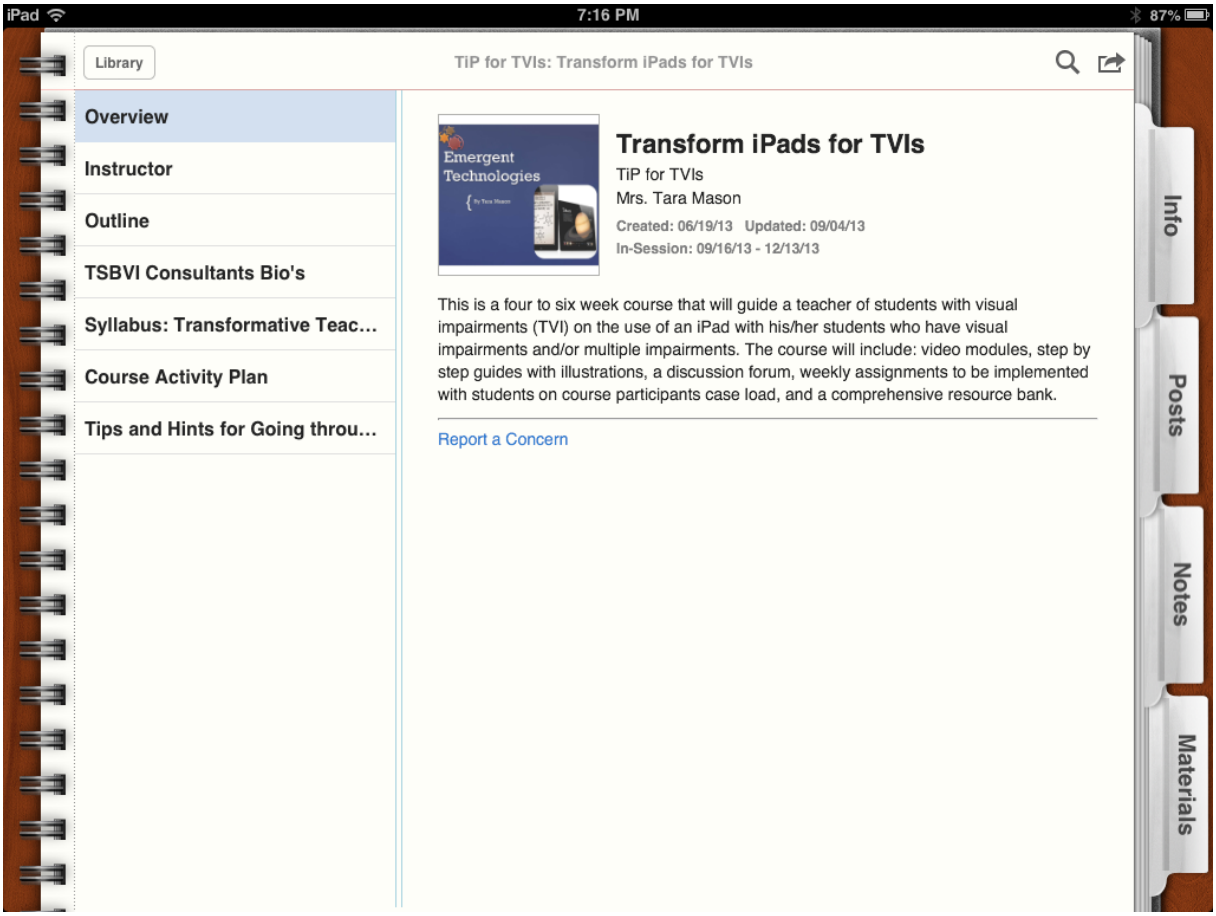
### Milestones

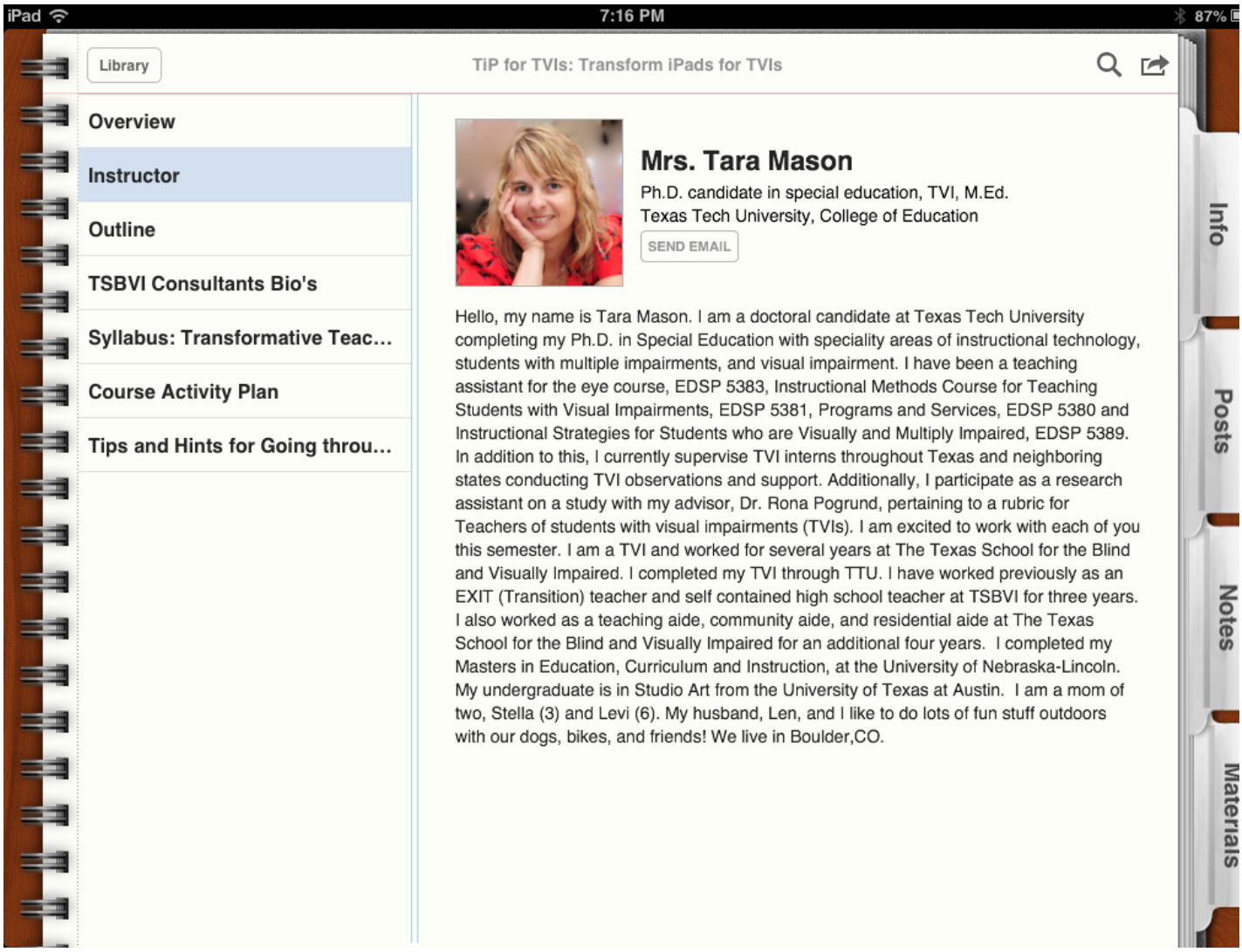
**October 2013**
Complete first half of course.
- ☐ Choose case study student
- ☐ Write case study narrative
- ☐ Complete iPad evaluation and draft implementation plan

**November 2013**
Complete second half of the course.
- ☐ Reflect on progress and make predictions using implementation plan.
- ☐ Create a collection of student artifacts, i.e. screen shots, papers, documented learning outcomes or teacher feedback to add to your case study write up, if you wish.

**December 2013**
- ☐ Complete post survey
- ☐ Turn in homework assignments, student artifacts, implementation plan reflections

# Appendix I
## iTunes U Course Screen Shot Examples




iPad
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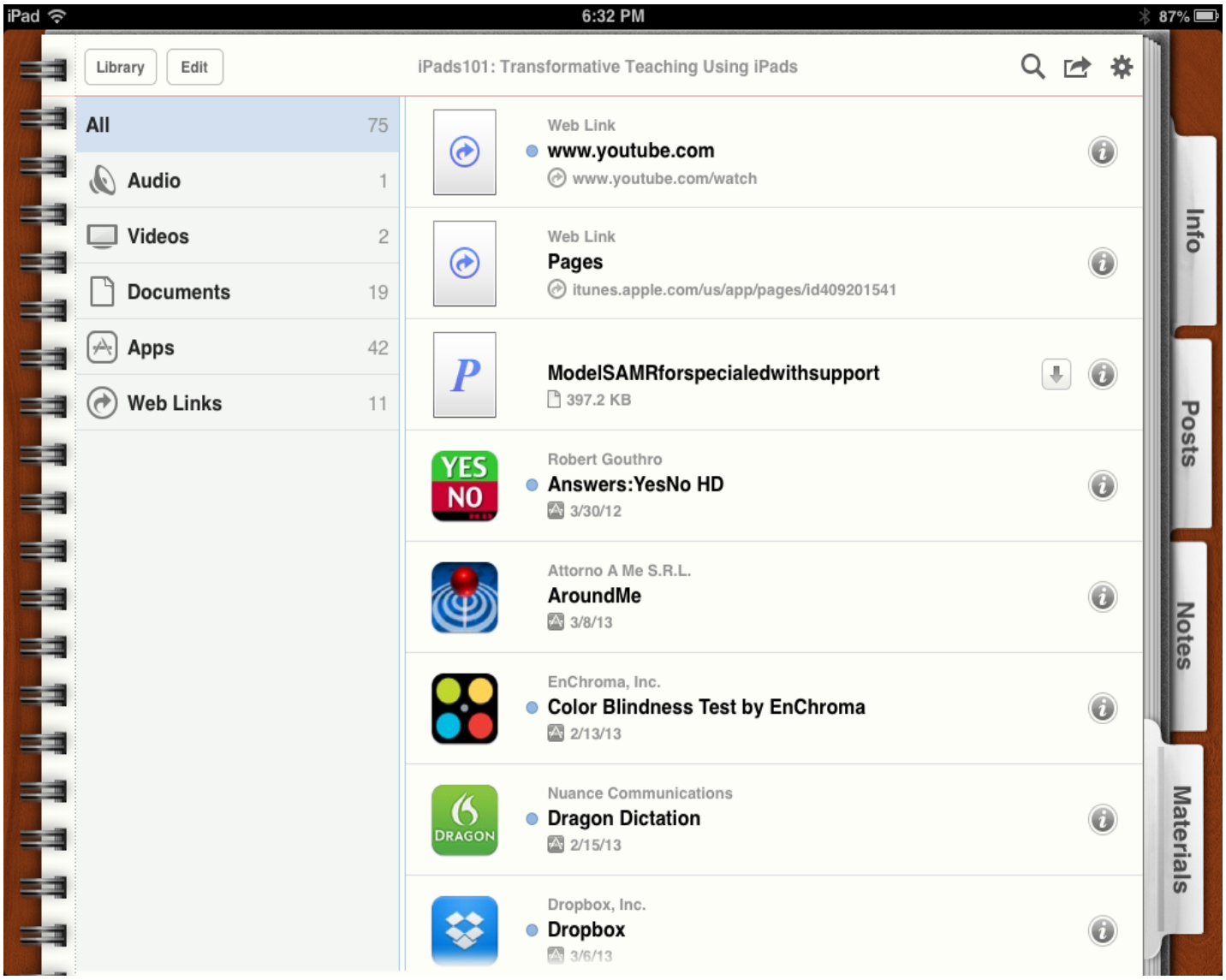
Library
TiP for TVIs: Transform iPads for TVIs
Overview
Instructor
Outline
TSBVI Consultants Bio's
Syllabus: Transformative Teac...
Course Activity Plan
Tips and Hints for Going throu...
Mrs. Tara Mason
Ph.D. candidate in special education, TVI, M.Ed.
Texas Tech University, College of Education
SEND EMAIL
Hello, my name is Tara Mason. I am a doctoral candidate at Texas Tech University completing my Ph.D. in Special Education with speciality areas of instructional technology, students with multiple impairments, and visual impairment. I have been a teaching assistant for the eye course, EDSP 5383, Instructional Methods Course for Teaching Students with Visual Impairments, EDSP 5381, Programs and Services, EDSP 5380 and Instructional Strategies for Students who are Visually and Multiply Impaired, EDSP 5389. In addition to this, I currently supervise TVI interns throughout Texas and neighboring states conducting TVI observations and support. Additionally, I participate as a research assistant on a study with my advisor, Dr. Rona Pogrund, pertaining to a rubric for Teachers of students with visual impairments (TVIs). I am excited to work with each of you this semester. I am a TVI and worked for several years at The Texas School for the Blind and Visually Impaired. I completed my TVI through TTU. I have worked previously as an EXIT (Transition) teacher and self contained high school teacher at TSBVI for three years. I also worked as a teaching aide, community aide, and residential aide at The Texas School for the Blind and Visually Impaired for an additional four years. I completed my Masters in Education, Curriculum and Instruction, at the University of Nebraska-Lincoln. My undergraduate is in Studio Art from the University of Texas at Austin. I am a mom of two, Stella (3) and Levi (6). My husband, Len, and I like to do lots of fun stuff outdoors with our dogs, bikes, and friends! We live in Boulder,CO.
Info
Posts
Notes
Materials


iPad
6:32 PM
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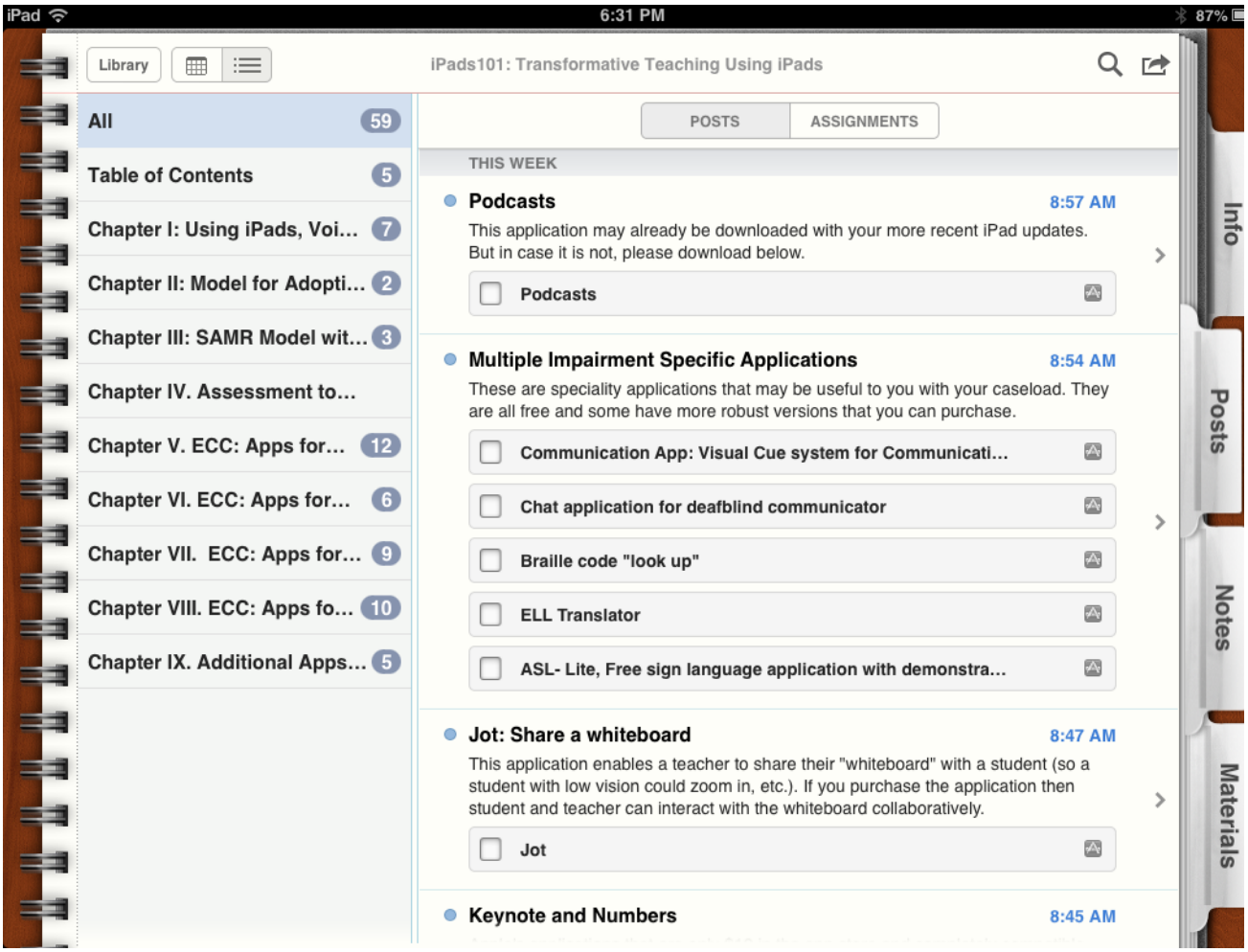
Library
Edit
iPads101: Transformative Teaching Using iPads
All 75
Audio 1
Videos 2
Documents 19
Apps 42
Web Links 11
Web Link
www.youtube.com
www.youtube.com/watch
Web Link
Pages
itunes.apple.com/us/app/pages/id409201541
ModelSAMRforspecialedwithsupport
397.2 KB
Robert Gouthro
Answers:YesNo HD
3/30/12
Attorno A Me S.R.L.
AroundMe
3/8/13
EnChroma, Inc.
Color Blindness Test by EnChroma
2/13/13
Nuance Communications
Dragon Dictation
2/15/13
Dropbox, Inc.
Dropbox
3/6/13
Info
Posts
Notes
Materials


iPad
6:31 PM
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iPads101: Transformative Teaching Using iPads
All 59
Table of Contents 5
Chapter I: Using iPads, Voi... 7
Chapter II: Model for Adopti... 2
Chapter III: SAMR Model wit... 3
Chapter IV. Assessment to...
Chapter V. ECC: Apps for... 12
Chapter VI. ECC: Apps for... 6
Chapter VII. ECC: Apps for... 9
Chapter VIII. ECC: Apps fo... 10
Chapter IX. Additional Apps... 5
POSTS
ASSIGNMENTS
THIS WEEK
Podcasts 8:57 AM
This application may already be downloaded with your more recent iPad updates. But in case it is not, please download below.
Podcasts
Multiple Impairment Specific Applications 8:54 AM
These are speciality applications that may be useful to you with your caseload. They are all free and some have more robust versions that you can purchase.
Communication App: Visual Cue system for Communicati...
Chat application for deafblind communicator
Braille code "look up"
ELL Translator
ASL- Lite, Free sign language application with demonstra...
Jot: Share a whiteboard 8:47 AM
This application enables a teacher to share their "whiteboard" with a student (so a student with low vision could zoom in, etc.). If you purchase the application then student and teacher can interact with the whiteboard collaboratively.
Jot
Keynote and Numbers 8:45 AM
Info
Posts
Notes
Materials

**Appendix J**
**Table of Contents: Print Packet Materials**

Transform iPads for TVIs (*Tip for TVIs*) **Binder Materials**

6) iTunes U Course Information
   a) iTunes U tutorial pdf
   b) iPad Learning Module Syllabus
   c) iPad Learning Module Post Outline
7) Expanded Core Curriculum Resources
   a) Application grids
      i) ECC and iPad for students who are blind
      ii) ECC and iPad for students who have low vision
      iii) ECC and iPad for students who are visually and multiply impaired
      iv) ECC and iPad for transformative teacher
8) Quick Start Guides
   a) Application quick start guides (30+)
9) iPad Evaluation Resources
   a) iPad Roadmap
   b) iPad Accessibility Flowchart
   c) iPad checklist
   d) iPad Implementation Plan
   e) iPad example checklist and implementation plan
   f) iPad example case study power point
10) iPad Module Assignments (to be completed with one case study student from your caseload)
   a) Case study student write up (template)
   b) iPad Checklist
   c) iPad Implementation Plan
   d) Notes and reflections on implementation plan (template provided)
   e) Examples of student artifacts (inclusion is optional)

**Appendix K**
**Follow Up Email- iPad Learning Module (October)**

Dear iPad Module Participants,

Thank you so much for being willing to go through the Transform iPads for TVIs (*Tip for TVIs*). At this time, I would like to check in and make sure everything is going well for each of you with the course. You should be completing the second half of the course and have implemented your iPad implementation plan with your case study student. Please let me know if you have any questions or concerns. I have attached digital copies of: the iPad checklist, implementation plan, and reflection page in case you need another copy for any reason. You are welcome to turn in any items to me at this time if that would help you stay organized! Please rest assured, your privacy is very important to me, and I will not be associating your name with your plan. Please save your file with the month and date of your birthday, like you entered on the surveys. If your name is on any item, I will mark it out and replace it with the month_date to ensure privacy.

Example file naming:

month_date_state_ipadchecklist

month_date_state_implementationplan

month_date_state_teacherreflection

month_date_state_studentartifacts1

Sincerely,
Tara

Tara Mason, TVI, M.Ed.
Ph.D. Candidate in Special Education
Research Assistant and University Supervisor for TVI Certification Candidates
Texas Tech University
tara.mason@ttu.edu
(281) 703-8074

**Appendix L**
**iPad Checkli**

**iPad- Assistive Technology Checklist**
**Collaborative project of Texas School for the Blind and Visually Impaired Outreach and Tara Mason, TVI, Ph.D. candidate at TTU**

**What assistive technology the student is currently using?**

- ❒ Computer
- ❒ Cell Phone
- ❒ Watch, Alarm Clock, or the like
- ❒ Other assistive technology: _____
- ❒ Other: _____

**What is the student using instead in order to access items that could be accessed through iPad?**

- ❒ Internet:_____
- ❒ For E-mail: _____
- ❒ For maps/directions:
- ❒ For recreation/leisure's activities: _____
- ❒ For academic assistive technology needs: _____

**What level of iPad skill does student exhibit?**

- ❒ Beginner
- ❒ Moderate user/exposure
- ❒ Proficient
- ❒ Skillful

**What are the vision-specific needs?**

- ❒ Low vision
- ❒ Functionally Blind
- ❒ Auditory materials
- ❒ Tactual materials
- ❒ Reduced clutter
- ❒ Font size needed:_____
- ❒ Color contrast needed: _____
- ❒ Vision-related assistive technology being used presently:

-_____

-_____

Tara Mason Draft

**What are the auditory-specific student needs?**

- ❒ Level of hearing loss:_____
- ❒ TDD for phone access with or without relay
- ❒ Signaling devices
- ❒ Closed captioning
- ❒ Personal amplification system/hearing aid
- ❒ FM or loop system
- ❒ Auditory-related assistive technology being used presently:

**st**

-_____
-_____

**What are the student communication needs?**

- ❒ Communicates with pictures, objects, tactile symbols, words, etc.
- ❒ Choice board with/without switch
- ❒ Voice output device
- ❒ Device with speech synthesis
- ❒ Accommodations for input/output (i.e. dictation software)
- ❒ Other communication: _____

Tara Mason Draft

**What would be the ideal planning for student's motor needs?**

- ❒ Modified keyboard
- ❒ Bluetooth Keyboard
- ❒ Switch system
- ❒ Tactile touch-screen adaption
- ❒ No touch-screen adaption
- ❒ Modified gestures for touch-screen

**What are the independent living skills need's?**

- ❒ Wifi Only
- ❒ Data Plan (Present mobile device carrier: _____)
- ❒ Static work station
- ❒ Mobile work station
- ❒ Increased capacity on mobile device
- ❒ O & M specific needs (Previous O&M electronic device being used: _____ _____)

**Potential Expanded Core Curriculum Use of the iPad:**

- ❒ Compensatory Academics (Math, Science, Social Studies, Language Arts, etc.)
- ❒ Functional Academics
- ❒ Communication assistive technology aid
- ❒ Learning Aid
- ❒ Orientation and Mobility
- ❒ Social Interaction
- ❒ Independent Living Skills
- ❒ Recreation and Leisure
- ❒ Career Education
- ❒ Sensory Efficiency Skills
- ❒ Self determination and advocacy

**Appendix M**
**iPad Implementation Plan**

**iPad: Assistive Technology Plan**

Student: _____ Grade:_____
Accommodation Categories: _____
Date:_____
Educational Team members:
_____
_____
_____

1. Identified areas of accommodation from iPad Assistive Technology Inventory:
-
-
-
-
-

2. Areas of Expanded Core Curriculum identified:

| ECC Area | Matching IEP Goal | Application identified |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

3. Assistive Technology Educational Plan Goals
   i. Goal 1:
   ii. Goal 2:
   iii. Goal 3:
   iv. Goal 4:
   v. Goal 5:

4. Collaborative members needing application/ iPad "how to" white sheets:

| Team member | White Sheet(s) needed | Date given: | Follow up: |
|---|---|---|---|
| | | | |
| | | | |

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Page 1

5. Horizontal Plan:

| Meeting number | Instructional goal: Introduce, Scaffold, Independent Practice, Monitor and Maintain |
|---|---|
| *Example: #1* | *IP- application, Pages* |
| | |
| | |
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**Appendix N**
**iPad Module Final Reminder E-mail (November)**

Dear Participants,

I want to thank each of you again for all your hard work. I have been receiving assignments and I am so impressed with the implementation plans so far! I hope the Transform iPads for TVIs (*Tip for TVIs*) has been beneficial to you in your teaching practice. At this time, please take a moment to complete the *iPad Learning Module Self-Assessment Survey*. It should not take you more then 5-10 minutes to complete. Thank you in advance for the time and effort you have put into becoming more transformative iPad users! I will be in touch in the next few weeks with one final survey pertaining to the quality of the iPad module. I have included that survey link below for those of you who have completed the course.

Please make sure you have turned in your three assignments to me (using file naming, month_date_state_assignmentname):

- ❒ Case study student write-up
- ❒ iPad evaluation checklist
- ❒ iPad implementation plan
- ❒ (Optional) teacher reflections and/or student artifacts

Please complete the *iPad Learning Module Self Assessment Survey*:
https://educttu.qualtrics.com/SE/?SID=SV_5dKPQwIHxUDau33

Please complete the *iPad Learning Module Feedback Survey*:
https://educttu.qualtrics.com/SE/?SID=SV_6im4wFzKq3ylk8Z

The course will remain active for three more weeks after this e-mail. Please feel free to save white pages and/or iPad resources to your iPad to use with your students. I appreciate the opportunity to work with each of you and thank you for being so generous with your time!

Sincerely,
Tara

Tara Mason, TVI, M.Ed.
Ph.D. Candidate in Special Education
Research Assistant and University Supervisor for TVI Certification Candidates
Texas Tech University
tara.mason@ttu.edu
(281) 703-8074

# Appendix O
## Post-self Assessment Survey

**Instructions: Check off all items on this checklist you are proficient doing. Since we are TVIs there is an additional column labeled "Instructional proficiency" this means you are confident in your ability to teach your students how to do this on the iPad as well.**

**Please enter the month and date of your birthdate (to verify your paired self assessment survey and to ensure anonymity).**

**Please fill in the state in which you work.**

**Please indicate your age range from the options below.**

- ◯ 20-29 years of age
- ◯ 30-39 years of age
- ◯ 40-49 years of age
- ◯ 50-59 years of age
- ◯ 60-70 years of age

**Please indicate your caseload size.**

- ◯ less then 5 students
- ◯ 6-10 students
- ◯ 11-15 students
- ◯ 16-20 students
- ◯ 21-25 students
- ◯ 26-30 students
- ◯ 31 students or more

**Please indicate the service delivery model in which you work.**

- ◯ Itinerant
- ◯ Resource room
- ◯ Self-contained classroom
- ◯ Residential school
- ◯ Other

**How confident do you feel helping your students and other related professionals to troubleshoot and use the technology that your student uses?**

- ◯ Extremely Confident
- ◯ Confident
- ◯ Somewhat Confident
- ◯ Not Confident

**iPad Controls: Location and basic function**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Home button: One Click | ◯ | ◯ | ◯ |
| 2. Home button: Two Click | ◯ | ◯ | ◯ |
| 3. Home button: Three Click | ◯ | ◯ | ◯ |
| 4. Side Slider: Mute/Screen Lock | ◯ | ◯ | ◯ |
| 5. Volume | ◯ | ◯ | ◯ |
| 6. Top Right: Sleep or combined with Home Button | ◯ | ◯ | ◯ |

**iPad Controls: The Settings menu**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Turning on Wifi | ○ | ○ | ○ |
| 2. Turning on and using Bluetooth | ○ | ○ | ○ |
| 3. Where to go if you are running out of space on your iPad | ○ | ○ | ○ |
| 4. Adjusting brightness | ○ | ○ | ○ |
| 5. Adjusting settings to save battery life | ○ | ○ | ○ |
| 6. Adjusting privacy settings | ○ | ○ | ○ |

**Managing The Home Screen**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Creating Folders | ○ | ○ | ○ |
| 2. Deleting apps | ○ | ○ | ○ |
| 3. Moving apps from screen to screen | ○ | ○ | ○ |
| 4. Using multi-tasking bar | ○ | ○ | ○ |
| 5. Adding or closing background applications | ○ | ○ | ○ |

**Personalizing Your iPad**

| | Not-Proficient | Proficient | Instructional Proficient |
|---|---|---|---|
| 1. Changing background colors, pictures, etc. | ○ | ○ | ○ |
| 2. Creating personalized sounds | ○ | ○ | ○ |
| 3. Setting a pass code | ○ | ○ | ○ |
| 4. Using Twitter with your iPad | ○ | ○ | ○ |
| 5. Using Facebook with your iPad | ○ | ○ | ○ |
| 6. Sharing any media with your iPad (text or e-mail) | ○ | ○ | ○ |

**Using the App Store**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Setting up an iTunes Account | ○ | ○ | ○ |
| 2. Downloading applications | ○ | ○ | ○ |
| 3. Creating more space if apps will not download | ○ | ○ | ○ |
| 4. Multi-tasking while using the App Store | ○ | ○ | ○ |
| 5. Controlled searches using the App Store | ○ | ○ | ○ |

**Accessibility on the iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Where to find accessibility features | ○ | ○ | ○ |
| 2. VI: Voice Over Controls | ○ | ○ | ○ |
| 3. VI: VoiceOver Gestures | ○ | ○ | ○ |
| 4. VI: VoiceOver with keyboard shortcuts | ○ | ○ | ○ |
| 5. VI: VoiceOver with Rotar | ○ | ○ | ○ |
| 6. VI: Zoom | ○ | ○ | ○ |
| 7. VI: Speak Text | ○ | ○ | ○ |
| 8. VI: Large Font | ○ | ○ | ○ |
| 9. VI: Screen Contrast | ○ | ○ | ○ |
| 10. VI: CVI Considerations for the iPad (i.e. low clutter, changing backgrounds) | ○ | ○ | ○ |
| 11. AI: Monotone | ○ | ○ | ○ |
| 12. AI: Creating alerts and notification modifications | ○ | ○ | ○ |
| 13. AI: Captioning considerations | ○ | ○ | ○ |
| 14. Students with OI: Assistive Touch | ○ | ○ | ○ |
| 15. Students using Guided Access | ○ | ○ | ○ |

**Searching & Notifications on your iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Different ways of searching on your iPad | ○ | ○ | ○ |
| 2. Configuring your search | ○ | ○ | ○ |
| 3. Configuring notifications on your iPad | ○ | ○ | ○ |

**Auto-corrections and Shortcuts**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Configuring shortcuts in settings | ○ | ○ | ○ |
| 2. Configuring auto-correct in settings | ○ | ○ | ○ |
| 3. Not accepting auto-corrections | ○ | ○ | ○ |
| 4. Copy, Paste and Cut | ○ | ○ | ○ |
| 5. Keyboard shortcuts | ○ | ○ | ○ |

**iCloud and iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Setting up iCloud account | ○ | ○ | ○ |
| 2. Syncing wirelessly with iCloud account | ○ | ○ | ○ |
| 3. Configuring iCloud account | ○ | ○ | ○ |
| 4. Syncing with iTunes | ○ | ○ | ○ |
| 5. Syncing with USB cable | ○ | ○ | ○ |
| 6. Using Airplay and Mirroring on iPad | ○ | ○ | ○ |

**Safari on the iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|

https://s.qualtrics.com/ControlPanel/Ajax.php?action=GetSurveyPrintPreview&T=11sJUZ Page 5 of 9

| | | | |
|---|---|---|---|
| 1. Web browsing | ○ | ○ | ○ |
| 2. Using Reader | ○ | ○ | ○ |
| 3. Using Reading List | ○ | ○ | ○ |
| 4. Adding web icons to home page | ○ | ○ | ○ |
| 5. E-mailing weblink | ○ | ○ | ○ |
| 6. Embedding web link in a text or e-mail | ○ | ○ | ○ |
| 7. Multi-tasking using Safari | ○ | ○ | ○ |
| 8. Troubleshooting with Safari webpages that are not working with VoiceOver | ○ | ○ | ○ |

**Calendar on the iPad**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Adding events | ○ | ○ | ○ |
| 2. Setting alarms or reminders | ○ | ○ | ○ |
| 3. Calendar Views | ○ | ○ | ○ |

**Camera and Photo Roll**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|
| 1. Taking pictures | ○ | ○ | ○ |
| 2. Using camera with students who are low vision | ○ | ○ | ○ |
| 3. Editing photos | ○ | ○ | ○ |
| 4. Setting up photo stream | ○ | ○ | ○ |
| 5. Taking videos | ○ | ○ | ○ |
| 6. Editing videos | ○ | ○ | ○ |
| 7. Editing videos using iMovie | ○ | ○ | ○ |

**Other important apps**

| | Not-Proficient | Proficient | Instructional Proficiency |
|---|---|---|---|

| | | | |
|---|---|---|---|
| 1. Messages (text messaging) | ○ | ○ | ○ |
| 2. Facetime (on iPad) | ○ | ○ | ○ |
| 3. Podcasts (on iPad) | ○ | ○ | ○ |
| 4. Youtube (on iPad) | ○ | ○ | ○ |
| 5. Google apps | ○ | ○ | ○ |
| 6. Pages | ○ | ○ | ○ |
| 7. Maps (on iPad) | ○ | ○ | ○ |
| 8. AroundMe | ○ | ○ | ○ |
| 9. Dropbox | ○ | ○ | ○ |
| 10. Voice Memos (on iPad) | ○ | ○ | ○ |
| 11. Dragon | ○ | ○ | ○ |
| 12. Calculator (on iPad) | ○ | ○ | ○ |
| 13. Weather (on iPad) | ○ | ○ | ○ |
| 14. Reminders (on iPad) | ○ | ○ | ○ |

**Please rate items about your confidence level on the scale below. 0-1 are the lowest levels, meaning you do not feel confident at all and 9-10 are the highest levels of self confidence.**

| | Not at all | | Very Little | | Some Influence | | Quite a bit | | A great deal | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| How much can you influence your students' access to assistive technology specifically iPads? | | | | | | | | | | | |
| How much can you freely advocate for your students' technology needs? | | | | | | | | | | | |
| How much can you obtain access to the technology instruction materials you need and other individualized technology accessories for your student? | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| How confident are you implementing Expanded Core Curriculum using technology? | | | | | | | | | | | |
| How confident are you implementing technology with your students who have multiple disabilities and a visual impairment? | | | | | | | | | | | |
| How sure are you that you can learn a new technology skill if you needed to for your student? | | | | | | | | | | | |
| How much can you influence your students' feelings of self confidence around their school work using assistive technology? | | | | | | | | | | | |
| How much confidence do you have in helping your students learn independent living skills using assistive technology such as iPads? | | | | | | | | | | | |

**If you were going to implement a technology plan using iPads with one of your caseload students what would it look like. Please indicate what you would do with your student using the iPad and how you would teach it.**

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**How helpful was the iPad Learning Module in developing your knowledge and skills regarding iPads?**

- ◯ Extremely Helpful
- ◯ Helpful
- ◯ Somewhat Helpful
- ◯ Not Helpful

**What would you have added to the iPad Learning Module that would have helped you develop your iPad knowledge and skills?**

# Appendix P
# Learning Module Feedback Survey

**Learning Module Effectiveness Feedback**

| | Very Satisfied | Satisfied | Somewhat Satisfied | Neutral | Somewhat Dissatisfied | Dissatisfied |
|---|---|---|---|---|---|---|
| The learning module explained important concepts/ideas and answered questions in ways that I could understand. | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module stimulated my interest in using iPads for my students with visual impairments | ○ | ○ | ○ | ○ | ○ | ○ |
| Appropriate teaching techniques were used by the learning module to enhance my development | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module was well organized | ○ | ○ | ○ | ○ | ○ | ○ |
| Overall, the learning module effectively supported my learning | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module enrollment process was well organized. | ○ | ○ | ○ | ○ | ○ | ○ |
| The learning module organization in iTunes U was easy to follow on my mobile device (i.e., on your iPad) | ○ | ○ | ○ | ○ | ○ | ○ |
| The materials/handouts in the iTunes U module were easy to follow and download. | ○ | ○ | ○ | ○ | ○ | ○ |
| The suggested applications were helpful and organized | ○ | ○ | ○ | ○ | ○ | ○ |
| The format of the learning module being associated with the Expanded Core Curriculum was helpful to me in my job as a TVI | ○ | ○ | ○ | ○ | ○ | ○ |

**Learning Module Materials: White Pages, iPad Evaluation and Accessibility Tips and Strategies**

| | Very Effective | Effective | Ineffective | Very Ineffective |
|---|---|---|---|---|
| The white pages or "Quick Start Guides" were effective | | | | |

://s.qualtrics.com/ControlPanel/Ajax.php?action=GetSurveyPrintPreview&T=19LMxg Page 1 of 4

| | | | | |
|---|---|---|---|---|
| for my learning about apps or accessibility information related to iPads | ○ | ○ | ○ | ○ |
| The white pages or "Quick Start Guides" were effective for collaboration with other team members to help students be more successful with their iPads | ○ | ○ | ○ | ○ |
| The iPad evaluation checklist was an effective way to learn about what my student(s) will need associated with their iPad use. | ○ | ○ | ○ | ○ |
| The iPad Road-map helped give me an overarching view of how I might think of implementing an iPad | ○ | ○ | ○ | ○ |
| The iPad Technology Plan was an effective way to plan for my student(s) iPad as a technology solution to be used in his/her program | ○ | ○ | ○ | ○ |

**What was the most significant thing you learned from the iPad Learning Module?**

**What supports were the most helpful within the learning module to help you?**

**How will you apply what you learned in the iPad Module?**

https://s.qualtrics.com/ControlPanel/Ajax.php?action=GetSurveyPrintPreview&T=19LMxg Page 2 of 4

**How can the module be improved in your opinion?**

**What would you change about the learning module?**

**What applications, professional development supports, or information is missing from the learning module regarding using iPads for students who have visual impairments?**

**What was your favorite and least favorite aspect of the learning module?**

**Do you feel that you are a better teacher with this knowledge regarding iPads and accessibility?**

- Definitely yes
- Probably yes
- Probably not
- Definitely not

**How important would it be for you to have Continuing Education credits associated with an online course like the iPad Learning Module on iTunes U?**

- ◯ Extremely Important
- ◯ Very Important
- ◯ Somewhat important
- ◯ Not at all Important

**Appendix Q**
**iPad Module Final Reminder E-mail (December)**

Dear Participants,

The Transform iPads for TVIs (*Tip for TVIs*) learning module study has come to a close. I hope the *Tip for TVIs* has been beneficial to you in your teaching practice. At this time, please take a moment to complete the *iPad Learning Module Self-Assessment Survey* and the *iPad Learning Module Feedback Survey,* if you have not done so already. It should not take you more then 5-10 minutes to complete each survey. Thank you in advance for the time and effort you have put into becoming more transformative iPad users! I have included that survey link below for those of you who have completed the course.

Please make sure you have turned in your three assignments to me (using file naming, month_date_state_assignmentname):

- ❒ Case study student write up
- ❒ iPad evaluation checklist
- ❒ iPad implementation plan
- ❒ (Optional) teacher reflections and/or student artifacts

Please complete the *iPad Learning Module Self Assessment Survey*:
https://educttu.qualtrics.com/SE/?SID=SV_5dKPQwIHxUDau33

Please complete the *iPad Learning Module Feedback Survey*:
https://educttu.qualtrics.com/SE/?SID=SV_6im4wFzKq3ylk8Z

The course will be unavailable after this week. Please feel free to save white pages and/or iPad resources to your iPad to use with your students. I appreciate the opportunity to work with each of you and thank you for being so generous with your time! You are welcome to get in touch with me if you have any questions, comments or concerns.

Sincerely,
Tara

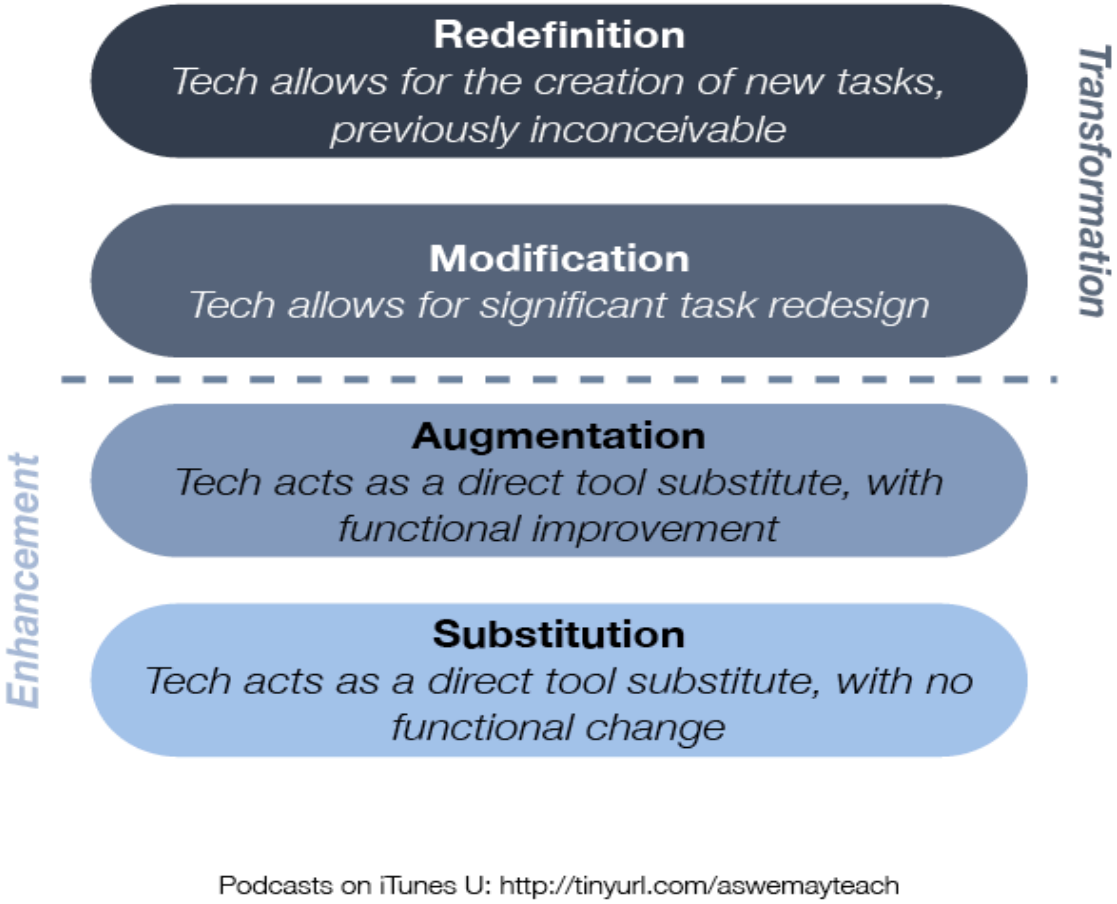
Tara Mason, TVI, M.Ed.
Ph.D. Candidate in Special Education
Research Assistant and University Supervisor for TVI Certification Candidates
Texas Tech University
tara.mason@ttu.edu
(281) 703-8074

# Appendix R
# iPad Assistive Technology Plan Evaluation Rubric

**iPad Assistive Technology Plan Evaluation Rubric**

| Plan Sections | Excellent 5 points | Emerging 3 points | Acceptable 1 point | Points |
|---|---|---|---|---|
| **Collaborative team members included (parent, related service, etc.)** | Team included, at least 4 members with parents | Team included, at least 3 members with parents | 1 or 2 other team members included | |
| **Areas of accommodation are specific and detailed** | At least 4 areas or accommodations listed from iPad checklist | At least 3 areas or accommodations listed from iPad checklist | 1 or 2 areas listed from iPad checklist | |
| **ECC areas** | Up to 9 areas of the Expanded Core Curriculum are included | At least 4 areas of the Expanded Core Curriculum are included | 1-3 areas of the expanded core curriculum are included | |
| **Plan goals are measureable and tied to ecc** | The plan includes at least 5-9 goals that are measureable and linked to the ECC | The plan includes at least 3-4 goals that are measureable and linked to the ECC | The plan includes 1 to 2 goals that are measureable and linked to the ECC | |
| **Collaboration implementation completed and followed up** | Team collaboration plan includes at least 5 members and TVI followed up with each | Team collaboration plan includes at least 3-4 members and TVI followed up with each | Team collaboration plan includes at least 1-2 members and TVI followed up with each | |
| **Horizontal plan complete and specific** | Horizontal plan is complete with up to 8-10 lessons and tied to the ECC | Horizontal plan is complete with up to 6-7 lessons and tied to the ECC | Horizontal plan is complete with up to 3-5 lessons and tied to the ECC | |
| | | | Total Points 30 Points Possible | |

**Appendix S**
**SAMR Model (Puentedura, 2006)**



# APPENDIX K

## Institutional Review Board Approval for Dissertation Study

TEXAS TECH UNIVERSITY
Vice President *for* Research

October 7, 2013

Rona Pogrund
Ed Psychology & Leadership
Mail Stop: 1071

Regarding: 504131 Transforming Teaching: Implementing Mobile Technology Learning Strategies in Serving Students with Visual Impairments

Dr. Rona Pogrund:

The Texas Tech University Protection of Human Subjects Committee has approved your proposal referenced above. The approval is effective from October 7, 2013 to September 30, 2014. This expiration date must appear on all of your consent documents.

We will remind you of the pending expiration approximately eight weeks before September 30, 2014 and to update information about the project. If you request an extension, the proposal on file and the information you provide will be routed for continuing review.

Sincerely,

Rosemary Cogan

Rosemary Cogan, Ph.D., ABPP
Protection of Human Subjects Committee

Box 41075 | Lubbock, Texas 79409-1075 | T 806.742.3905 | F 806.742.3947 | www.vpr.ttu.edu
An EEO/Affirmative Action Institution

APPENDIX L

Phase II--2C Intercoder Thematic Categories: Agreement or Disagreement

Participant Birthdate: _____

| Thematic Categories | Agreement | Disagreement |
|---|---|---|
| ❒ **Challenged** | ❒ Agree | ❒ Disagree |
| ❒ **Resource-Dependent** | ❒ Agree | ❒ Disagree |
| ❒ **Disability-Focused** | ❒ Agree | ❒ Disagree |
| ❒ **Comprehensive** | ❒ Agree | ❒ Disagree |
| ❒ **Collaborative** | ❒ Agree | ❒ Disagree |
| ❒ **Device-Focused** | ❒ Agree | ❒ Disagree |
| ❒ **ECC-Focused** | ❒ Agree | ❒ Disagree |
| ❒ **Inclusive** | ❒ Agree | ❒ Disagree |
| ❒ **Individualized** | ❒ Agree | ❒ Disagree |
| ❒ **Desire to be…** | ❒ Agree | ❒ Disagree |
| ❒ **Structured and Systematic** | ❒ Agree | ❒ Disagree |
| ❒ **Accessibility-Focused** | ❒ Agree | ❒ Disagree |
| ❒ **Independent & Proficiency** | ❒ Agree | ❒ Disagree |
| ❒ **Narrowly-Focused** | ❒ Agree | ❒ Disagree |

Other Thematic Category:
_____

Other Non-Listed Thematic Category:
_____

Comments:
_____
_____
_____
_____