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SAUDI SPECIAL EDUCATION TEACHERS' KNOWLEDGE, SKILLS, AND PROFESSIONAL DEVELOPMENT NEEDS OF ASSISTIVE TECHNOLOGY IN THE CLASSROOM

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SAUDI SPECIAL EDUCATION TEACHERS' KNOWLEDGE, SKILLS, AND PROFESSIONAL DEVELOPMENT NEEDS OF ASSISTIVE TECHNOLOGY IN THE CLASSROOM

A Thesis

Presented to the

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California State University,

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In Partial Fulfillment

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by

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Approved by:

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ABSTRACT

This project assesses Saudi Arabian special education teachers' perceptions about their competencies and professional development needs on assistive technology (AT). The researcher developed an online self-administrated 27 question survey in order to evaluate special education teachers' perceived knowledge regarding AT, as well as to investigate their needs for professional development. The survey webpage link was sent via email to 110 special education teachers at General Directorate of Education in Unaizah, Saudi Arabia. A total of 37 teachers participate in this study for a 33.6% response rate. The findings indicate that special education teachers are not confident in their ability to correctly utilize AT in a classroom. The results also show that participants are interested in receiving AT training. In addition, it indicates that special education teachers preferred face-to-face learning methods for AT training.

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I would like to take this opportunity to express my gratitude to my first reader Dr. Kathleen Phillips and second reader Dr. Sang Nam. This project would not be accomplished without your support, encouragement, and guidance. I thank you greatly.

DEDICATION

To my family, with love

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CHAPTER ONE

INTRODUCTION

Problem Statement

The practice of teaching exceptional students in Saudi Arabia has undergone dramatic changes over the past decade. In 2007, over 93% of male and 73% of female students with disabilities received their education in Saudi regular education schools (Almusa, 2010). In the 90s, these students were classified and separated from their regular peers in special institutions (Almusa, 2010). The Kingdom of Saudi Arabia (KSA) government passed a law in 2000 that pledged an equal access to free and proper education to all students including those with disabilities (Alquraini, 2010). Assistive technology (AT) should be considered for many of these students in order to provide access to a free and appropriate education (Hauser & Malouf, 1996). AT provides students with disabilities greater opportunities to be independent and to maximize their abilities in a variety of environments (Burgesahler, 2003: Gustafson, 2006).

The KSA government put in place policies to ensure a high quality education for children with special needs in a less restrictive environment. However, Alrubiyea (2010) indicates that students with disabilities need a comprehensive policy that focuses on their rights and needs, including the use of assistive technology. On the other hand, in the USA special education law, Individual with Disabilities Education Act (IDEA) mandates that AT devices and

services should be considered in students' Individualized Educational Programs (IEP) (Gustafson,2006; Poel, Wood, &Schmidt, 2013). that mandating reflects the great potential of AT on the academic success of students with disabilities (Michaels & McDermott, 2003). Further, many educational organizations and agencies such as the Council for Exceptional Children (CEC) and National Council for Accreditation of Teacher Education (NCATE) have developed standards that guide special education teachers' practice in the use of assistive technology to ensure the correct and effective implementation (Poel, Wood, &Schmidt, 2013; Michaels & McDermott, 2003).

Special education teachers play a significant role for providing access to the curriculum for students with special needs. They use many different strategies and tools in order to adjust and adapt the curriculum to be accessible to students with disabilities. The use of assistive technology devices was one of the most significant changes in special education for the purpose of accessing the curriculum. Moreover, special education teachers' knowledge of the selection, use, and integration of assistive technology devices to maximize learning opportunities for students with special needs will benefit these students (Gustafson,2006).

While several studies have been conducted in many countries such as the United States to examine the state of assistive technology implementation with students with disabilities, there is limited information about the needs and rights of students with disabilities in the KSA (Alrubiyea, 2010). This is supported by

AlFaraj and Kuyini (2014) who stated that there is a lack of comprehensive information in regard to assistive technology use in the KSA. In order to understand the states of assistive technology use, it is most important to determine to what extent special education teachers feel prepared to implement and use assistive technology in their classrooms.

Purpose of the Study

In the KSA, a few studies were conducted to assess the practice of AT use and barriers (Al Faraj & Kuyini, 2014; Subihi, 2014). Subihi's (2014) study was about special education student teachers' knowledge of augmentative and alternative communication (AAC), and Al Faraj and Kuyyini (2014) wanted to know about the available technology devices for students with Down syndrome in Saudi Arabia. Both of these studies mentioned that there is a need for comprehensive information in the area of AT, particularly the knowledge and skills of assistive technology of Saudi special education teachers.

The purpose of this study is to investigate: (a) the Saudi Arabian special education teachers' perceptions about their competencies on assistive technology, (b) special education teachers interest in receiving training regarding AT, and (c) special education teachers' preferred methods for learning about technology.

This research will focus on Saudi Arabian special education teachers and will be guided by the questions below:

1. What are the Saudi Arabian special education teachers' perceptions about their competencies on assistive technology?
2. Are these special education teachers interested in receiving training regarding AT?
3. What are teachers' preferred methods for gaining information and training about AT?

Significance of the Study

This study will provide detailed information about Saudi Arabian special education teachers' perceptions about their competencies and professional development needs on AT. The findings of such a study will be beneficial for stakeholders in the education sector in KSA in order to assess whether or not modification is necessary in the current structure of AT training. In addition, educational colleges will find useful information that will help them determine the need of including more and various types of AT training in their programs in order to prepare future teachers.

CHAPTER TWO

REVIEW OF THE LITERATURE

Defining Assistive Technology

There are many definitions of the term assistive technology that have been defined by educators. However, the most common and used term was first presented and written into The Technology-Related Assistance for Individuals with Disabilities Act (Tech Act) in 1988 in the USA, which had been later incorporated within IDEA of 1997 (Harris, 2013). The definition of assistive technology is constructed by the implementation of two separate parts; assistive technology devices and assistive technology services.

Assistive Technology Devices

According to IDEA of 2004 an AT device is defined as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities". However, there is an exclusion stating that "the term assistive technology device does not include a medical device that is surgically implanted, or the replacement of such device"(Dell, Newton, & Petroff, 2008, p. 4-9).

There are a wide range of AT device options that can be considered as assistive technology. The AT devices range from low-tech to high-tech. This range is known as an AT continuum. Low-tech devices are usually non electronic,

simple, and inexpensive (e.g., highlighter tape pencil grips, and large-print books). Mid-tech devices are generally electronic, easy to operate, and not expensive (e.g., talking calculators, scanning pens, and portable keyboard). High-tech devices are typically complex electrical, expensive, and require a lot of training (e.g., word processor, communication devices, and speech recognition software) (Dell et al., 2008, p. 5-6; Harris, 2013; Maor, Currie, & Drewry, 2011).

AT devices can be also classified based on the unique functional needs of a disability within one of the following categories: (a) activities of daily living, (b) assistive listening, (c) augmentative and alternative communication (AAC), (d) computer access, (e) electronic aids to daily living, (f) math, (g) mobility, (h) organizational access, (i) physical education, leisure, and play, (j) reading, (k) seating and positioning, (m) transportation, (n) visual aids, and (o) writing (Harris, 2013). Alsalem (2010) mentioned that this classification has been used by many different countries around the world.

Assistive Technology Services

The second part of AT definition is related to AT service. According to IDEA of 2004, assistive technology service means:

> Any service that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device. The term includes (a) the evaluation of the needs of a child with a disability, including a functional evaluation of the child in the child's customary environment; (b) purchasing, leasing, or otherwise providing for the acquisition of assistive

> technology devices by children with disabilities; (c) selecting, designing, fitting, customizing, adapting, applying, maintaining, repairing, or replacing assistive technology devices; (d) coordinating and using other therapies, interventions, or services with assistive technology devices, such as those associated with existing education and rehabilitation plans and programs; (e) training or technical assistance for a child with a disability or, if appropriate, that child's family; and (f) training or technical assistance for professionals (including individuals providing education or rehabilitation services), employers, or other individuals who provide services to, employ, or are otherwise substantially involved in the major life functions of that child (Harris, 2013, para. 3).

The Effectiveness of Using Assistive Technology

Technology has facilitated opening a number of educational doors to youngsters, especially the ones who have disabilities. Fischer, Pumpian and Sax (2010) noted that various solutions from the technology world are accommodating cognitive, sensory, and physical impairments in a number of different ways. Incorporating technology, as Holzberg (2011) pointed out, helps to increase the motivation of students to learn and to personalize lessons in the classroom to the individual needs of a student. Even those learners who have the most profound and severe disabilities could utilize AT to join classrooms of normal learners, and their potential could be attained in ways that were not

possible in the past, when assistive technologies were not there (Blackhurst & Morse, 2014). All in all, the vast majority of learners who have disabilities can benefit from utilizing AT within the classroom.

Assistive technology plays a significant role in improving the education of students with disabilities (Adebisi, Liman & Longpoe, 2015). There are many benefits of using assistive technology with students with disabilities that have been identified. Having an access to technology tools and applications provides students with disabilities greater opportunities to be independent and to maximize their abilities in a variety of environments (Burgesahler, 2003: Gustafson,2006). The implementation of assistive technology with exceptional students allows an equal opportunity to learn in the inclusive classroom (Michaels & McDermott, 2003). In addition, AT helps students with disabilities in the preparation of postsecondary education by providing them with an access to a variety of educational options (Burgesahler, 2003).

Numerous studies have shown positive results of using specific applications of assistive technology with students with disabilities with many different skills. Two studies stated that a graphic organizer is a useful tool to help students with learning disabilities in reading comprehension and organizing and outlining their writing ideas (Singleton & Filce, 2015; Brown, 2011). In their study, Hetzroni and Shrieber (2004), reduced spelling errors and better organization was noticed when using word processing software compared with hand-written tools with students with learning disabilities. Findings of a study conducted by

Garrett et al. (2011), showed that speech recognition called (Dragon NaturallySpeaking) is effective software in improving writing fluency with students with physical disabilities. Further, Cho (2014) stated that:

> The academic and social success of individuals with moderate to severe disabilities is related to their access to effective methods of communication. The use of various forms of augmentative and alternative communication (AAC) has been shown to be an effective and efficient communication method for many individuals with severe disabilities in communicating with their family members, friends, and others. (para. 2)

The technology could be an important equalizer for students who have disabilities that may prevent their full participation in school. This is most apparent for students who have vision, hearing, and mobility impairments, although it is also true for those who have perception and cognitive limitations (Quinn et al., 2009). With technology, a student who is unable to speak physically could communicate with synthesized spoken language: one can utilize a portable voice synthesizer to respond to and ask questions within the regular classroom. Because of this technology, this student would be able to overcome a physical obstacle that might have led to him or her being put into a special segregated class or requiring a full-time instructional interpreter or helper to provide *a voice* (Levin & Locke, 2011). With such technology, students with disabilities can participate in school activities and classroom tasks and assignments fully.

Assistive Technology Decision-Making

Many of the assistive technology tools options create new methods in delivering contents to students with disabilities. According to Subihi (2013) there are more than 26,000 assistive technology devices available to be integrated in individualized education program (IEP). Gamble, Dowler, & Orslene (2006) stated that many of those who are working with students with disabilities "do not have an effective process for matching the abilities and needs of a specific worker with the most appropriate AT." Members of an IEP team are required to consider whether AT is needed to be included in students' IEPs or not. Even so, there is a lack of polices and formal frameworks that guide IEP teams in AT decision-making (Zabala et al., 2000). Some associations have developed frameworks aimed to facilitate and guide decision making process for IEP team members. The most remarkable frameworks and guidelines are the following; SETT framework, WATI Assistive Technology Consideration Guide, and Georgia Project for Assistive Technology.

The Student, Environments, Tasks, Tools (SETT) Framework

The SETT Framework is a useful framework for team-based assistive technology assessment. It is a guideline that can be used to gather data for making effective assistive technology decisions (Zabala, 1995). It is a four-part model developed by Zabala in 1995. SETT is an acronym for Student, Environments, Tasks, and Tools. It seeks to organize the information that the IEP team gathers regarding students' needs for assistive technology services and

devices which facilitate the decision-making process. The four-part model asks questions concerning a student's special needs and current abilities, the environment and availability of equipment and support, a description of the task(s) to be accomplished, and the tools to accomplish those tasks (Zabala, 1995). Framework questions are designed in such a way that they generate discussion and thoughts, and are deliberately broad so as to catch all ideas and potential solutions.

Georgia Project for Assistive Technology (GPAT)

The Georgia Department of Education has developed a checklist which is known as the Assistive Technology Consideration Checklist. The checklist aims to help the IEP team members develop solutions throughout the assistive technology consideration process. When utilizing the GPAT checklist in the consideration of AT devices and services, the IEP team works through four components; (a) the task that the student needs to accomplish (b) whether the student can do the task independently with the standard classroom tools (c) modifications and accommodations for completing the tasks independently along with assistive technology solutions for completing the tasks with support when necessary (d) additional solutions including assistive technology (Georgia Project for Assistive Technology, 2004).

The Wisconsin Assistive Technology Initiative (WATI) Assistive Technology Consideration Guide

In 2003, the Wisconsin Assistive Technology Initiative designed a guide, called the AT Consideration Guide, designed to support IEP teams in determining if students need technology assistance. The guide contains four questions (Wisconsin Assistive Technology Initiatives, 2003):

1. What task is it that we want this student to do, that she or he is unable to do at a level that reflects his/her skills/abilities (writing, reading, communicating, seeing, hearing)?
2. Is the student currently able to complete tasks with special strategies or accommodations?
3. Is there currently assistive technology (either devices, tools, hardware, or software) used to address this task?
4. Would the use of assistive technology help the student perform this skill more easily or efficiently, in the least restrictive environment, or perform successfully with less personal assistance?

A wide range of AT devices options, from low tech to high tech, are available and should be considered when embedding AT in a student's IEP. However, high-tech tools are not necessarily the best option for meeting all students' needs. Flippo, Inge and Barcus (1995) noted that, "Sometimes a low-tech choice is good or better than an expensive high-tech solution" (p. 143).

There are barriers that IEP team members might encounter in the process of AT decision making. Lack of assistive technology knowledge is considered to be a major barrier in implementing AT services and devices (Flanagan, Bouck, & Richardson, 2013). In his study, Alkahtani (2013), designed a survey in order to examine AT preparation of 119 special education teachers. Results indicated that the majority of participants (75.6%) reported they did not receive sufficient training to provide assistive technology service to students with disabilities. Furthermore, teachers' awareness of the potential impact that AT could make to students with disabilities is critical in the process of selecting and implementing AT. AlFaraj and Kuyini (2014) found that some special education teachers in the KSA are not aware of the benefits of including AT in a student's IEP. Also, they reported that not many computer applications or software programs are available in the Arabic language. This minimizes the range of AT choices. These barriers need to be addressed to ensure that the process of AT decision-making and implementation is smooth and effective.

Professional Development

Teachers need to possess the necessary knowledge and skills for integrating and employing AT in classrooms. In essence, lack of special educators' knowledge and skills is one of the most considerable barriers in the integration and implementation of assistive technology (Alper & Raharinirina, 2006; Alsalem, 2010; Flanaga, Bouck & Richardson, 2013; Michaels &

McDermott, 2003). Findings of many studies indicated that most teachers of students with disabilities describe themselves as being insufficiently prepared to use AT (Alkahtani, 2013; Alsalem, 2010; Lee & Vega, 2005). Providing professionals with knowledge and skills needed is very important in order to effectively integrate assistive technology in the classroom (Gustafson,2006). On the whole, not many educators have the necessary knowledge or skills to equip them to use AT effectively.

Before discussing the importance of professional development, it is critical to understand the two reasons for lack of teachers' competence in using AT in their classrooms. The problem of the lack of AT knowledge and skills of special education teachers is related to the pre-service period as well as insufficient in-service AT training. Universities are not providing adequate AT training in their teacher preparation programs (Bausch & Ault, 2012; Smith, Kelley, Maushak, Griffin-Shirley & Lan, 2009). Many reasons were determined for lack of institutional preparation for future teachers, including: (a) the constant change of technology (b) financial support (c) lack of AT guidelines (Michaels and McDermott ,2003; Smith et al, 2009).

There are many studies that point to the need for teacher training on the use, integration, and implementation of AT in classrooms. Bausch et al. (2009) analyzed assistive technology policy documents from 10 different states in America. Their results revealed that 5 states acknowledged that teachers did not have expertise in assistive technology. In his study, Alkahtani (2013) learned

that 75 percent of the 127 special and general education educators who were surveyed reported that they were prepared poorly and 18 percent stated that they were in fact not prepared at all to offer assistive technology services for learners within their schools. Moreover, fewer than 2 percent of the participants in the study stated that they were sufficiently prepared (Alkahtani, 2013).

Continuing in-service training in AT is of great importance. Alkahtani (2013) in his study, indicated that nearly 85 percent of those surveyed stated that they were interested in receiving professional development in assistive technology. The participants in Wood's (2015) study included ten educators, five special and five general education educators, from six small high and middle schools, stated that they wanted to learn more about AT. Ribeiro and Moreira (2010) in their research study learned that 84 percent of educators who took part in the research never had any training in assistive technology. Even though some educators have broad pre-service assistive technology training, the development of technology calls for ongoing or continuous in-service training (Blackhurst & Morse, 2014). A lack of teacher training in AT is a major impediment to the integration of assistive technology.

Professional development could bring about changes in educator practice. A better understanding of the way that educators learn about, recommend, put into practice, and incorporate AT as well as the assistive technology professional development needs of educators might be of help in informing professional development (Park, Roberts & Stodden, 2012; Reed & Bowser, 2012). An

increase in educator skill and knowledge in integrating assistive technology might lead to improved access to the general education curriculum for learners who have learning disabilities (Gray et al., 2010). This would ultimately help in reducing the achievement gap between learners without disabilities and those with disabilities.

CHAPTER THREE

METHODS

Introduction

In chapter three, the researcher will discuss the method used in this study including study design, sampling and the study participants, the development of the survey used and the method that was used in data collection, and procedures. Also, because of the human participants in the study the protection of the human subjects will be discussed as well as the collected data analyzed.

Study Design

The purpose of this study was to assess Saudi Arabian special education teachers' perceptions about their competencies and professional development needs on assistive technology. Al Faraj and Kuyini (2014) stated that there is a lack of comprehensive information in regard to assistive technology use in the KSA. The current study was guided by the questions below:

1. What are the Saudi Arabian special education teachers' perceptions about their competencies on assistive technology?
2. Are these special education teachers interested in receiving training regarding AT?
3. What are teachers' preferred methods for gaining information and training about AT?

A quantitative research method was used in the process of collecting data in this study by administrating an online self-administered survey located on a website called (Survey Monkey). many studies have been conducted to examine special education teachers' knowledge and skills of AT in many different countries. The findings of these studies indicated that most of special education teachers lack knowledge and skills necessary to use AT. Therefore, it was hypothesized that Saudi special education teachers are lacking in skills and knowledge of utilizing AT in a classroom. Also, they have the desire to receive more training in AT.

Sampling

Special education teachers at General Directorate of Education in Unaizah, Saudi Arabia were selected to participate in the survey. This area has been chosen because it covers many school locations (e.g. urban, suburban, and rural). The General Directorate of Education in Unaizah provided the researcher the email addresses of their special education teachers. The survey web link was used to be emailed to 110 special education teachers, 37 responded to the survey. The study did not target a particular age range or particular gender. However, the participants had to be special education teachers.

Data Collection and Instrument

The data collected was based on the questionnaire survey emailed to special education teachers. An online self-administered survey located on Survey Monkey was the instrument that the researcher used for this study (See Appendix A). The questionnaire was divided into three parts. The first part of the survey gathered participants' demographic information which included participants' age, gender, education level, years of experience, grade level of instruction, disabilities that they work with, and school location in which they teach.

The second part, assistive technology knowledge and skills, contained 15 items developed to assess special education teachers' perceived skills and knowledge of assistive technology. This section was adopted from the University of Kentucky Assistive Technology (UKAT) project and the Technology Competencies for Beginning Special Educators as recommended by the Council for Exceptional Children (CEC).

The final part of the questionnaire consisted of four questions regarding assistive technology development needs. This part contained questions about teachers' interest in receiving more AT training and preferred method and time for AT training.

Procedures

The data was collected by conducting an online self-administered survey located on Survey Monkey (see Appendix A). Once the consent was given from both the General Directorate of Education in Unaizah, Saudi Arabia (See Appandix C) and Institutional Review Broad (IRB) at California State University, San Bernardino (See Appandix B), the researcher was provided with the special education teachers' emails. The survey webpage link was sent to the participants' emails.

Protection of Human Subjects

To ensure confidentiality of the respondents, the collected data was reported in group form only and no personal identifiable information such as names or birthdays were collected that might link the data to the participants. In addition, the consent form did not require participants' signatures. Instead, they were required to click "I agree" in the consent webpage to indicate their consent to participate.

Participants were given an informed consent form (See Appendix B) to explain that this was a voluntary process, that they had rights regarding their participation, and that there would not be any negative effect if they decided not to complete the survey. Also, the informed consent described the purpose and benefits of the study, the foreseeable risks to the participants, and the estimated time to complete the survey.

Data Analysis

The quantitative data collected from the survey was used to assess Saudi special education teachers' AT skills, knowledge, and professional development needs. The information was analyzed by using a statistical software program known as Statistical Package for the Social Sciences (SPSS).

CHAPTER FOUR

RESULTS

Introduction

This chapter will review the results of this study assessing special education teachers' AT knowledge, skills, and professional development needs. First, demographic data of the respondents will be discussed. The discussion will also include the results of the quantitative data collected regarding the respondents' current AT knowledge, skills, and interest in learning more about AT.

Presentation of Collected Data

There was a total of 37 respondents to the online survey out of 110 surveys emailed to special education teachers in Unayzah for a 33.6% response rate. It should be mentioned that some participants only answered some questions which explains why the samples sizes differed in the results. The demographic data included: age, gender, education level, years of experience, grade level of instruction, disabilities with which they work, and school location in which they teach. More than half of the respondents were in the age range of 21 to 28 (54.05%, n=20), 43% (n=16) of the participants were 29 to 35 years old, and one was 43 years or older. Almost half of respondents were male (51.35%, n=19), and 48.6% of them were females (n=18). The majority of the participants

had bachelor degrees (94.6%, n=35), and one of them had a masters degree. Slightly over 56% of the participants reported less than six years of teaching experience (n=21). Almost forty percent (n=15) of the participants had seven to thirteen years of teaching experience. One reported more than twenty years of teaching experience. In regard to participants' grade level of instruction, the majority of them had taught in an elementary level (57.14%, n=20), seven of them (20%) had taught at pre-school level, 14.3% of the respondents were middle school teachers, and the lowest percent of the participants were teaching in high school (8.6%, n=3). The greatest number of the participants worked with students with intellectual disability (48.7%, n=18). Slightly over 24% (n=9) of the participants reported that they worked with students with hearing impairments, three teachers (8.1%) worked with students with multiple disabilities, and the same percent (8.1%, n=3) worked with students with specific learning disabilities. Of the respondents, 5.4% (n=2) taught students with blindness, and one respondent worked with students with autism (2.7%). The largest percentage of the participants (86.1%, n=31) taught in urban areas, while 11% (n=4) worked in rural areas, and 2.78% (n=1) taught in suburban locations. Table 1 summarizes the demographics.

Table 1. Demographic Frequency Summary (N=37)

Variable	Frequency (n)	Percentage (%)
Age		
21-28	20	54
29-35	16	43.2
36-42	0	0
43 or over	1	2.7
Gender		
Female	19	51.4
Male	18	48.6
Educational Level		
Bachelor's degree	35	94.6
Master's degree	1	2.7
Other	0	0
Years of Experience		
0-6 years	21	56.8
7-13 year	15	40.5
14-19 years	0	0
20 and over	1	2.7
Grade Level of Instruction:		
pre-school	7	20
Elementary	20	57.1
Middle	5	14.3
High	3	8.6
Teaching Specialist		
Autism	1	2.7
Deaf-blindness	2	5.4
Deafness	9	24.3
Intellectual disability	18	48.6
Multiple disabilities	3	8.1
Specific learning disability	3	8.1
Speech or language impairment	0	0
School Location		
Rural	4	11.1
Suburban	1	2.8
Urban	31	86.1

Participants were asked to answer the question: “From where did the received their AT training?” 42.4% of the respondents (n=14) reported that they did not received any AT training. Less than ten percent (6%, n=2) received AT training from colleges or by attending conferences. Almost a quarter of the participants (21.2%, n=7) learned from their own personal interest. Eight participants (24.2%) received their AT training from formal university classes. Most of the participants (58.8%, n=10) received less than five hours of AT training, while 11.8% of them (n=2) had eleven to fifteen hours of AT training, and three of them (17.7%) received six to ten hours of training. Eight of the teachers (23.5%) reported that they never used AT in their classrooms, while 2.3% (n=11) indicated that they did not use AT very often. The same percent (32.3%. n=11) reported that they often used AT. A few of the participants (11.8%, n=4) reported regular use of AT in their classrooms. Participants were asked to estimate their AT knowledge. The majority of them reported insufficient AT knowledge (44.1%, n=15) or little knowledge regarding AT (35.3%, n=12). Less than 15% indicated that they had adequate knowledge (14%, n=5) or excellent knowledge (5.9%, n=2) about AT. Table 2 summarizes this data.

Table 2. Participants' Responses to Items 8 to 11 (N=37)

Variable	Frequency (n)	Percentage (%)
Received AT Training From		
No received training	14	42.4
My own personal interest	7	21.2
Colleagues	2	6
Attending conferences	2	6
Attending a class at a university	8	24.2
Other	0	0
Amount of Formal Training		
1-5 hours	10	58.8
6 -10 hours	3	17.7
11-15 hours	2	11.8
16-20 hours	2	11.8
Other	0	0
Frequency of Using AT in A classroom		
Never	8	23.5
Rarely	11	32.3
Often	11	32.3
Always	4	11.8
AT Knowledge		
Poor	15	44.1
Fair	12	35.3
Good	5	14.7
Excellent	2	5.9

The goal of the first research question is to assess Saudi Arabian special education teachers' perceptions about their competencies on assistive technology. Participants were asked to rate their AT knowledge and skills on a scale from items 12-22 with the following options (1) no skills and knowledge, (2) inadequate skills and knowledge, (3) adequate skills and knowledge, (4) excellent skills and knowledge, and (5) superior skills and knowledge. The AT skills and knowledge in items 12-22 were grouped into five categories as suggested on the UKAT and CEC. The groups included foundational knowledge, instructional strategies and planning, assessment, collaboration, and professional and ethical practice. The researcher grouped the participants who rated themselves 1 or 2 in a certain skill to be below average level. Scores of 3 were average, and 4 or 5 were above average.

The AT foundational knowledge and skills included the understanding of AT concepts and terms as well as AT device options. The results indicated that most of the participants were below the average in understanding AT concepts, terms, and the AT device options. However, almost 30% of them did have average level in the foundational knowledge and skills.

In the Instructional strategies and planning skills, between 49 – 62 percent of the participants indicated below average skills in operating and identifying a variety of AT devices and software programs, while about 10% rated themselves as having above average skills. AT assessment knowledge and skills were assessed in the following items: evaluating AT effectiveness, determining

appropriate AT based on students' needs, and following a systematic plan to ensure correct AT implementation. Between 19% to 21% of the respondents reported below average in these skills. On the other hand, almost 10% of the participants indicated above average in assessment skills. The majority of the respondents reported below average in the collaboration skill item, and over 30% indicated an average skill in collaboration with IEP teams to select and implement AT. Close to 50% of the participants indicated below average skills and knowledge in identifying resources for AT professional development. Table 3 and 4 summarize this data.

Table 3. Assistive Technology Knowledge and Skills (N=37)

AT Knowledge and skills	Frequency (n)			Percentage (%)	
	1	2	3	4	5
	(0) %	(0) %	(0) %	(0) %	(0) %
Foundation Knowledge					
AT concepts and terms	(5) 13.5	(16) 43.2	(12) 32.4	(3) 8.1	(1) 2.7
AT devices option range	(7) 18.9	(11) 29.7	(11) 29.7	(5) 13.5	(3) 8.1
Instructional Strategies and Planning					
Operating a variety of AT devices	(5) 13.5	(17) 45.9	(5) 13.5	(9) 24.3	(2) 2.7
Identifying a variety of AT devices	(6) 16.2	(17) 45.9	(6) 16.2	(8) 21.6	(0) 0
Identify and operate software programs	(5) 13.5	(15) 40.5	(9) 24.3	(6) 16.2	(2) 5.4
Arrange the classroom environment to facilitate the use of AT	(6) 16.2	(15) 45.9	(5) 13.5	(9) 24.3	(2) 2.7
Assessment					
Evaluate AT effectiveness	(7) 19.4	(12) 33.3	(6) 16.7	(9) 25	(2) 5.4
Determine appropriate AT based on students ‘need	(5) 13.9	(15) 41.7	(6) 16.7	(7) 14.9	(3) 8.4
Follow systematic plane to ensure correct AT implementation	(10) 27	(11) 29.7	(7) 18.9	(7) 18.9	(2) 5.4
Collaboration					
Collaborate with IEP team to select and implement AT	(4) 10.8	(11) 29.7	(12) 32.3	(8) 21.6	(2) 5.4
Professional and Ethical Practice					
Identify resources for AT professional development	(11) 29.7	(7) 18.9	(9) 24.3	(9) 24.3	(1) 2.7

Note: the rate indicates to (1) no skills and knowledge, (2) Inadequate skills and knowledge, (3) adequate skills and knowledge, (4) excellent skills and knowledge, and (5) superior skills and knowledge.

Table 4. Assistive Technology Knowledge and Skills Competency Level (N=37)

AT Knowledge and Skills	Rate		
	(1 - 2) Below Average	(3) Average	(4 – 5) Above Average
Foundation Knowledge			
AT concepts and terms	(21) 56.7	(12) 32.4	(4) 10.8
AT devices option range	(18) 48.6	(11) 29.7	(8) 18.6
Instructional Strategies and Planning			
Operating a variety of AT devices	(22) 49.4	(5) 13.5	(11) 27
Identifying a variety of AT devices	(23) 62.1	(6) 16.2	(8) 21.6
Identify and operate software programs	(20) 59.4	(9) 24.3	(8) 21.6
Arrange the classroom environment to facilitate the use of AT	(21) 62.1	(5) 13.5	(11) 27
Assessment			
Evaluate AT effectiveness	(19) 52.7	(6) 16.7	(11) 30.4
Determine appropriate AT based on students ‘need	(20) 55.6	(6) 16.7	(10) 23.3
Follow systematic plane to ensure correct AT implementation	(21) 56.7	(7) 18.9	(9) 24.3
Collaboration			
Collaborate with IEP team to select and implement AT	(15) 40.5	(12) 32.3	(10) 27
Professional and Ethical practice			
Identify resources for AT professional development	(18) 48.6	(9) 24.3	(10) 27

Note: the rate indicates to (1) no skills and knowledge, (2) Inadequate skills and knowledge, (3) adequate skills and knowledge, (4) excellent skills and knowledge, and (5) superior skills and knowledge.

The second question of this study is divided into two focuses: (a) teachers' interest in receiving AT professional development, and (b) teachers' preferred methods and time for learning about AT. The majority of the participants (91.8%, n=34) were interested in receiving more AT training. Only two of the participants (5.4%) indicated that they did not want to receive training in the area of AT, and one of the respondents was not sure about receiving AT training. In regard to the areas of curriculum the teachers wanted to see more AT options. The largest percent of the participants (37.8%, n=14) wanted to have more AT options in math, while 27% of them indicated that they need more AT options in reading, and less than 7% of them indicated that writing should have more AT options. Questions regarding teachers' preferred learning methods for AT training, showed that the majority of the respondents (52.8%, n=19) reported that attending workshops or conferences would be suitable to learn more about AT. One-on-one individualized instruction was ideal for eleven of the participants (30.6%), while only 6% preferred online modules to receive AT training. Table 5 summarizes this data.

Table 5. Professional Development (n=37)

Variable	Frequency (n)	Percentage (%)
More AT training interest		
Yes	34	91.8
No	2	5.4
I do not know	1	2.7
Areas of Curriculum		
Math	14	37.8
Writing	7	18.9
Reading	10	27
Speaking	6	16.2
Other		
Preferred Method for AT Training		
One-on-one individualized instruction	11	30.6
Attending workshops or conference sessions	19	52.8
Online modules	6	16.7
Other		
Preferred time for AT Training		
Summer	12	33.3
Weekends	7	14.4
After school	17	47.2
Other		

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CHAPTER FIVE

DISCUSSION

Introduction

In this chapter, the researcher will discuss the results of to what extent Saudi special education teachers were prepared to use AT in a classroom. The chapter will also include a discussion of the limitations of this study and recommendations for future work.

Discussion

The survey webpage link was sent via email to 110 special education teachers at General Directorate of Education in Unaizah, Saudi Arabia. Thirty-seven teachers returned the survey. Most of the participants were younger than 35 years old. This study aimed to assess Saudi Arabian special education teachers' perceptions about their competencies on assistive technology as well as professional development needs.

Lack of teachers' perceived AT knowledge and skills most certainly minimizes the use and implementation of AT. Twenty-seven of respondents (79.4%) indicated that they have inadequate AT knowledge and skills. Nineteen of the respondents (55.8%) reported that they rarely or never used AT in a classroom. Lack of assistive technology knowledge is considered to be a major

barrier in implementing AT services and devices (Flanagan, Bouck, & Richardson, 2013).

The foundational AT skills and knowledge items included special education teachers' understanding of AT terms and concepts, and AT device options. The results from the questionnaire indicated that the majority of special education teachers had below average ratings in these skill areas. One possible reason is that these special education teachers have not received pre-service training and in-service training regarding AT. Educational colleges are not providing sufficient AT training in their teacher preparation programs (Bausch& Ault, 2012; Smith, Kelley, Maushak, Griffin-Shirley & Lan, 2009).

The findings in this study indicated that (49 – 62) percent of special education teachers were below average in identifying and operating a variety of AT devices and software programs, while 13 - 24% rated themselves as having average or above average skills. One explanation could be that many technology tools and computer software programs are not available in Arabic which minimizes the teachers' AT choices. AlFaraj and Kuyini (2014), mentioned that lack of computer programs written in Arabic is one of the challenges in using technology with students with disabilities.

Assessment is a very important part of AT services and should provide a clear picture about the effectiveness of the implemented AT devices as well as to what extent they meet students' needs. The Wisconsin Department of Public Instruction (2009) stated that assessment provides in-depth understanding about

students' abilities and difficulties in the acquisitions of new information. In this study, more than half of special education teachers reported below average ratings in the AT assessment knowledge and skills. It is likely that special education teachers implemented AT without having the skills that would allow them to evaluate whether the chosen AT tool was effective or not.

In the collaboration skills items, the majority of respondents reported average or above in collaborating with IEP team members to identify and implement AT. This result is supported by the finding in Gustafson's study (2006). He found that 62 of the participants were above the average in collaborating skills. The result indicated that special education teachers possess good collaboration skills in general. However, they might need more training in the area of collaboration regarding AT decision-making.

Overall, the result of this study showed that special education teachers believe that they are not sufficiently prepared to choose and implement AT in a classroom. This leads to either avoiding or misusing AT with students with disabilities which limits their opportunities. Because of the importance of integrating AT in students' IEPs, teachers need to possess the knowledge and skills in the area of AT in order to meet the needs of students with disabilities.

Participants were asked about their interest in receiving training about AT. The findings indicated that 91.8% of participants wanted to receive AT training. Based on their learning styles, 83.4% of the participants (n=30) preferred methods for professional development were one-on-one individualized instruction

and conferences, known as face-to-face interactions. These findings match the finding of Al Kahtani (2013). He found that 84.3% of teachers (n=107) were interested in receiving AT training, and 121 of them preferred face-to-face methods. The reason for teachers' preference of face-to-face methods over online modules could be that face-to-face methods provide more opportunity for direct interaction and communication with trainers and other educators.

Furthermore, the findings of this study are beneficial for stakeholders in the education sector in the Kingdom of Saudi Arabia. This is imperative for developing guidelines for AT practice to help those teachers in meeting students with disabilities' needs. Administrators and educators must work together to develop a comprehensive policy for AT practice in a classroom. This policy includes guidelines for identifying and implementing AT with students with disabilities. They may consider using an existing framework to facilitate decision-making process such as SETT framework, WATI Assistive Technology Consideration Guide, and Georgia Project for Assistive Technology.

The results indicate that there is a need to provide AT training for in-service special education teachers. Therefore, the policy also may include a complete plane for professional development in the area of AT, considering the teachers' preferred learning times and styles for AT training. The outcomes suggest that professional development for understanding and implementing assistive technology should be provided by using face-to-face learning methods. Flippo, Inge and Barcus (1995) indicate that conferences, workshops, and in-

service courses in technology implications can provide teachers with skills necessary to the implementation of AT.

Moreover, stakeholders in the education sector in the Kingdom of Saudi Arabia may consider building regional technical assistance centers. These centers will have staff who are knowledgeable in the area of AT, and provide AT assistance to professionals who need to develop their skills in AT. Flippo, Inge and Barcus (1995) state that “by providing technology assistance, the skills level of the professional is increased in areas that are directly associated with need” (p. 216).

Educational colleges also may find this information useful in helping them determine the need of including more AT training in their programs in order to prepare future teachers. The findings of this study indicated that only 24.2% of the participants (n=8) received AT training at the university, and 42.45 did not received any AT training. Less than ten percent (6%, n=2) received AT training from colleges or by attending conferences. Thus, educational colleges may need to consider adding more AT training in their programs. The AT training should provide future teachers with knowledge and skills in identifying and operating AT in classroom, and in the possible limitations might be faced when using AT with students with disabilities.

Limitations

There are limitations to this study. First, the sample size was not large. Even though the survey web link was sent to 110 special education teachers, 37 participants responded for 33.6% response rate. A large sample would have provided more responses which would help in the generalization of the results.

Second, time was one of the limitations to this study. Due to time limitations, data were collected using only quantitative methods. Qualitative methods such as interviews and direct observation of participants implementing AT would have provided in-depth understanding of the teachers' knowledge and skills.

Finally, this study targeted special education teachers at the General Directorate of Education in Unaizah, Saudi Arabia. Thus, the result cannot be generalized to the large population of special education teachers in the KSA. Future research should focus on the collecting similar information throughout the entire nation.

Recommendations for Future Study

Based on the results of this study, many questions were raised and could be considered for future research. The findings of this study indicated that Saudi special education teachers were not confident in their abilities to use AT with students with disabilities. It would be beneficial to understand why teachers felt

they were unprepared to use AT in a classroom and what could have been done differently to better prepare them in this area.

It would appear from the findings of the study that special education teachers did not receive adequate AT training at the pre-service level. Therefore, future work may investigate the current AT training courses provided by educational colleges. That information would help to determine the types of AT courses and trainings that should be provided as well as the basic need of including more AT training in the programs. Strong AT preparation at pre-service level would help teachers to be more confident in their abilities to implement AT in their classrooms.

Moreover, this study did not assess the current use of AT provided in classrooms. Future research might look at the current AT devices and services used in a classroom, to what extent students with disabilities benefit from these services, and the available AT options to special education teachers. This information would provide a road map for future study, training, and support.

Special education teachers share roles and responsibilities in providing AT service to students with disabilities with other service providers such as general education teachers, speech pathologists, and occupational therapists. Therefore, the roles and responsibilities connected with identifying and implementing AT with other services providers should be considered.

Conclusion

This study examined Saudi Arabian special education teachers' perceptions about their competencies and professional development needs on AT. Results of this study demonstrated that special education teachers were not confident to use AT in their classrooms. Often this results in not implementing AT properly or not using it at all. Thus, administrators and educators might need to develop a comprehensive policy to address this issue. These policies should include (a) guidelines for AT practice in a classroom, (b) complete and constant planes for professional development opportunities, and (c) educational colleges should review the existing AT training in their programs. They may need to hire assistive technology specialists and add more AT professional development opportunities.

The findings also showed that special education teachers were interested in receiving AT training and preferred face-to-face methodology over online/virtual methods, and they preferred to receive it after school or during summer. Therefore, AT training should be provided based on teachers' preferred learning times and styles. Professional development may be provided by conducting conferences and/or workshops directed toward AT. The lack of AT knowledge and skills prevents special education teachers of implementing AT in a proper way. AT training is significant to improve special education teachers' competencies on the area of AT and in turn, to improve the education of students with disabilities.

APPENDIX A

QUESTIONNAIRE

Special Education Teachers' Assistive Technology Skills and Knowledge Questionnaire

Part I: Demographic data

1- What is your age?

- 21-28
- 29-35
- 36-42
- 43 or over

2- What is your gender?

- Female
- Male

3- What is the highest level of education you have completed?

- Bachelor's degree
- Master's degree
- Other: (please specify)

4- How many years of experience do you have in education?

- 0-6 years
- 7-13 year
- 14-19 years
- 20 and over

5- Grade level of instruction:

- pre-school
- Elementary
- Middle
- High

6- Disabilities that you work with:

- Autism
- Deaf-blindness
- Deafness
- Intellectual disability
- Multiple disabilities
- Specific learning disability
- Speech or language impairment
- Other: (please specify)

7- The school location that you teach in:

- Rural
- Suburban
- Urban

Part II: Knowledge and use of Assistive Technology

8- I have received training regarding AT from:

- None
- My own personal interest
- Colleagues
- Attending conferences
- Attending a class at a university
- Other: (please specify)

9- How much formal training have you received for using AT?

- 1-5 hours
- 6 -10 hours
- 11-15 hours
- 16-20 hours
- Other: (please specify)

10- How frequently do you use assistive technology with your students.

☐ never ☐rarely ☐often ☐always

11- Estimate your knowledge of assistive technology.

☐ poor ☐ fair ☐ good ☐ excellent

Please indicate your current Assistive Technology (AT) knowledge and skills in each of the following items.

0= No Current Skills/Knowledge (professional development might be very important)
1= Inadequate Skills/Knowledge (professional development might be important)
2= Adequate Skills/Knowledge (professional development might be moderately important)
3= Excellent Skills/Knowledge (professional development might be slightly important)
4= Superior Skills/Knowledge (professional development might not be needed)

	My level of expertise in this area Least → Most				
12. I know the concepts and terms regarding AT.	1	2	3	4	5
13. I am confident in my ability to identify and operate software programs that meet students with disabilities' Individualized educational plan (IEPs) goals.	1	2	3	4	5
14. I have the knowledge to assess students with disabilities to determine what assistive technology would be appropriate.	1	2	3	4	5
15. I know how to arrange the classroom environment to facilitate the use of AT.	1	2	3	4	5
16. I know how to evaluate whether AT is effective in	1	2	3	4	5

meeting my students with disabilities needs.					
17. I know that AT device options range from low tech to high tech.	1	2	3	4	5
18. I am confident in my ability to identify a variety of AT devices (low tech – mid tech – high tech) that could be used with students with disabilities.	1	2	3	4	5
19. I know how to operate a variety of AT devices (low tech – mid tech – high tech) to support students with disabilities.	1	2	3	4	5
20. I follow a systematic plan to ensure that AT is correctly implemented.	1	2	3	4	5
21. I know how to identify resources for professional development related to AT.	1	2	3	4	5
22. I collaborate with IEP team members in selecting and implementing AT.	1	2	3	4	5

Part III: Professional Development

23. Are you interested in receiving more knowledge and training about AT?
    - Yes
    - No
    - I do not know
24. In which areas of curriculum would you like to see assistive technology options?
    - Math
    - Writing
    - Reading
    - Speaking
    - Other
25. Based on your learning style, please select your preferred method for AT training.
    - One-on-one individualized instruction
    - Attending workshops or conference sessions
    - Online modules
    - Other: (please specify)
26. When do you prefer to receive your training?

- Summer
- Weekends
- After school
- Other: (please specify)

Would you like to add any comments?

(The survey was adapted from University of Kentucky Assistive Technology (UKAT) project and the Technology Competencies for Beginning Special Educators as recommended by the Council for Exceptional Children (CEC).)

APPENDIX B

INFORMED CONSENT

CALIFORNIA STATE UNIVERSITY
SAN BERNARDINO

College of Education
Department of Special Education, Rehabilitation and Counseling

INFORMED CONSENT

Study Title: Saudi Special Education Teachers' Knowledge, Skills, and Professional Development Needs of Assistive Technology in the Classroom

The study in which you are being asked to participate is designed to assess Saudi Arabian special education teachers' current level of knowledge and skills of assistive technology and professional development needs. This study is being conducted by Mazen Almethen, a graduate student, under the supervision of Dr. Kathleen Phillips, Department of Special Education, Rehabilitation and Counseling, California State University, San Bernardino. This study has been approved by the Institutional Review Board, California State University, San Bernardino.

PURPOSE: The purpose of the study is to assess Saudi Arabian special education teachers' current level of knowledge and skills of assistive technology and professional development needs.

DESCRIPTION: Participants will be asked questions regarding their knowledge and skills of assistive technology, their previous assistive technology training, their preferred training methods, and some demographics.

PARTICIPATION: Your participation is completely voluntary and you do not have to answer any questions you do not wish to answer. You may skip or not answer any questions and can freely withdraw from participation at any time without penalty.

ANONYMOUS: Your responses will remain anonymous and data will be reported in group form only.

DURATION: It will take 10 to 15 minutes to complete the survey.

RISKS: There are no foreseeable risks to the participants. However, participants who become uncomfortable filling out the survey can freely withdraw from participation at any time without penalty.

BENEFITS: There will not be any direct benefits to the participants. However, the findings of such a study might be beneficial for stakeholders in the education sector in the Kingdome of Saudi Arabia in order to assess whether or not modification is needed to be made to the current structure of AT training. In addition, educational colleges will find useful information that will help them determine the need of including more AT training in their programs in order to prepare future teachers.

CONTACT: If you have any questions regarding this study, please feel free to contact Dr. Kathleen Phillips at (909) 537-7679 or at kathiep@csusb.edu.

RESULTS: Please contact with the Pfau Library at California State University, San Bernardino for the results of the study after June 2017.

Conformation statement: I read and understand the information above, and decide to participate in this study.

ONLINE AGREEMENT BY SELECTING THE "I AGREE" OPTION ON THE WEBPAGE INDICATES CONSENT TO PARTICIPATE IN THE STUDY

909.537.5606 • 909.537.7406
5500 UNIVERSITY PARKWAY, SAN BERNARDINO, CA 92407-2393

APPENDIX C

APPROVAL LETTER

December 14, 2016

CSUSB INSTITUTIONAL REVIEW BOARD
Expedited Review
IRB# FY2017-62
Status: **APPROVED**

Mr. Mazen Almethen and Prof. Kathleen Phillips
Department of Special Education, Rehabilitation and Counseling
California State University, San Bernardino
5500 University Parkway
San Bernardino, California 92407

Dear Mr. Almethen and Prof. Phillips:

Your application to use human subjects, titled "SAUDI SPECIAL EDUCATION TEACHERS' KNOWLEDGE, SKILLS, AND PROFESSIONAL DEVELOPMENT NEEDS OF ASSISTIVE TECHNOLOGY IN THE CLASSROOM" has been reviewed and approved by the Institutional Review Board (IRB). The attached informed consent document has been stamped and signed by the IRB chairperson. All subsequent copies used must be this officially approved version. A change in your informed consent (no matter how minor the change) requires resubmission of your protocol as amended. **Your application is approved for one year from 12-12-2016 through 12-11-2017. Please note the Cayuse IRB system will notify you when your protocol is up for renewal and ensure you file it before your protocol study end date.**

Your responsibilities as the researcher/investigator reporting to the IRB Committee include the following 4 requirements as mandated by the Code of Federal Regulations 45 CFR 46 listed below. Please note you cannot deviate from your approved protocol without submitting a protocol change and receiving final approval of that change from the IRB. Your protocol is approved for 1 year and requires annual renewal if you have not completed your study. The protocol change and renewal forms are located on the IRB website under the forms menu. Failure to notify the IRB of the above may result in disciplinary action. You are required to keep copies of the informed consent forms and data for at least three years. Please notify the IRB Research Compliance Officer for any of the following:

1) Submit a protocol change form if any changes (no matter how minor) are proposed in your research protocol for review and approval of the IRB before implemented in your research,
2) If any unanticipated/adverse events are experienced by subjects during your research,
3) To apply for renewal and continuing review of your protocol one month prior to the protocols end date,
4) When your project has ended by emailing the IRB Research Compliance Officer. m

The CSUSB IRB has not evaluated your proposal for scientific merit, except to weigh the risk to the human participants and the aspects of the proposal related to potential risk and benefit. This approval notice does not replace any departmental or additional approvals which may be required. If you have any questions regarding the IRB decision, please contact Michael Gillespie, the IRB Compliance Officer. Mr. Michael Gillespie can be reached by phone at (909) 537-7588, by fax at (909) 537-7028, or by email at mgillesp@csusb.edu. Please include your application approval identification number (listed at the top) in all correspondence.

Best of luck with your research.

Sincerely,

Caroline Vickers

Caroline Vickers, Ph.D., IRB Chair
CSUSB Institutional Review Board

CV/MG

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