Students' Attitudes Toward the Use of Hearing Aids in Al-Ahsa, Kingdom of Saudi Arabia

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This dissertation titled

Students' Attitudes Toward the Use of Hearing Aids in Al-Ahsa, Kingdom of Saudi Arabia

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ABSTRACT

ALODAIL, ABDULLAH , Ph.D., August 2011, Curriculum and Instruction, Instructional Technology

Students' Attitudes Toward the Use of Hearing Aids in Al-Ahsa, Kingdom of Saudi Arabia

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Hearing aid devices are worn within people’s ears to help them hear the sounds around them. Teachers have to accept the use of hearing aids in the classroom as a device to assist students with hearing loss (Plumley, 2008). Further study is helpful to hearing aid research because it demonstrates the importance of hearing aid benefit awareness in motivating parents and children to properly use hearing aids. The price of hearing aids should be reasonable enough for students to afford or the government should provide them for free. The purpose of this study was to explore male and female students’ attitudes toward the use of hearing aids in Al-Ahsa Schools in Saudi Arabia using different predictors that can determine students’ attitudes. The researcher identified some factors that may impact these attitudes— namely gender, perceived effectiveness, social life, denial, and adaptation— in order to reliably predict the dependent variable, attitudes of students toward the use of hearing aids. The study also intended to examine which of these predictors is the most important in examining students’ attitudes.

The design of multiple regression method was used in this study. The survey tool was designed by the researcher to collect and interpret the data for this study. Based on the nature of the study, the quantitative method was employed to obtain information
about students’ attitudes toward the use of hearing aids. One hundred and thirty-three out of 138 students participated from both special schools, only for students with hearing impairments, and public schools, which had some students with hearing impairments, in Saudi Arabia. One hundred and thirty total responses were used in the analysis after removing three cases of outliers, and the response rate of the study was 92%. The components of the survey focused on six aspects: perceived effectiveness, social life, adaptation, denial, attitudes and certain demographic questions.

The results showed that an $R^2$ of .18 was obtained from the analysis indicating that approximately 18.4% of the variance of the students’ attitudes toward the use of hearing aids can be accounted for, based on the sample size, by the linear combination of perceived effectiveness, social life, adaptation, denial, and gender. The adjusted ($R^2$) indicates that the combination of predictors resulted in determining around 15% of the variance in the dependent variable, students’ attitudes when considering the whole population. The analysis showed only one of five predictors, the perceived adaptation, significantly predicted the dependent variable ($N=130, \beta = .3, p< 0.05$). The other predictors were not significantly successful in determining the dependent variable. The results showed there was no significant difference between boys’ and girls’ attitudes toward the use of hearing aids. Based on the ANOVA table, the combination of the five independent variables significantly predicted the dependent variable.

Approved: _____________________________________________________________

Teresa J. Franklin
Professor of Educational Studies
DEDICATION

To those who encouraged my endeavors to study perfectly, those who provided me a chance to improve my great capability, and nurtured my devotion to learning and to my lovely parents:

Kholifh Alodail and Moneera Bu Hamil.

To You

To my beloved wife, Maha, for her endless support, encouragement, and sacrifices throughout this educational journey. Thank you, Maha, for your love, concern, and understanding.

To the imagination and the meaning of my life, to my two shining roses and eyes: Ruwaa and Moneera. You are the truest blessings in this life; you are my hope in a bright future.

My endeavor is dedicated to my two darlings, so you might pursue higher for yourselves in your bright futures.
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CHAPTER ONE: INTRODUCTION

As we all know, the social environments for students can be complicated. For students with hearing impairments, social interactions can be especially difficult (Gatehouse, Naylor & Elberling, 2003). The media has recently discussed how the Ministry of Education in Saudi Arabia has established a new and critical role for students with hearing impairments to integrate them into the regular school. Such decisions require hearing peers and teachers to be highly sensitive to their special needs and to increase communication skills for those with hearing impairments. The best way to assist those with hearing impairments is to encourage them to wear hearing aids at school and instruct their peers and teachers to respect their hearing problems (Al-Thagafi, 2010).

Because of the gradually increasing number of students who are affected by hearing impairments, this study focused on students’ attitudes toward the use of hearing aids. Appleton and Bamford (2006) found that while hearing aids may make the students stand out more, students seem to see the benefits of wearing hearing aids and, therefore, took a more positive attitude in wearing them. Among adults and children, however, there was a significant difference in attitude toward hearing aid use. Children seemed to perceive a more significant benefit of wearing hearing aids. There are several factors that could contribute to this outlook, one being that the effects of social stigma's relation to hearing aid usage is less among children than adults, and another is that the sample size of their study was simply too small (Appleton & Bamford, 2006).

Cox, Alexander, and Gray (2005) examined “why only 23% of hearing impaired adults” sought to get hearing aids and actually used them, but the study did not include
children (p. 12). The adults who used their hearing aids reported that they led happier lives than those who did not use them. So, why did some adults choose not to wear their hearing aids? Cox, Alexander, and Gray (2005) suggest many adults thought the use of hearing aids would make them stand out, and they had a negative view of the use of hearing aids.

Another study that shows attitudes toward hearing loss was conducted by Fujikawa and Cunningham (1989) who examined executives’ attitudes toward hearing loss and hearing aid use. Among the 250 high-level executives that were surveyed, 90% said that they thought hearing aids would be useful, but nearly 70% feared they would be stereotyped as old and unable to perform their jobs. Studies with different samples of subjects are necessary to generalize the attitudes toward hearing loss and hearing aids.

Al-Abduljawad (2009) discussed that in Saudi Arabia there is an overwhelming use of the auditory speech approach in deaf education, and the mode of communication is sign language for individuals who are deaf. The issue with this method is that deaf students can only communicate with a small number of individuals, such as deaf students and hearing peers who understand sign language, which severely limits social interaction. Special education in Saudi Arabia is a relatively new phenomenon that started in 1964. By 2004, there were no less than 1,562 schools for deaf boys and girls. So while there are problems with opportunities for deaf students, such as not being accepted into governmental universities, we can take some comfort in the fact that there have been vast improvements within Saudi Arabia for students with special needs. The Al–Amal Institutions in Saudi Arabia conducted a survey to examine what type of communication
was preferred by students with hearing loss. In this study, 260 people participated, half of which were boys and the other half girls whose ages ranged from 12 to 24 years old. Of the 260 participants, 174 used hearing aids and they found them useful for their communication in the classroom and in the real world after school. Still, the deaf individuals found sign language to be crucial for them to connect with others in their own group who are also deaf. “In this study, we found that the majority of deaf individuals prefer the total communication method, while 67 prefer sign language alone and 55 prefer sign language besides to oral communication” (Al-Abduljawad, 2009, p. 5).

Abolfotouh and Al-Ghamdi (2000) discussed the pattern of hearing impairment among schoolboys in an institute for deaf subjects which was conducted in Abha, Saudi Arabia. The study was to find out if there was any preventable measure that could be taken in order to stop preventable deafness. Hearing impairments are a big problem in the deaf world and in Saudi Arabia specifically. A hearing examination was given to 155 students to find out the types and degrees of deafness in the students. The study found that more than 97% of students had hearing loss in various grades. The results of the study showed that preventable causes of deafness are still present and more needs to be done to upgrade prenatal care. Late diagnosis of hearing problems can lead to hearing loss that could have been prevented (Abolfotouh & Al-Ghamdi, 2000).

Background of the Study

Students who have hearing loss or impairment are in urgent need of assistive technological tools that help them to hear properly. Teachers should be aware of the kinds of devices appropriate for a student’s needs. Al-Abduljawad (2003) conducted a
study to determine the effectiveness on middle ear pathology when benefiting from the use of hearing aids. In her research, Al-Abduljawad examined the reasons for participants’ hearing loss, degree and time of diagnosing hearing problems, and parents and children’s opinions in terms of the usefulness of using hearing aids. There were “150 female participants in this study, ranging in age from 6.3 to 13.9” (p. 226). All of the participants had hearing loss and were attending the Al-Amal institutions for deaf girls in Riyadh, Saudi Arabia. Al-Abduljawad (2003) created a survey for parents who had children with hearing problems, which contained questions regarding parents’ perception of their child’s hearing aid benefits and the impact the aid had on their child’s verbal communication. Al-Abduljawad (2003) used clinical examination of the ear by using otoscope which gently pulls the auricle upward and backward. This examination did not include children who had perforation of tympanic membrane and those with active discharge. Al-Abduljawad (2003) found that there were 14 right ears and 21 left ears suffering from middle-ear problems. Eighteen ears were excluded because of discharge found during clinical examination and five ears were excluded due to grommet tubes, which are put in place to prevent the accumulation of mucus in the middle ear. The author suggested that all the examined children should be treated before using hearing aids. Additionally, Al-Abduljawad discovered that 70% of the participants expressed a positive attitude regarding hearing aid use. Al-Abduljawad explained the complex details behind the hearing loss (Al-Abduljawad, 2003). This study is helpful to hearing aid research because it demonstrates the importance of hearing aid benefit awareness in
motivating parents and children to properly use hearing aids. The study further supports the idea of free or affordable hearing aids for students.

According to Plumley (2008), hearing aid devices are worn within students’ ears to help hear the sounds around them. Teachers can help students who are deaf to adapt by accepting the use of hearing aids in the classroom as devices to assist students with hearing loss. Another device that helps students with hearing loss is a cochlear implant, which is used when students are not satisfied with wearing hearing aids. The implant device requires a certain severity of hearing loss. As Plumley states, “A child will need intensive hearing therapy in order for the brain to learn how to interpret the signals of a cochlear implant” (p. 1).

Inside and outside classrooms, fm devices can be used to accommodate students with hearing aids. The teacher can wear an fm transmitter that spreads better speech sounds to a student wearing a receiver. It takes care of students’ needs so students can attend their classes and have a prepared classroom setting, for example, when a teacher uses a microphone to speak and a student has a receiver that delivers the voice signal to the child’s hearing aid or cochlear implant. There are other alerting systems that help students with hearing aids in case of fire or other emergencies. Unfortunately, many buildings have normal sound systems, such as smoke detectors, that are not heard by students with high hearing loss. Teachers should be responsible to observe and measure if the listening devices help students or not in their daily lives and learning environments. Parents will play the most important part for teachers by giving feedback to the teacher
about their child’s hearing level. The educational success of a student with hearing loss depends upon the crucial contribution of both families and teachers (Plumley, 2008).

Statement of the Problem

According to Najd Online Academy (2006), one concern in Saudi education is that the education system itself is relatively new. It was not until the 1930s that formal education at the primary level existed, and not until 1954 that a Ministry of Education was developed. Many countries that have more thoroughly dealt with specific problems in their educational system have a head start on Saudi Arabia. Because of these factors, students with special needs, especially those with hearing loss, have had a difficult time being fully immersed into the public school system. Recognizing that they have a problem, the government of Saudi Arabia has opened a special department within the Ministry of Education called the Special Education Department. This was opened so that more students will be able to reach their full potential.

A number of studies, such as Wong (2003); Ross (1995); Strange, Johnson and Ryan (2008); and Bauman (2004) have provided detailed results of children’s attitudes toward hearing aid use in countries outside of Saudi Arabia. However, the issue of children’s attitudes toward the use of hearing aids has not been investigated by educators in the Kingdom of Saudi Arabia. Since the Kingdom of Saudi Arabia has been providing hearing aids for students, it is beneficial to investigate their attitudes toward the use of hearing aids. Hopefully, this current study will improve familiarity among educators, parents, and students about the benefits of using hearing aids.
The Purpose of the Study

The present study was to investigate the students’ attitudes toward hearing aids as perceived by a group of Saudi students aged 7-22 in Elementary, Intermediate and High Schools. It made a comparison between boys’ attitudes and girls’ attitudes toward the use of hearing aids. This study also focused on students’ attitudes toward the devices that are most important for those with hearing impairments. The importance of these hearing aids is that they allow those students to access information like their normally hearing peers.

Unfortunately, most of our students at school are not aware of using hearing aids. Thus, the Kingdom of Saudi Arabia has begun to educate students with hearing impairments by immersing them into public schools with their normally hearing peers. The Kingdom has provided students with hearing impairments with free hearing aids to use with the teachers’ assistance at schools. This study has the following objectives: firstly, it will describe attitudes on the use of hearing aids for students with hearing impairment. Secondly, it will identify areas where an intervention could substantially improve their adaptation or ability to cope with hearing aids, and effectiveness of using hearing aids. Lastly, it aims to understand how children react when they start wearing hearing aids.

Research Questions

This study aimed to examine the following research question. In this study, five predictors—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—are included. The dependent variable was attitudes of students toward the use of hearing aids.
Do these predictors—gender, perceived effectiveness, perceived social life, perceived denial, and perceived adaptation—predict attitudes of students toward the use of hearing aids?

In order to answer the research question above, tests were conducted to explore the null and alternative hypotheses:

\[
\text{Ho: } R^2 = 0 \\
\text{HA: } R^2 \neq 0
\]

Ho: The independent variables, factors of students’ attitudes toward the use of hearing aids—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—are not significant predictors of the dependent variable, students’ attitudes toward the use of hearing aids in Saudi Arabia.

HA: The independent variables, factors of students’ attitudes toward the use of hearing aids—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—are significant predictors of the dependent variable, students’ attitudes toward the use of hearing aids in Saudi Arabia.

Statement of Research Hypotheses

Based on the research questions above, the following hypotheses were tested for the five research questions. The research question was analyzed using a multiple regression.

Significance of the Study

The significance of this study is to help Saudi students with hearing impairments become aware of the benefits of the use of hearing aids. Often, those students do not get enough attention and assistance in the education system, and if they were given more
attention they could lead fuller lives and reach their full potential. The researcher will hope to make it easier for students with hearing loss to be included into public society by raising awareness of their difficulties.

In summary, the researcher hopes to:

1. Help Saudi students in their education pursuits.
2. Give Saudi educators a better understanding of the needs of students with hearing impairments.
3. Provide useful information about the attitudes of students toward hearing aids.
4. Provide a bridge for more research to be conducted in the future.

It is important to help students who have hearing problems, to see how others have reacted. This field is a neglected area where little research is available. Furthermore, it is important because the lack of knowledge in this area causes many hardships to students with hearing impairments. The findings will help improve educators, parents and all individuals’ knowledge of how to interact with students who wear hearing aids.

The data will help encourage all individuals to be more accepting to those who wear hearing aids. The findings of this study may help the Ministry of Education in Saudi Arabia consider students’ attitudes toward hearing aid use as a factor for improving or not improving services to these students in the educational system.

Delimitation and Limitation of Study

The purpose of this study was to investigate the attitudes of Saudi students who wear hearing aids in Al-Ahsa city Schools of Saudi Arabia toward the use of hearing aids. The limitations of this study are as follows:
1. The scope of the study is limited because it aimed to collect data from schools in only one city, Al-Ahsa, in Saudi Arabia. This limited the generalization of the findings of this study. The scope of the data may also be limited because the subjects of this study are only students and not teachers or parents.

2. The subject of the study, students’ attitudes toward the use of hearing aids, is subjective and difficult to measure.

3. There are not many existing articles directly related to this research topic. The investigator has found limited literature from Saudi Arabia on students’ attitudes toward the use of hearing aids because the majority of the studies are from western sources such as the United States and Scandinavia.

4. The survey for the pilot study was written in English and the participants were Americans, but the survey for main study has been translated into Arabic by Abdullah Alshehri (2010) (Appendix A and B). The targeted participants in the main study were Saudi students who can speak, write, and understand Arabic. This translation process may have created some confusion about the meaning or clarity of the survey items for the participants. The participants’ responses were entered and translated from Arabic into English for interpretation and reporting.

5. One of the greatest difficulties for a researcher in this area is describing students’ attitudes toward the use of hearing aids because it is difficult for a researcher to measure the abstract concept of students’ emotions.
6. The study is prone to information bias because it may be difficult for some of the students to express their emotions. Students may have difficulties answering all of the survey items.

7. Gender segregation is prominent in the Kingdom of Saudi Arabia in terms of separate schooling for boys and girls. The investigator was not able to directly explain the purpose of the study to the female teachers because males are not allowed to enter female schools. The researcher provided an explanation of the study in the letter to female teachers in girls’ schools. There was an inability to deal directly with Saudi all-girls schools, thus limiting the researcher’s exposure to a portion of the sample. The oral explanation of how to fill out the survey was done only for male teachers who teach students with hearing impairments who wear hearing aids.

Definition of Terms

Some terms used in this study might have several meanings based on their contexts. The following operational definitions were used to identify the terms in this study:

*Effectiveness*. In this study, effectiveness indicates that the users of hearing aids benefit from using them because it improves their hearing (Appleton & Bamford, 2006).

*Social life*. This term refers to the idea that wearing hearing aids may be either socially encouraged or socially stigmatized. With this, the quality of life may be improved or decreased. People who wear hearing aids should be ready psychologically and accept the fact that they need them (Bauman, 2004).

Denial. This term indicates that some people with hearing impairments refuse to wear hearing aids or they put them „in their drawer” because of several reasons such as social stigma, cost, and comfort (Hendricks, 2005). Kochkin’s study (1993) indicates a few reasons why about twenty million people in the U.S. do not use hearing aids for their hearing loss. These reasons are: “1) there is a stigma attached to hearing assistance instruments; 2) a person's hearing loss is not serious enough to warrant using a hearing instrument; and 3) in terms of importance, hearing aids are not comfortable or perhaps they might not work well” (p. 1).

Adaptation. This term indicates that many users need time to adapt to their new hearing aids, to adapt to the reactions other people might have toward them, and to realize the immediate benefits of wearing them. According to Bauman (2004), people who wear hearing aids need time to adjust to them and their sounds. They cannot discern unclear sounds unless they are in quiet areas. People who wear the hearing aids should be ready psychologically and accept the fact that they need them. They need to find the best hearing aids to fit their needs. Ultimately, when they become familiar with using hearing aids, they will realize the usefulness of the aids which have brought convenience to their daily routines (Bauman, 2004).

Attitude. This term refers to positive and negative perceptions toward hearing aid use that lead students with hearing impairments to use the hearing device properly, and negative
attitudes toward the use of hearing aids that could be changed through counseling (Brooks, 1989). According to Zheng, Caissie, and Comeau (2001), attitude is defined as the perception of hearing aid users toward the use of hearing aids.

*Hearing impairments.* This term refers to the following definitions by different scholars that will be used by the current study:

a) Hearing impairments are categorized by identifying levels of hearing loss, such as mild, severe, or profound loss. A person with hearing impairment is one who has a hearing problem or has an inability to hear sounds or voices (Plumley, 2008).

b) Hearing impairment can happen at any age due to several reasons such as infection, drug use, trauma, allergies, noise exposure, and genetics. People with hearing impairments have many interpersonal communication problems, particularly understanding conversation in a crowd, at events, and on the phone, that force them to ask people to repeat their speech (Plumley, 2008).

c) According to Wilson and Stephens (2003), hearing loss is the leading sensory impairment in the world.

*Hearing aids.* This term designates that devices to help people with hearing loss to hear are defined as hearing aids. It should be noted that people who wear hearing aids have reported that they are necessary devices for them to hear or amplify sounds around them (Zheng, Caissie & Comeau, 2001).
Assistive Educational Technology. The operational definition of Assistive Educational Technology in this study is tools that are used with students with disabilities, and in terms of this dissertation, hearing loss. Some characteristics of assistive technology are:

a) A tool that makes information accessible to students with hearing loss. It helps students learn effectively in a classroom with other students (Behrmann, 1995).

b) According to Behrmann (1995), assistive technology is defined as devices that help improve the learning environment for students with disabilities.

c) Technology is an assistance tool for the teacher to use in the classroom to improve and provide an effective instruction for students with or without disabilities in learning (Behrmann, 1995).

d) Assistive technology is further classified as either high-tech tools that require electrical support or low-tech tools that do not require plug-in help. Examples of high-tech tools are calculators, word prediction software, and voice recognition software. Low-tech examples are cassette recorders, pencil grips, and head pointers (Behrmann, 1995).

e) An assistive technology device is defined as any tool or system, whether purchased and used as intended or personalized, that improves daily life for a person with a disability (Edyburn, 2004).

f) The Assistive Technology Act of 1998 which sought to offer technology related assistance to individuals with disabilities as a way to enhance their lives (Alper & Raharinirina, 2006).
g) Assistive Technology is an important device that can be used to improve the lives of Americans with disabilities (Johnston, Beard & Carpenter, 2007).

Cochlear Implants. This term refers to surgically implanted electronic devices that enable a person who is nearly deaf to be able to hear. A cochlear implant is similar to a type of hearing aid since they both attempt to allow those who cannot hear to be able to hear (Chee, Goldring, Shipp, Ng, Chen, & Medzelski, 2004).

Organization of the Study

This study is organized into five chapters. Chapter one introduces the nature and the objectives of the study. Chapter two provides detailed discussion of the literature, including the attitudes of children, adolescents, and adults- both males and females- toward the use of hearing aids. The literature review is divided into four areas: 1) assistive technology: (a) purpose of assistive technology; (b) categories of assistive technology; (c) benefits of assistive technology; (d) multimedia assistive technologies; (e) assistive technology for hearing in the classroom; (f) using technology to support hearing; and (g) impact of assistive technology; and 2) hearing aids: (a) perceptions of hearing aid use; (b) hearing aid awareness; (c) challenges of those with hearing impairments; and (d) reasons that people do not wear hearing aids; 3) attitudes: (a) parents’ perspective toward hearing aids; (b) attitudes toward hearing aids in the developing world; (c) attitudes toward cochlear implants; (d) satisfaction with hearing aids; (e) perceptions of those with hearing impairments; (f) components of attitudes toward the use of hearing aids;(g) use of sign language; and 4) studies conducted in Saudi Arabia on the attitudes toward and benefits of hearing aids. In chapter three, the researcher examines the attitudes toward the
use of hearing aids in K-12 in some of Saudi Arabia’s schools, specifically in Al-Ahsa city. This chapter includes the purpose of the study, the description of the methods used to answer the question of students’ attitudes toward the use of hearing aids, the procedures that were used to conduct the study and the statistical strategy that was used to analyze the data. In chapter four, the study explores the findings of the study students’ attitudes toward the use of hearing aids in Saudi Arabia. The researcher uses quantitative methods (survey) to gain information about students’ perception toward the use of hearing aids. In chapter five, the researcher addresses the summary of the study, discussion of the findings followed by the main research question and the hypothesis underlying the study. Finally, the chapter discusses the conclusion of the study, limitations of the study and recommendations for further research. A considerable amount of this research has been explored to understand students’ attitudes toward the use of hearing aids in Saudi Arabia.
CHAPTER TWO: A REVIEW OF THE LITERATURE

This chapter discusses students’ attitudes toward wearing hearing aids and the benefits that students with hearing impairments may have with such aids. According to Behrmann (1995), this assistive technology tool has the potential to become a very useful device for people with hearing loss around the world.

The three basic parts of hearing aids are the microphone, the amplifier, and the receiver. The environment provides an acoustic signal to the microphone, which converts it to an electrical signal. Then the electrical signal is transmitted to the amplifier, where its amplitude rises. A receiver gets the amplified electrical signal and converts it back to sound. Finally, auditory processing occurs when the receiver delivers the amplified electric signal to the ear (Katz, 2001). Hearing aids help the students with hearing loss to interact with other people and learn information from teachers and from the world around them. Although this study focuses on students’ attitudes only, this literature review covers research that addresses the attitudes of both students and adult non-students who wear hearing aids, as the literature focusing on the students is limited. Since most studies have been conducted in the U.S. the review will depend heavily on relevant research in the United States about Technology Act. Some studies that have been conducted recently in Saudi Arabia will be included as well. The research literature covered in this review is divided into four areas: 1) assistive technology: (a) purpose of assistive technology; (b) categories of assistive technology; (c) benefits of assistive technology; (d) multimedia assistive technologies; (e) assistive technology for hearing in the classroom; (f) using technology to support hearing; and (g) impact of assistive technology; and 2) hearing
aids: (a) perceptions of hearing aid use; (b) hearing aid awareness; (c) challenges of those with hearing impairments; and (d) reasons that people do not wear hearing aids; 3) attitudes: (a) parents’ perspective toward hearing aids; (b) attitudes toward hearing aids in the developing world; (c) attitudes toward cochlear implants; (d) satisfaction with hearing aids; (e) perceptions of those with hearing impairments; (f) components of attitudes toward the use of hearing aids; (g) use of sign language; and 4) studies conducted in Saudi Arabia on the attitudes toward and benefits of hearing aids.

Assistive Technology

In earlier studies (Behrmann, 1995), assistive technology was defined as devices that help improve the learning environment for students with disabilities. It was classified as either high-tech tools that require electrical support or low-tech tools that do not always require electricity. Examples of high-tech tools are calculators, word prediction software, and voice recognition software. Low-tech examples are cassette recorders, pencil grips, and head pointers. Assistive educational technology makes information accessible to students who are deaf or who have hearing impairments. This tool provides a support method between the teacher and student in a learning environment. It helps students learn effectively in a classroom with other students. Assistive technology is a tool for the teacher to use in the classroom to help improve and provide effective instruction for students with or without disabilities in learning.

Students with disabilities can receive technological support to assist them in the cognitive process in a variety of areas. A computer allows students to use a variety of fonts and styles, helps them with learning tasks and enables them to apply their work with
graphic images, drawings and videos. Giving students options in learning, such as providing computers, motivates students and gives them the means to develop new and complex ideas. The language learning process can be facilitated by specialized computer programs, like visual assistive technology devices (i.e. graphic organizers). Students may also choose outlined note-taking or writing assistance devices, such as word processing programs (Behrmann, 1995).

Examples of assistive technology devices that help students organize their thoughts and outline their ideas are “spellcheckers, dictionaries, and thesaurus programs” (p. 1). These technological devices can expedite the process of students learning how to revise their own work and others’ as well as teach them to use resources they were not aware were available, such as dictionaries, word processors and the Internet. Assistive technologies that can further help students’ productivity include hardware-based and software-based tools. Some of these productivity tools are “calculators, spreadsheets, databases, and graphics software” (p. 1). These tools “enable students to work on math or other subjects that may require calculating, categorizing, grouping, and predicting events” (Behrmann, 1995, p. 1). Many small portable devices, such as personal digital assistants (PDAs) and smart phones, may contain these productivity tools. Access to reference materials can assist critical thinking skills for students with disabilities who are completing academic work (Behrmann, 1995).
**Purposes of Assistive Technology**

The Assistive Technology Act of 1998 has helped people with disabilities to access educational tasks by using assistive technology devices. People with disabilities have the right to live and have the same privileges as regular people do. Assistive technology has further increased the access to the general curriculum for students with disabilities. However, there are some barriers to the application of assistive technology devices such as high prices, the lack of student knowledge regarding how to use assistive technology devices, the lack of training for teachers in the school or other places, and the time required to learn about current aids and new laws limiting their use (Alper & Raharinirina, 2006).

According to Johnston, Beard and Carpenter (2007), The Assistive Technology Act of 1998 was introduced during the Clinton administration and aimed at offering technology related assistance to individuals with disabilities as a way of improving their lives. The goal of this Act was to provide grants to assist states with special programs for constituents with disabilities. Technology can be used to improve the lives of Americans with disabilities. The Technology Act is divided into four sections: The State Grant Program is to create the awarding of grants to states to support capacity building and advocacy activities; National Activities are to provide for the coordinated effort in research related to assistive technology; The Alternative Financing Mechanism is to provide grants to states to help pay for the federal share of costs related to the establishment, administration, or expansion related to alternative financing for assistive technology system for individuals with disabilities; and Repeal and Conforming
Amendments is to repeal the technology act of 1988 (1998 amendment to section 508 of the rehabilitation act) (Johnston, Beard & Carpenter, 2007).

According to Section 508 (n. d.) the purposes of the Assistive Technology Act of 1998 is to financially assist all states in undertaking organizations or groups that support assistive technology devices to constituents with disabilities at different ages. These organizations are designed to increase the availability of funding and access to assistive technology devices and assistive technology services. More funding and access would increase the active involvement of individuals with disabilities and their family members and guardians. Maintaining these programs will help to improve family members and guardians in making decisions related to the provision of assistive technology devices and assistive technology services. Increasing the provision of outreach to underrepresented populations and rural populations will enable the two groups to enjoy the benefits of activities carried out under this Act to the same extent as other populations. This Act will “increase and promote coordination among State agencies, between State and local agencies, among local agencies, and between State and local agencies and private entities such as managed care providers that are involved or are eligible to be involved in carrying out activities under this Act” (p. 4). It will also “increase the awareness of laws, regulations, policies, practices, procedures, and organizational structures that facilitate the availability or provision of assistive technology devices and assistive technology services” (Section 508, n. d. p. 4).

The Assistive Technology Act of 1998 provides four main services. The first are advocacy services that are able to be used in assisting those with disabilities and members
of their families or others who assist them. The second service is the assistive technology itself. The third is technology that helps those with disabilities by assisting them with technological tools that are most beneficial to them. Assistive technology devices can be any equipment, item, or product system that will help maintain or increase the operational level of functioning for those with disabilities. Finally, the assistive technology service is a service in which any person with a disability can use in education and community living. For example, students who have a reading disability can use technology-based curriculum development services to improve and support them in reading skills (Section 508, n. d.).

Because of the Assistive Technology Act, Congress addressed many issues pertaining to individuals with disabilities in 1998. These issues included, people who are disabled should be able to live independently, make their own choices, determine their own lives, take advantage of an education, and live meaningful lives. By meaningful lives, the Act refers to having a career and to being fully included as a part of mainstream American life. Assistive technology devices are instrumental all over the globe for people with disabilities. This Act will not only help those with disabilities, but also make the United States and the world more productive by using assistive technology devices in different tasks (Section 508, n. d.).

More than 50 million people in the United States have some sort of disability, and this Act helped many of them acquire assistive technology. Improvements and developments have been made to education, rehabilitation and training, employment, and residential living for people with disabilities. Another is that those of all ages with
disabilities are better able to use them. These advancements take place in education, rehabilitation, and places of employment, residential and independent living facilities, recreation services and many more daily activities (Section 508, n.d.).

According to The Family Center on Technology and Disability (n.d.) “The Assistive Technology Act, also known as the “Tech Act” provides funds to states to support three types of programs: The establishment of assistive technology (AT) demonstration centers, information centers, equipment loan facilities, referral services, and other consumer-oriented programs; protection and advocacy services to help people with disabilities and their families, as they attempt to access the services for which they are eligible; Federal/state programs to provide low interest loans and other alternative financing options to help people with disabilities purchase needed assistive technology” (p. 2).

Ultimately, the Assistive Technology Act provides a huge range of assistive technology services and devices. Therefore, families should be aware of how federal laws impact their children’s needs to have assistive technology devices and services. The use of different kinds of technology-related assistance has indicated a significant impact on many aspects of the respondents’ lives. For example, the majority of students with disabilities benefited by having fewer learning problems because of assistive technology used in the classroom; “nearly 75% of school age children were able to remain in a regular classroom, and 45% were able to reduce their use of school-related services; 65% of working-age persons were able to reduce dependence on family members; 58% were able to reduce dependence on paid assistance, and 37% were able to increase earnings
among elderly persons” (p. 2). “Eighty percent were able to reduce dependence on others half were able to reduce dependency on paid persons and half were able to avoid entering a nursing home” (p. 2). Based on these results, it is evident that the problem is how much effective assistive technology will cost individuals (The Family Center on Technology and Disability, n.d.).

**Categories of Assistive Technology**

According to Chris (2001), there are fourteen categories of technology that are included in the Assistive Technology Act of 1998 for those with disabilities:

<table>
<thead>
<tr>
<th>Categories</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily Living</td>
<td>Focuses on assistive technology tools for everyday tasks.</td>
</tr>
<tr>
<td>Mobility Aids</td>
<td>Supports a person who is physically impaired to move independently.</td>
</tr>
<tr>
<td>Home Modifications</td>
<td>Changes made to one’s home to make it more accessible.</td>
</tr>
<tr>
<td>Seating and Positioning Technology</td>
<td>Aids people with physical disabilities with sitting and walking.</td>
</tr>
<tr>
<td>Prosthetics and Orthotics</td>
<td>Replaces body parts for persons with physical disorders.</td>
</tr>
<tr>
<td>Recreation</td>
<td>Modifications can be made to recreational equipment to allow participation for people with disabilities.</td>
</tr>
<tr>
<td>Visual Impairment</td>
<td>Helps people who are blind or have visual deficits with accessible tools.</td>
</tr>
</tbody>
</table>
Table 1 (Continued)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodations</td>
<td>Provides different tools to assist persons with physical, sensory, or cognitive disorders in the public and private places.</td>
</tr>
<tr>
<td>Vehicle Modifications</td>
<td>Changes made to vehicles for persons with physical disabilities.</td>
</tr>
<tr>
<td>People Who Are Deaf or Having Hearing Problems</td>
<td>Helps people who are deaf or have hearing deficits with accessible tools.</td>
</tr>
<tr>
<td>Augmentative Communications</td>
<td>Provides alternative ways for persons with sensory, communication, or cognitive disorders to communicate.</td>
</tr>
<tr>
<td>Individuals with Various Disabilities</td>
<td>Supports individuals with various disabilities by providing accessible devices.</td>
</tr>
<tr>
<td>Environmental</td>
<td>Modifications or tools to help individuals in their environments.</td>
</tr>
<tr>
<td>Computer Access Aids</td>
<td>Allows those with disabilities to use computers and other software.</td>
</tr>
</tbody>
</table>

**Daily Living**

The first category for assistive technology caters to daily living (living aids).

These forms of technology assist persons with physical, sensory, or cognitive disorders. For example, this technology helps individuals with physical disabilities to perform daily tasks, such as showering by providing “grab bars and a shower chair for bathing. Other items in this category are architectural changes, clothing and dressing help, along with eating and cooking aids such as spiked cutting boards, home maintenance aids, bathing.
aids, education aids, one handed utensils, velcro snaps, reachers, writing guides, button hooks, and zipper pulls” (P. 1). While the first example focuses on individuals with physical, sensory and cognitive disabilities.

*Mobility Aids*

The second category, of mobility aids, support a person who is physical impaired by using technology assistance such as “a walker, a red tipped cane, manual and electric wheelchairs, mobile bases for custom chairs, three wheel scooters and other utility vehicles”(p. 1). For example, transitioning from a manual wheelchair to an electronic wheelchair gives the patient more mobility and makes them able to be less dependent on others. These two categories are different in that the first one help persons who have physical, sensory, or cognitive disorders to pick up items and make buttoning and zipping clothing easier and other uses in their daily home and the second one helps to improve movement abilities and protect for falling (Chris, 2001).

*Home Modifications*

The third category is home modifications which assist people with physical, sensory, or cognitive disabilities at home and include having ramps at the house entrance, widened doorways, and rails in the bathroom, lifts, and visual alerting system.

*Seating and Positioning Technology*

The fourth category is seating and positioning technology, which helps people with physical disabilities to sit and walk. Examples of these devices include “headrests, lateral supports, and chair inserts” (P. 1). “For persons with ambulatory difficulties, low tech aids such as canes, walkers or crutches can be used. These products are engineered
to provide accommodations to a wheelchair or other seating system to provide greater body stability, and the reduction of pressure on the skin’s surface (cushions, contour seats, lumbar supports)” (p. 1). For example, a wheelchair with straps simultaneously supports the torso and protects the lower body so that the user does not slip out when the chair is in motion. Both of these categories deal with a person with physical, sensory, and cognitive disability to live independently and move from place to place easily, but the fourth one deals more with physical disability and helps people in difficult seating environments such as cars, waiting rooms, and movie theaters (Chris, 2001).

_Prosthetics and Orthotics_

The fifth category is prosthetics and orthotics that help persons with physical disorders by replacing a body part with “artificial limbs, splints, speaking valves, braces, foot orthotics, helmets and restraints” (p. 1). Prosthetics and orthotics help people with physical disabilities such as a missing limb by replacing a part of body with an artificial limb.

_Recreation_

Recreation is the sixth area that helps all people with disabilities in which assistive technology modification can be made. Examples of this aid are “adapted bicycles, racing and all terrain wheelchairs, adapted swings, switch-adapted toys and games, tennis wheelchairs, skiing equipment, playing card shuffler, beach wheelchair, and adapted camera” (p. 1). “More examples are specialized photography equipment, adaptive exercise equipment not used in a rehabilitation setting, and adapted equipment for fishing, hunting, and camping” (p. 1). Recreational assistive technology helps people
with all kinds of disabilities to enjoy many kinds of entertainment activities they would not be able to do otherwise because of their disabilities (Chris, 2001).

**Visual Impairment**

The seventh category is visual impairment and helps people who are blind or have visual deficits. Examples include “screen magnifier/enlarger, Braille devices, speech output devices, large print monitors, reading machines, electronic book readers, talking equipment (clocks/watches, calculators, etc.), book holders, manual and electric page turners, large button phones, speaker phones, large print books, and taped/audio books” (Chris, 2001, p. 1).

**Accommodations**

The eighth category is accommodations to assist persons with physical, sensory, or cognitive disorders. Examples of this aid are “accessible workstations, farm equipment adaptations, and adapted keyboards. Structural adaptations, fabrications in the home, worksite or other areas (ramps, lifts, bathroom changes)” that remove or reduce physical barriers for an individual with a disability are all other examples of this category (p. 1). For example, a person whose disability makes it difficult or impossible to use the stairs could have a stair glide installed in their home so they can access the first and second floors of the house easily. The seventh category provides visual device to assist people with reading and vision around them. The eighth category helps a person with physical problem to access job work materials (Chris, 2001).
Vehicle Modifications

The ninth example of assistive technology is vehicle modifications for persons with physical disabilities. Examples of this aid are “hand controls, wheelchair lifts and ramps, adaptive shoulder and seat safety belts, tie downs and lock downs that secure the wheelchair to the vehicle floor, extended directional mirrors, raised roofs, and adapting driving aids” (p. 1). For example, because students who use wheelchairs cannot access school busses easily, some busses now have built-in lifts and safety belts to accommodate wheelchair bound students (Chris, 2001).

People Who Are Deaf or Having Hearing Problems

The tenth category supports those people who are deaf or having hearing problems. Examples of these devices include “hearing aids, auditory trainers, fm systems, personal amplification systems, group assistive listening systems, smoke alarms with strobe flashers, and door bells with flashing signals, vibrating baby monitors, telephone amplifiers, text telephones, and visual alerting systems” (p. 1). For example, a text telephone would enable business persons who are deaf to conduct business transactions and equipping an entrance with a signal light would alert him/her that someone has entered his/her office. The ninth category deals with devices support with transportation alterations that help a person with physical disability but the tenth category support those who are deaf or have a hearing problem to participate in conversation (Chris, 2001).

Augmentative Communications

The eleventh category is augmentative communications that provide alternative ways for persons with sensory, communication, or cognitive disorders to communicate.
Examples of this technology are speech synthesis head wands and single systems, as well as writing and typing devices like Braille aids, modified type writers and spelling devices. Other examples are “eye gaze boards, voice output devices, spelling boards, pages with picture choices or speaking computers, speech generating devices, communication boards/books, software with a speech output, artificial larynx, devices that produce text but not voice output for face-to-face communication (e.g. Crespeaker), voice clarifiers, and voice amplifiers and stuttering aids” (p. 1). For example, a person with speech impairment can use a voice-output augmentative communication device to effectively communicate with teachers, classmates, and family members (Chris, 2001).

*Individuals with Various Disabilities*

While the eleventh category focuses on individuals with sensory, communication, or cognitive disabilities, the twelfth category supports individuals with various disabilities. This category offers alternative access like “a head pointer, trackball, and alternative keyboard” (p. 1). These devices help people with disabilities to perform the same kind of jobs as people without disabilities do in the work site. While the technology from the eleventh category support those to communicate with people in the society on general communication, technology in the twelfth category focuses more on those individuals with disabilities by proving alternative access information such as alternative keyboard that is easy to use by a person with disability (Chris, 2001).

*Environmental*

The thirteenth category of assistive technology is environmental. These technologies reduce the amount of physical barriers and sensory disorders that keep
people with disabilities from operating various appliances. Examples of these are construction engineering architecture modifications to the living environment, as well as electronic devices like “remote controls, hearing aids, transporting aids, wheelchairs, clappers, ablenet plugs with switch, visual instead of hearing cues (telephone, doorbell), adapted structures, alarm and security systems, door/gate openers, environmental controls and switches” (p. 1). Electronic systems make it easier for people with disabilities to “control various appliances, lights, telephone and security systems in their room, home, or other surroundings and services” (p. 1). For those with vision or reading impairments, there are many electronic technologies that can assist them, such as “magnifying devices like closed circuit television (CCTV) systems, talking scales, blood pressure gauges, glucometers, screen readers, screen magnifiers, Braille displays, Braille-based PDAs and documents” (p. 1). For example, a person with disability can equip home devices that allow a person with disability to control more in their environment (Chris, 2001).

**Computer Access Aids**

The fourteenth category is computer access aids allow those with disabilities like physical disability to be able to access computers. Examples of these aids are “modified keyboards, touch screens, voice to text software, alternative Input Devices, accessible software, special keyboards for one-hand typists, switches activated by pressure, large screen computers with magnified text and images, special software, voice to text software, and talking computers” (p. 1). For example, using voice activated software on a computer enables an individual who does not have full use of his/her hands to write articles without typing on a keyboard. While the environment aids category makes it
possible for those with disabilities to overcome difficulties they face in using devices such as television, computer software and hardware products can be modified to aid students with disabilities who have specific needs, such as a one-hand typist who needs a special keyboard (Chris, 2001).

**Benefits of Assistive Technology**

Dangsaart, Naruedomkul, Cercone, and Sirinaovakul (2008) discussed a unique aspect of how assistive technology makes information accessible to students with hearing impairments is that they may not be able to learn without assistive technology devices. Students who are deaf or have a hearing problem can have Thai text translated into Thai sign language with the Intelligent Thai text (IT). The goal of using Thai sign language is to improve the abilities of communication and to improve access to e-educational devices to gain knowledge and learning skills for those who are deaf or have a hearing impairment. Thai people who are deaf face the problem of the difference between their sign language and second language (Thai) in syntax and semantics. In order to assist students who are deaf or who have a hearing problem, there should be a way to improve their language literacy or skills. When they have strong language skills, they will be able to access the knowledge through assistive devices like “television closed captioning, teletype telephones, and a speech-to-text machine translation system” (p. 1126). When students who are deaf or have a hearing impairment present language weaknesses, they may use either a human interpreter or a machine translation. Computers play an important role in language learning for all students with hearing impairments and students without
them by giving them the opportunity to work on their self-based needs and increase cognitive psychology and education (Dangsaart et al., 2008).

Thibodeau (2010) conducted a study to compare the benefits of adaptive fm and fixed fm systems through the measurement of speech recognition in noise with adults and students in clinical and real settings. The participants of this study were five adults whose ages ranged from 20-55 and five students whose ages were from 11-15 years old. All the participants had moderate to severe hearing loss and were examined using objective and subjective speech recognition in noise measures with two types of fm processing. These two types were: prototype body-worn fm receivers and a special version of adaptive fm transmitters. Findings of the study showed that AFMA processing was significant for improving the higher noise levels for the majority of the participants. In addition, the AFMA processing had resulted in an increased fm advantages after sampling the noise and it exceeded the 57-dB SPL criteria. This study indicated that the two types of hearing aids are important and can be used by students with hearing impairments because students had positive image toward these kinds of aids (Thibodeau, 2010).

Multimedia Assistive Technologies

Telecommunications and multimedia advancements have made it possible to create new learning devices for students with hearing impairments. Cognitive assistance is a collection of application program software used to instruct students through tutorials, drill and practice, problem-solving, and simulations. Multimedia CD-ROM-based application programs encourage reading improvement, which uses talking word processors and CD-based books to read each page of the story, highlighting the words on
the computer screen as they read. Students can click on the pictures to see the definitions and hear the pronunciations. These books are available in all languages, so students can read in their native language while being exposed to a second language. Teachers can modify the material to include video, pictures, and animation based on their students’ needs (Behrmann, 1995). All of the above are forms of assistive technology and help normalize the lives of those with disabilities.

According to Robison and Jensema (1996), the benefit from the use of technology as a tool is that it is easier to adapt to and students can be more comfortable with it. Computer speech recognition software will eventually be very helpful for students who are deaf or hard-of-hearing, but it will take years to apply this technology in that manner. A future area of study is where there are a number of interpretive applications. Advanced technology can be used in such a way that it can be implemented by sign language interpreters, where it could replace the usual methods of translation. When the speed and accuracy of computer speech recognition improves, it is likely to become a standard tool. In the future, the speech recognition computer can be more useful and accrued to students with disabilities such as visual impairment (Robison & Jensema, 1996).

Jerram and Purdy (2001) conducted a study to examine the advantages of hearing aids and the satisfaction of adults who wear them. Jerram and Purdy used the effectiveness of “technology, demographic factors, pre-fitting expectations, attitudes, and adjustment to hearing loss on hearing aid outcome” as factors in the study (p. 64). The participants in this study were 200 adults whose ages were between 31-88 years. The survey was distributed to 200 participants questioning them about the effects of using
hearing aids. The equal number of males and females participated in survey: 81 males and 81 females out of 200. Twelve private and seven public hospital audiology clinics participated in the study. Three methods were used to assess the results of hearing aids: the period of using hearing aids, the advantages of hearing aids, and general satisfaction. The results of this study suggest hearing aid technology influences the satisfaction of people with hearing impairments by improving their abilities to hear in a variety of situations. Counseling before and after fitting may be useful in terms of expectations of hearing aids. The study helps the researcher to include the recommendation of new technology, which will lead to more positive reactions toward the use of hearing aids (Jerram & Purdy, 2001).

Web-based video lectures can further influence deaf students’ learning. In a study conducted by Debevc and Peljhan (2004), 63 deaf students and adults were classified into four groups. This classification was based on how familiar they were with using a computer. Debevc and Peljhan (2004) found the use of web-based video lectures with deaf students was a useful and effective method. Ultimately, the use of technology tools for deaf students’ learning helps them to improve their abilities in learning. In the article, the visual device aid used for deaf students was very useful because they cannot hear. The students will not miss information taught in the classroom if they have to leave since they have the capability to replay the visual device. It helps deaf students with different levels of impairment who do not know lip reading or sign language. Assistive technology is more reliable than lip reading. Students have choices of methods in comprehending materials regarding their level of hearing. This visual device helps to keep students
interested in gaining information because they can improve their lip reading and sign language skills when the information is being presented in multiple ways (Debevc & Peljhan, 2004). It can be clearly seen that visual aids have a positive effect on facilitating deaf students’ learning. They arouse or attract students’ interest in the subject matter.

A good example of assistive technology helping the learner is the human-computer interaction (HCI) software. This field is about more than just the technology of CALL (Computer Assisted Language Learning). According to Hemard (2003), HCI is designed based on the set of learners whom it is assisting. HCI knows its audience; that is why it is so instrumental in helping deaf language learners. Teachers have to take into account the individual dimension when choosing an HCI software program that they plan to use for hearing-impaired students. Assistive technology classes have students with differing scales, abilities, backgrounds, and tastes. Some students, therefore, will have preference for one type of technology over another. Knowing the students’ preference will greatly assist teachers and students in learning. One way to utilize HCI could be to focus on language piecemeal so that when using HCI in addition to assistive technology programs, the learner is better able to manage the program, and HCI provides the teacher with more specialized help. An example of this approach would focus on vocabulary and reading as opposed to teaching all aspects of the language. Practice is also a key aspect in the relationship between assistive technology and its users as assistive technology is good at teaching conventions of English like grammar, vocabulary, and reading. Much flexibility and access has further been gained through devices like external USB memory sticks because it is easier to save large amounts of texts and videos (Levy & Stockwell,
Using a variety of assistive technology, including Computer Assistive Language Learning, is very efficient because it helps both teachers and learners to manage the program.

**Assistive Technology for Hearing in the Classroom**

According to Plumley (2008), children who have hearing impairments are in urgent need of assistive technology tools that help them hear the teacher in the classroom. Teachers should be aware of how these devices are used appropriately in students’ learning environments and encourage them to wear hearing aids in the classroom as a device to assist in language learning. Another device that helps students with hearing loss is a cochlear implant, which is used when students are not satisfied with wearing hearing aids. The implant device requires a certain severity of hearing loss. The child’s brain must learn how to interpret the signals of a cochlear implant. Teachers should pay attention to how a child’s cochlear implant works by observing a child’s attention and participation in class.

In addition, special fm devices can be used in the classroom to accommodate students with hearing impairments. The teacher can wear an fm transmitter that broadcasts his/her voice to a student wearing a receiver. The device also takes care of students’ hearing needs so they can focus on their classes and have a prepared classroom setting. There are alerting systems that help students with hearing aids in case of a fire or other emergency because many schools have sound systems such as smoke detectors that cannot be heard by students with high hearing loss. There are many kinds of hearing
devices that can help hearing impaired students and their teachers in the classroom in order to have a more suitable environment (Plumley, 2008).

Students with hearing impairments need to have access to assistive technology tools. Parents and teachers should work together to help students succeed in classroom environments. Teachers should be responsible to observe and measure the listening devices to determine whether they help students or not. Parents play an important role because they are familiar with the communication style of their children. Children with hearing impairments will not have a hard time understanding their parents when parents talk closely to them. The collaboration between families and teachers is an important relationship in the educational success of the student with a hearing loss. Assistive technology like hearing aid devices gives a child the opportunity to join a community by attending school and learning the language through assistive technology provided in the school (Plumley, 2008).

Students with hearing aids have to be placed much closer to the teacher during classroom language learning. To assist students with hearing loss, a teacher should use visual aids, write particular information on the board, give handouts of the main topic, speak up, face students while speaking, reconstruct or rearrange the classroom setting, explain the ideas in different ways, permit the recording of the lesson, and match students who have hearing loss with those who don’t to work together. These ways of learning help hearing-impaired students learn the language more quickly (Plumley, 2008).
Using Technology to support Hearing

Luft, Bonello, and Zirzow (2009) described the technology skills assessment that they used in their study. The study showed that teachers could use this kind of assessment to judge the computer and assistive technology needs for students with hearing problems in their learning environments. Teachers could use this information to judge the effectiveness of teaching by giving students pre-tests and post-tests and then comparing both results. The study found that students were more likely to have a greater understanding of basic computer functions, the Internet, presentation and word processing software, and general applications than personal assistive technologies. In the majority of schools, the number of students at the “mastery” (Luft, Bonello, & Zirzow, 2009, p. 397) level of hearing aid use was below 50%. In contrast, mastery levels of general applications ranged from 40% to over 90%. In one high school, mastery levels of word processing and presentation software were close to or at 100% while, at the same high school, mastery levels of hearing aids were below 40%. In conclusion, the authors found that students were better able to demonstrate their abilities using computer software and online programs, such as word processing and the Internet, than they were able to use personal assistive technology (Luft, Bonello, & Zirzow, 2009).

According to Keith (2010), through the use of technology, children in challenging circumstances can still access and learn through numerous multimedia frameworks. Different software is available that enables children and students with learning disabilities to read, write, and spell words. There are different forms of software available, including text-to-speech and text in word processing, which can both be used
based on one’s needs. Some types of software help by highlighting text when reading, while others predict or suggest words to the user that facilitate the progression of the work. There are other newer assistive technology products coming onto the market, all aimed at assisting students who are physically challenged, hearing impaired, visually impaired, or able people. One example is a spell checker, which can help students with learning disabilities by giving them a list of words in order to choose the correct spelling of the word they want to write. Overall, multimedia assistive technology has played an effective role in helping students with hearing problems in challenging circumstances (Keith, 2010).

According to Raskind (2010), assistive technology can solve a variety of learning obstacles that students with disabilities face during the learning process. The student who has difficulty writing can use a special program that converts speech to text to dictate a report required by the school. A student who is struggling with math can use a hand-held calculator to keep score in a game while playing with a friend. A student with dyslexia may benefit from assistive technology in language learning by reading aloud and listening to the teacher’s speech. Assistive technology devices today are also common on the Internet, in books, in schools, and through other resources. Examples of assistive technology tools are “abbreviation expanders, alternative keyboards, audio books and publications, online math worksheets, freeform database software, graphic organizers, outlining, information/data managers, optical character recognition, personal fm listening systems, portable word processors, proofreading programs, speech-recognition programs, speech synthesizers/screen readers, talking calculators, dictionaries, and word-prediction
programs” (page. 1). These devices play an important role in many learning environments for students with hearing impairments such as language learning classrooms (Raskind, 2010).

Impact of Assistive Technology

The use of different kinds of technology-related assistance has a significant impact on many aspects of the respondents’ lives. The following majority of students with disabilities benefited by having fewer learning problems because of assistive technology used in the classroom; “nearly 75% of school-age children were able to remain in a regular classroom, and 45% were able to reduce their use of school-related services; 65% of working-age persons were able to reduce dependence on family members. 58% were able to reduce dependence on paid assistance, and 37% were able to increase earnings among elderly persons. 80% were able to reduce dependence on others, half were able to reduce dependency on paid persons, and half were able to avoid entering a nursing home” (p. 2). The Act of 1998 was the result of earlier research study that examined the stigma of wearing hearing aids due to negative attitudes (The Family Center on Technology and Disability, n.d.).

Haley and Hood (1986) conducted a study to evaluate young adolescents’ perception of their peers who wear hearing aids. The subjects of the study were two 13-years-old students. They were individually videotaped reciting the Pledge of Allegiance under three conditions: “(1) wearing a body type hearing aid, (2) wearing a post auricular aid, and (3) wearing no aid at all” (p. 449). The researcher of the study indicated that junior high school students between ages 12 and 15 tended to rate their hearing
impairments in a negative way or more negatively than their peers with normal hearing. The results of the study showed that youngsters’ attitude toward their peers with hearing impairments is related mostly to the presence or absence of hearing aids and quality of their peers’ speech. This study helps researchers to figure out the reactions of peers toward their peers who wear hearing aids. It also points out their attitudes toward the speech that is produced by them (Haley & Hood, 1986).

The purpose of Silverman and Klees’ (1989) study was to determine if both high school and elementary school students responded negatively toward peers who wore visible hearing aids, and what the level of negative response was. They were provided a photograph of a male peer on a semantic differential to determine which word the forty high school juniors and seniors would choose to describe a person with hearing aids. The finding indicated that both students in high school and elementary schools reacted in the same negative way toward their peers with hearing aids. Silverman and Klees (1989) suggested coping strategies toward decreasing the negative reaction toward children with hearing aids, reducing the extent of negative reaction toward children and providing hidden or small hearing devices to children to wear. Students with hearing aids could wear a T-shirt, for example, that has a message that shows they are comfortable with their hearing loss. This could help the other students to feel more comfortable and could also teach them about the issue and the device. Another way to make students with hearing aids more comfortable is to make sure they are fitted with the one that will be the least noticeable (Silverman & Klees, 1989).
Kent and Smith (2006) discussed the factors that help to increase the use of hearing aids by adults with severe to profound hearing loss. The survey was conducted between 40 males and 17 females and their mean age was 23.6. It was designed to determine the potential reasons that impact the use of hearing devices within young and old people. The use of hearing aids was related to the user’s age, degree of the hearing problem, and education setting. Students who have high hearing problems used hearing aids less often. Secondary school students were less likely to use than their peers in elementary school. Students are more likely to use their hearing aids if they think their teacher understands their hearing problems. In terms of previous studies, there was a negative stigma related to the use of hearing aids among the senior citizen population. People who refuse to wear their hearing aids are afraid of not being accepted and how they look. These factors may cause hearing aid users to have low self-esteem. Improvements for increasing the use of hearing aids focus on providing good quality, reducing noise feedback, and improving the aid’s cosmetic appearance. It is also suggested that improving society’s acceptance of hearing loss and hearing devices will improve listening stress management. Other solutions to improve the use of hearing aids are to make the devices more affordable and to stress that their use is necessary (Kent & Smith, 2006).

Another article by Kent and Smith (2006) discussed why people do not wear hearing aids for reasons other than perception. These authors found that reasons for not wearing hearing aids are these devices are not affordable and not easy to use. Psychosocial aspects are factors the researchers discussed. In this study, 16 adolescents, 8
male and 8 female, were the interviewees ages 12-17. The results discovered factors for not wearing hearing aids that people with hearing loss want to appear normal and do not want comments/questioning from peers. The factors for acceptance of wearing hearing aids were those of users of hearing aids who or that had positive relationship with hearing peers and had a strong sense of identity. Having positive relationships with hearing peers and a strong sense of identity were the factors for hearing aid users to accept their hearing devices (Kent & Smith, 2006).

Most and Aviner (2009) discussed the auditory, visual and auditory-visual perception of emotions by individuals with cochlear implant, hearing aids and normal hearing. They studied the benefits of cochlear implants in regard to their emotional perception by the user. Emotion perception was examined by having the participants identify happiness, anger, surprise, sadness, fear, and disgust (p. 449). The results of the survey found that auditory identification was better among the group that had no hearing loss. Those with hearing loss often had difficulty with nonverbal cues of emotion (Most & Aviner, 2009).

Hearing Aids

Typical Use of Hearing Aids

According to the American Speech-Language-Hearing Association (n.d.), 35 million children and adults have hearing impairments in the United States. Less than 25% of people with hearing problems have gotten hearing aids. An audiologist certified by ASHA (American Speech-Language-Hearing Association) notes the use of hearing aids by people in helping with focusing the sounds’ direction, improving listening in loud
conditions, and providing better hearing. Hearing aids help make speech over the telephone clearer, in small or larger group listening settings such as restaurants, concert halls, and movie theaters, and hearing aids help to hear sounds at a distance. There are a variety of hearing aid models that a person with hearing problems can choose from depending on their diagnosis and the severity of their hearing loss.

After assessing reasons why some twenty million United States citizens do not use hearing aids for their hearing loss in a survey, Sergei Kochkin (1993) came up with some interesting explanations. The first was that a stigma is attached to hearing assistance instruments. The second was that a person’s hearing loss is not serious enough to warrant using a hearing instrument. Next, in terms of importance, hearing aids are not comfortable or perhaps they might not work well. Fourth, many thought hearing aids were used solely for specific hearing problems. The last reason was that while hearing aids may be somewhat needed, the cost of buying them outweighs the need of the hearing loss sufferer. This information was gathered through a survey which questioned the participants on perceived degree of hearing loss, and perceived use of hearing assistance equipment (Kochin, 1993).

Vestergaard (2006) conducted a study to examine the self-report outcome in new hearing-aid users. Out of all the participants, twenty-five wore hearing aids. The users who initially wore hearing aids for more than four hours a day reported that there was greater effectiveness from hearing aid usage on their hearing problem compared to returning users or those who used hearing aids less than four hours a day. This study indicated that the effectiveness of using hearing aids by students or other users of hearing
aids consistently improved hearing for those with hearing impairments if the hearing aid is used more than four hours per day.

Davis (2003) conducted a study to explore if individuals whose ages ranged from 55 to 74 years old would have advantages from hearing aids, particularly for those who do not use hearing aids or give serious thought to using them even in noisy situations. The method used in this study to choose participants having one of four components: 1) those who possessed a hearing aid, 2) those who replied yes they have a problem with their hearing, 3) those who replied no they do not have a problem with their hearing, and 4) those who agreed to come to the clinic for a hearing test. For clarification, 623 people were selected for in-depth interviews concerning their hearing attitudes to hearing and hearing services of whom 506 were subsequently visited by an interviewer in their own home. This resulted in 351 participants agreeing to come to the clinic for a hearing test. The results showed that 6% of individuals with hearing loss wore their hearing aids. The study revealed that more participants do not use their hearing aids, and that users who had great cognitive function may benefit from hearing aids (Davis, 2003). The study helps this researcher understand the different perceptions between hearing aid users and what the actual hearing test indicated about the hearing loss.

Perceptions of Hearing Aid Use

In 1989, Brooks examined the perception of people prior to obtaining or using a hearing aid. The overall goal of that study was to determine the perception of hearing aid usage prior to the person receiving the instrument. A survey was distributed to two hundred participants (100 = control group and 100= experimental group) questioning
them about their feelings toward hearing aids. Findings of the study revealed that positive 
attitudes led them to use the instrument properly, and negative attitudes toward the use of 
hearing aids could be changed through counseling. The researcher suggested that the 
attitudes played a key role in helping those who have hearing loss to accept the use of 
hearing aids. This method revealed atypical attitudes that can bring about better use of 
the hearing aid (Brooks, 1989). Brooks’s (1989) study will provide a useful model for 
this current study of a methodological approach (e.g., questionnaire) to determine 
perceptions of those who use hearing aid devices.

McCarthy and Barry (2001) conducted a study to examine the link between 
personality type and the awareness of the benefit of hearing aids. The participants of this 
study were sixteen male veterans whose ages ranged from 60-75 years old. All the 
participants had worn binaural hearing aids (for both ears) for a minimum of one year. 
The Keirsey Four Types Sorter was the instrument used to measure personality type 
including 16 items and four responses for each item. Findings of the study showed that 
personality type may influence expectation in terms of hearing aid benefit. This study 
suggests the most important part of successful awareness of the benefit of hearing aids is 
personality type. This article gives the researcher one idea of why students do not wear 
hearing aids. Certain personality types may require more counseling than other 
personality types to be successful in using hearing aids (McCarthy & Barry, 2001).

According to Stark and Hickson (2002), the effects of hearing aids on the lives of 
people with hearing impairments and the significant others are important. There were 
questions asked to people with hearing impairments and their significant others; the
researchers wanted to see if hearing aids improved the quality of life for people who have hearing impairments and of their significant others. The participants were 88 males and 43 females between the ages of 47 to 90. Thirty-eight cases were excluded for missing data and the survey was self-reported. The results showed a positive improvement in hearing for the person with hearing impairment and their significant others following hearing aid fitting, but the impact was not significant for their health. This study demonstrates people with hearing impairments perceive a positive improvement in their quality of life and their communication with others (Stark & Hickson, 2002).

Humes, Wilson and Humes (2003) conducted a study to discuss the differences between three senior groups who used hearing aids connected by gender, age and hearing loss. There were 200 participants in this study whose ages ranged from 60 to 89 who had hearing loss. The authors created three groups, one group of 26 participants declined hearing aids, one group of 24 who started using hearing aids and later returned them, and a third group of 26 who were initially using hearing aids for the first six months. The methods used in this study were audiological evaluation and questionnaires. The authors have found that there was no difference on two scales used in the study between those who used hearing aids for six months and those who started using them and then returned the hearing aids, but the group who kept their hearing aids had “better finger dexterity and higher loudness discomfort levels than those who did not use” (Humes, Wilson & Humes, 2003, p. 432) hearing aids. The significance of this study is that it gives a way to
counsel those who reject the use of hearing aids and avoid the communication problems connected to the rejection of using hearing aids.

A study conducted by Joore, Brunenberg, Chenault and Anteunis (2003) goes beyond the traditional patient perspective and examines hearing aid fitting from a societal viewpoint. The participants in this study were 80 individuals with hearing problems whose ages were from 18 years and older. All the participants had hearing impairments with moderate hearing loss. The results of the study showed that hearing aid fitting solved the issues with paid work who used hearing aids, but did not impact unpaid work that used hearing aids. This study indicated that students and other users who used hearing aids saw consistent improvement in their hearing if the task was rewarded or waged. However, the results of the study were inconclusive regarding paid and unpaid work (Joore et al., 2003).

In the article by Appleton and Bamford (2006) the assistance of hearing aids to children in their classes and daily lives was discussed. The authors questioned children with hearing aids and their parents about the benefits of hearing aids in the children’s lives at home and at school. The authors asked 16 children (between seven to eleven years old) and their parents to fill out the questionnaire. The results of Appleton and Bamford’s (2006) study showed that 88% of the time, children’s perceptions of hearing aid use was more positive than their parents’ perceptions. Some parents and children differed from other parents and children on how to describe the beneficial or non-beneficial uses of hearing aids. The study also found that the different outcomes between the parents and children were not affected by the degree of the child’s hearing loss.
Rather, the parents were less likely to view the hearing aids as effective because they were not using them; they did not understand the benefits and they did not spend enough time with their children to know how much hearing aids were helping. In general, parents overestimate the amount of hearing problems in their children and children underestimate the amount of their hearing problems. There were many factors that could contribute to this outlook, one being that the effects of social stigma related to hearing aid usage were less among children than adults, and another that the sample size of this study was simply too small. More research is needed to contribute to a more accurate understanding of different views (Appleton & Bamford, 2006).

Vestergaard (2006) conducted a study to examine self-reported problems among twenty-five first time hearing-aid users. The users who initially wore hearing aids for more than four hours a day reported that there was a greater improvement of their hearing problem due to hearing aid usage, compared to continuing users or those who used hearing aids less than four hours a day. This study indicated that the effectiveness of using hearing aids by students or by other users consistently improved hearing of those with hearing impairments if the hearing aid was used more than four hours per day (Vestergaard, 2006).

Vuorialho, Sorri, Nuojua, and Muhli (2006) conducted a study to examine the use of hearing aids in Finland in comparison to a similar study by Sorri, Luotonen and Laitakari (1984) done twenty years earlier. In Vuorialho et al. (2006), there were “76 first-time hearing aid users with a mean age of 73.8 years” (p. 356). Interviews were conducted by an experienced audiology assistant who did not participate in the fitting
process. The audiologist was able to assess the skills of participants in using their hearing aids, and asked the participants about their overall attitudes toward the use of hearing aids. “The results showed that at the time of the interviews, 56.6% were regular users, 36.8% were occasional users, 5.3% were non-users, and one participant lost his hearing aid. In contrast in the 1983 study, 40.9% were regular users, 25.8% were occasional users, and 33.3% were non-users” (Vuorialho et al., 2006, p.355). The findings of the 2006 study revealed that more participants used their hearing aids, which suggests that recently, more people are using their hearing aids (Vuorialho et al., 2006). The study helped to understand some ways to increase positive attitudes toward the use of hearing aids.

Rawool and Keihl (2008) conducted a study to examine the perception of non-hearing aid users about their own hearing abilities and communication proficiency. The participants surveyed in this study were 30 adults whose ages were between 65-89 years. The survey questioned participants about their own hearing abilities, their feelings toward hearing aids, and their ability to communicate successfully with others. Findings of the study revealed that 63% of the participants had audiometric hearing problems and 32% of them were either unaware of or denied having such problems. The results of the study showed that 60% of those who have hearing problems believed that others were aware of this hearing problem, and 13.3% of those who thought that they did not have hearing problems believed other people still treated them as such. It was found among socially active older individuals that perception of mumbling was related to the acceptance of hearing loss. The findings of the study revealed that socially active individuals deny
hearing loss or may not be aware of their hearing loss; however, the majority of the participants, 93%, could not afford to purchase hearing aids because they are too expensive.

Rawool and Keihl (2008) suggested that it is necessary to explore and design programs in order to raise individuals’ awareness about their hearing loss, and that peers and friends can play a key role to help those who have hearing loss to accept their problems. It is necessary to design programs that focus on the importance of using modern hearing aids in order to positively change the image of hearing aids and hearing loss. The study helps the researcher to include the recommendation for schools to design programs in order to help some students recognize their problem (Rawool & Keihl, 2008).

Roup and Noe (2009) conducted a study to examine the effects of hearing aids, including hearing handicaps, advantages of hearing aids, and hearing aid fulfillment, for listeners with initially “high-frequency sensorineural hearing loss (HF SNHL)” in completely-in-the-canal (CIC) hearing aids (p. 48). In this study, three surveys were distributed by mail to 79 participants divided into two groups whose ages ranged from 38 to 79 years old; 53 of them returned the survey with completed answers. The results showed that listeners with “HF SNHL realized the benefit of and satisfaction from amplification with CIC hearing aids, and those individuals with HF SNHL are candidates for this type of hearing aid” (Roup & Noe, 2009, p. 48). This study helps to make clear the methods for measuring hearing aid users’ satisfaction and the benefits of amplification with CIC hearing aids” (Roup and Noe, 2009).
Hearing Aid Awareness

The following article provides information about the usage of hearing aids. According to “Audiology Awareness Campaign” (2007), Americans usually wait seven years before taking action and seeking a health care professional to treat their health problem related to hearing. Hearing aids provide users with an opportunity to benefit from using them. Hearing aids can be very helpful for a person with hearing loss. Since hearing problems vary from person to person, several microphones as part of a hearing aid may be particularly helpful for discrimination and localization in both noisy and quiet situations. The patient should talk to the audiologist about the many options for microphones. To exploit the full benefits of hearing aids (especially when it comes to size), it is in the patient’s best interest to listen to the advice of the audiologist. It is essential for the patient to recognize that his/her choice of hearing aids can influence someone else who may need them. The article states “If you do not seek help you may experience some of these. They include depression, anxiety, anger, hostility, frustration, embarrassment, lower self-esteem, increased feelings of isolation, resentment, paranoia, and avoidance” (p. 2). People around the individual with hearing loss could impact him/her by advising him/her of the advantages of wearing hearing aids (“Audiology Awareness Campaign,” 2007).

The individual should realize that not using hearing aids will have a negative impact on human relationships. It is necessary for one to adapt to using hearing aids by getting advice from audiologists. Hearing aids cannot always provide what one expects regarding hearing improvement. The user should be aware of two potential limitations
with hearing aids: “the physical hearing aids themselves and their effectiveness during the use” (p. 3). “Daily hearing aid maintenance should include handling them carefully, keeping them away from pets, and avoiding all airborne chemicals like aerosols (deodorants, perfumes, hairsprays)” (p. 3). It is natural that fear or aversion takes place when one is exposed to unfamiliar things. However, while gathering information and making attempts to obtain and use hearing instruments, individuals will begin to see the benefits and these devices will become important tools that they cannot live without. It is important to understand that individuals should get advice from audiologists, not just physicians, and also, that individuals need to be aware of both the benefits and limitations of hearing aid use. The article provides an overview of how hearing aids support people with hearing impairments (“Audiology Awareness Campaign,” 2007).

Meister and Wedel (2003) conducted a study to examine whether a difference existed between old and young users of hearing aids in terms of parameters of hearing improvement. In their study, 200 hearing aid users participated who were between 15 and 91 years old. One of the results showed that old and young users of hearing aids perceived noise in speech perception as the most common problem with their hearing aids. The findings of the study revealed that both young and old participants used their hearing aids equally (Meister & Wedel, 2003). This study suggests it is important to measure students’ perception of the benefits of using hearing aids when it is crowded or noisy, and that early use of hearing aids can translate into life-long use.

Erber (2003) conducted a study to explore the effects of different types of sensory loss in daily communication and how the non-auditory aspects to aging impact the ability
of individuals to live on a daily basis with their hearing aids. The participants were elderly people who used hearing aids and who the author interviewed face-to-face. The author found that the persons with multi-sensory loss required assistance from a communication partner, such as talking slowly and loudly, speaking from a shorter distance, and most importantly, using hearing aids. Findings of the study suggested for hearing aid users to increase the period of wearing hearing aids, improve self-assessed benefits from hearing aids, increase their conversation fluency, and decrease stress and worry in both users and non-users of hearing aids (Erber, 2003). This study indicates that the most important part of successful uses or benefits of hearing aids pertains to extending the period of wearing them (Erber, 2003).

Hallgren, Larsby, Lyxell, and Arlinger (2005) conducted a study to discuss hearing aid effectiveness regarding word recognition and cognitive tasks necessary for speech awareness in both quiet and noisy situations. The participants of this study were young and adult individuals with hearing loss who wore hearing aids for a minimum of nine months and whose ages ranged from 25 to 80 years old. Findings of the study showed that cognitive tests represented fewer benefits of using hearing aids in objective measures and found the participants strained less when using hearing aids (Hallgren et al., 2005). This study suggests that the age of hearing aid users does not have an impact on the benefit of hearing aids use. It gives the researcher of this study an idea about students wearing hearing aids do not have to use so much effort in order to be able to hear.
Kim and Barrs (2006) built their article based on previous studies in order to examine the current hearing aid technology. The study suggests that using hearing aids with new technology will be better for those with hearing impairments to improve their hearing abilities; this leads to more positive reactions toward the new technology of hearing aids than the current negative reaction that exists. The article discusses the type of hearing aids which gives the users an option to choose either monaural or binaural hearing devices, size or kind, and type of circuitry. Having more types of hearing aids, such as ones that are open-fitting or use digital signal processing, gives opportunity for individuals with hearing impairments to choose the best hearing aid for them. This may help them feel more positive toward using hearing aid and ultimately benefit more from hearing aid use (Kim & Barrs, 2006). This study shows various views of the types of hearing aids that might improve students’ attitudes toward the use of hearing aids.

**Challenges of Those with Hearing Impairments**

According to Fujikawa and Cunningham (1989), a group of executives were surveyed to determine their attitudes and practices concerning hearing loss. “One-third of the executives had not had a hearing test in the past five years” (p. 357). Executives with “poorer hearing were less likely to complete the hearing test, and 14% of executives rated their own hearing as poor, but only two of them actually wore hearing aids” (p. 357). “Ninety percent” of the executives reported that they felt hearing aids would be effective in combating hearing loss, but two-thirds believed in the hearing aid stereotype, i.e., that hearing aid is connotative of old age (p. 357). This study shows that there is some discrepancy between hearing aid use and thoughts on hearing aids among executives who
are often in highly influential position. Most participants claimed that they did not feel hearing aids represented an old age and were a useful tool in combating hearing loss, though only two respondents were actually using them. Clearly, in some way, the executives were not comfortable with using hearing aids even though many needed them (Fujikawa & Cunningham, 1989).

The study by Erler and Garstecki (2002) aimed to discuss the difference between hearing loss and hearing aid use by females in the following age groups: “35-45 years, 55-65 years, and 75-85 years” (p. 83). As stated in the study there are negative attitudes toward hearing loss and the use of hearing aids are often dependent on age. The study found that stigma toward hearing loss and hearing aid use in this particular age group of women is normal. People do not properly use hearing aids because they feel stigma so the act of refusing to use hearing devices is viewed as denying that they have a hearing problem. In the article, the researchers state that there is variability of stigma related to hearing loss and the use of hearing aids in women of advanced age. The scholars claim that refusal to use hearing aids has to do with one’s stage in life and beliefs. Younger women may not admit hearing loss and the need for hearing equipment while elderly women based on their career demand may become more familiar with the hearing devices. It is true that the use of such gadgets is viewed as a sign of aging despite the benefits to the users. Therefore, the authors encourage counseling of clients before they adapt to the use of hearing equipment (Erler & Garstecki, 2002).

Gatehouse, Naylor, and Elberling (2003) conducted a study to examine the benefits of hearing aids in relation to the communication between the user and the
environment. Fifty students who wore hearing aids and had hearing problems participated in this study. The experimental design method was used in this study to understand ways that listeners benefited from the more complex processes of wearing hearing aids. The study contained a test of cognitive ability together with speech identification. Findings of the study revealed that the users who scored higher on the cognitive test understood speech more than the users who scored lower on the cognitive test. Gatehouse, Naylor and Elberling (2003) recommended the use of more complex hearing aids in order to improve the level of hearing quality for all users of hearing aids. It is necessary to produce more hearing aids that fit users’ characteristics in order to maximize their hearing potential. The study helps the researcher to consider the complexities involved in the „real world” (e.g. classroom) environment that students who wear hearing aids should contend with, as opposed to testing results in a “controlled environment” (e.g. laboratory) (Gatehouse, Naylor, & Elberling, 2003).

The study by Bauman (2004) examines whether users have any expectations when using hearing aids. Hearing aids are tools to decrease hearing loss, but it is no cure for hearing loss. People who wear hearing aids need time to adjust to them and their sounds. They cannot discern unclear sounds unless they are in quiet area. People who wear the hearing aids should be ready psychologically and accept the fact that they need them. They need to find the best hearing aids to fit their needs. Ultimately, when they become familiar with using hearing aids, they would realize the usefulness of the aids which have brought convenience to their daily routines (Bauman, 2004).
Cox, Alexander and Gray (2005) conducted a study which found the reasons why only 23 percent of hearing-impaired adults actively sought out hearing aids and used them, when the elderly that did use them reportedly have led longer, happier, and healthier lives (p. 12). As one possible reason, the study looked at the personalities of those who used hearing aids and observed if they were different from the general population. A cross-sectional survey was set up and collected from 230 adults with hearing impairments, all of whom were seeking hearing aids. The results showed that those seeking out hearing aids were more pragmatic as well as more routine-orientated than the general population. This group of people tended to be less creative in finding new ways to deal with complex problems, not limited to hearing loss. They tended not to use a social support system in solving problems. In conclusion, this population, while in the range of normal, displayed characteristics that set them apart from the general populace. The data clearly points to the need for better publicity and public education about the benefits of using hearing aids (Cox, Alexander & Gray, 2005).

Hendricks (2005) discusses how seniors are treated in society in terms of getting a job. There is always a bias against the elderly that they cannot do what young people do in the work environment. A 2002 opinion poll, conducted by the Office of Management and Budget, shows that when people age, there are fewer differences between them than young people. The prevalent stereotype against of seniors is that everyone thinks they are old, mad, grumpy, greedy geezers. Regarding this study, the old people will not choose to wear hearing aids because they are afraid other people would become more biased against them (Hendricks, 2005).
The article by West and Smith (2007) aims to “describe the development of the measure of audiologic rehabilitation self-efficacy for Hearing Aids (MARS-HA), which was constructed in accordance with published recommendations for self-efficacy questionnaire development” (p. 759). The survey was distributed to 83 new users of hearing aids and 128 veteran users of hearing aids. The results showed that the background noise, the concern about appropriate aids such as changing the battery, and volume control adjustment were the main reasons for not wearing hearing aids. “The results revealed strong internal consistency and good test-retest reliability in both groups, with the followings subscales identified both for the new users and the experienced users: (1) basic handling, (2) advanced handling, (3) adjustment to hearing aids, and (4) aided listening skills” (p. 759). Because it measured both new and older users of hearing aids, it was important to see if the questionnaire was independently valid to both groups. Studies found that overall there were no differences in self-efficacy (West & Smith, 2007).

According to Dancer (2009) depression is a severe problem that negatively influences person’s feelings, and the way they think they act. Hearing impairment comes with many challenges, especially for older people because of this type of technology. This particular study found that the older people with untreated hearing conditions oftentimes experienced a sense of loss and grief. Many users of hearing aids mentioned the usefulness of using them, ranging from improved relationships at home, to a new sense of freedom with family and friends. Family members of hearing aid users also expressed changes in the lives of the users, therefore improving relationships among them and leading to more recommendations of using such aids to other hearing impaired
persons. Some non-users of hearing aids indicated that they did not find any reason for using the hearing aids since they did not have any hearing impairment. Others mentioned the cost of these hearing aids as a reason for not considering their use and states that hearing aids made the users appear older. The family plays an important role in advising their family members to seek ways to improve their hearing. The author reported that wearing hearing aids is a good way to improve the well-being of those who really need them, since hearing aids could improve their communication. Emotional, psychological social and physical well-being as well as life skills could be improved by seeking help to reduce the loss of hearing. The advantages of treating hearing loss are enormous. They include: the possibility of greater earning power, communication, intimacy, warmth in family relationships, control over life events, increased perception of mental function, physical health, and social participation, lesser occurrences of discrimination, anger, sadness, paranoia, anxiety, social phobias, and self-criticism (Dancer, 2009).

**Reasons That People do not Wear Hearing Aids**

The study by Ross (1995) indicates that “twenty percent” of adults who have hearing loss need to use hearing aids, but they do not use them (p. 1). The first step in helping a person with a hearing problem would be to have that individual admit the fact that they have a hearing problem, and help him or her become motivated to wear an aid. If the person is not motivated to seek help, or if they deny the fact that they have a hearing problem, then little could be done to help them. The author mentions some important reasons related to not using hearing aids. The first one deals with people’s age; for a senior citizen it may not be easy to accept new things. The second reason concerns
the new challenges a person with hearing loss faces, such as the change symbolized by having to wear a hearing aid. When choosing a hearing aid, some people with hearing loss may focus on the public attention to cosmetic appearance and be dissuaded to purchase one even if it really helps them. People should know the advantage of hearing aids is their function, not cosmetic value. The third reason is related to the person’s apparent disability; a person may start feeling she or he is disabled so the society will not accept him or her as normal. Another reason is associated with the high cost of hearing aids, which prevents people from purchasing them. Lastly, people who have used hearing aids before and found them useless are more likely to have developed a negative stereotype toward hearing aids (Ross, 1995).

In another article by Kochkin (1995), he lays emphasis this time on consumer satisfaction. The data of this study came from 1200 consumers who answered a 34 item survey. According to the author, the users of completely in the canal (CIC) hearing tools have a rather positive attitude toward the use of these devices because they are more cosmetically attractive, user friendly, high performing, and technologically useful. There are other advantages of using a CIC hearing tool: it raises gain and output, which reduces problems associated with the sound quality, thereby enhancing the reception. CIC instruments have been able to attract younger and new users to the hearing instrument industry. This study is very useful to those who consider using the CIC type of hearing aid (Kochkin, 1995).

Building on his previous research, Kochkin (2000) studied hearing aid users and found the reasons that hearing aids are not used are that statistically, “10.6%” of the users
with hearing aids "in the drawer’are satisfied with the product, “27.1% are neutral, and 62.3%" are dissatisfied (Kochkin, 2000, p. 35). The subjects cited varying reasons for not using hearing aids. The first reason was poor benefits, which suggested that three in ten hearing aids are put in the drawer because users do not perceive any benefit from wearing them. Other problems are background noise, fit and comfort, negative side effects like pressure in the ears, blisters in the ears, rashes in the ears and other issues. More than 90,000 consumers reported they could not afford the cost of hearing aid maintenance. Other reasons that came up included that hearing aids are broken and that the sound quality of the hearing devices was poor. Others, about 50,000 consumers, did not mention any reason for not using their hearing aids, and more than 40,000 customers were not comfortable with the volume control of the devices. The author identified many reasons why individuals do not use hearing aids, but most importantly among them was customer dissatisfaction. Based on Kochkin’s research, there was every indication that when these challenges are addressed, users may no longer refrain from using hearing aids (Kochkin, 2000).

Because most studies like the previous one have found that hearing aids users are over 60 years of age, Meister, Lausberg, Kiessling, von Wedel and Walger (2002) examine the relationship between the hearing needs of the elderly and the importance of hearing aids within that group. A questionnaire was sent to 200 random sample of 200 hearing aid users. The study found that the older the user became, the more concerned he or she was with the "handling" (Meister et al., 2002, p. 1) or maintenance of the hearing aid. Presumably this is because as age increases physical skills decrease,
making it difficult for the user to effectively take care of the device. Battery problems were a recurring issue as well as insertion problems of the machine into the ear. As modern technology adjusts to these problems, these issues should gradually disappear over time. Many hearing aids now have automatic volume adjustments, but battery issues may still remain. Overall, the overwhelming majority of hearing aid users surveyed in this study were satisfied with the results of their hearing aids (Meister et al., 2002).

In another study, Mansfield and Taylor (2004) examined any barriers that might exist in the use of hearing aids among elderly hearing aid users and those who reportedly had hearing problems, but did not use hearing aids. The survey took place in nursing homes and brief interviews were conducted. The study found that many in the nursing homes had hearing problems but did not have a hearing aid; for them, the main problem was neglect. Those with hearing aids reported that they had problems with the ‘fit’ of the hearing aid; they said that it was uncomfortable and inconvenient, and at times the aids did not work well. The study shows that there are several factors that caused problems to hearing aid usage. There seemed to be a lack of knowledge about hearing aids in nursing homes. Encouraging change at the institutional level would be a major way to address this problem. This study demonstrates the importance of educating both the hearing aid users and institutions about the use and benefit of hearing aids (Mansfield & Taylor, 2004).
Attitudes

*Parents’ Perspective Toward Hearing Aids*

Steinberg, Krantz, Kaimal, Ewing, Soslow and Lewis (2007) interviewed twenty-four parents whose children had been referred for genetic hearing loss tests using qualitative methods. Interviews showed that many parents felt personally responsible and sometimes were relieved at knowing about their children’s hearing loss. Perceptions of hearing loss were shown to be somewhat based on past experience with hearing loss. This study especially brought to light the fact that the genetic scientists who are responsible for conducting the test need to be trained on how to deal with different families and how to communicate the benefits of the test (Steinberg et al., 2007).

The study by Sorkin and Zwolan (2008) is about parents’ attitudes toward cochlear implantation in children during their early years. It examines ethnicity and income to see their effects on parents’ attitudes. The researchers handed out a four-page retrospection survey to the parents whose children had cochlear implants. The parents were randomly sampled and totaled three hundred. Attitudes toward cochlear implants were found to be different based on economic status and ethnicity. Early intervention professionals are most commonly found in higher income families and, therefore, they have a higher opinion about these procedures (Sorkin & Zwolan, 2008).

Sjoblad (2010) in his study aimed to find the age when young children should be diagnosed with hearing loss and fitted with a hearing aid and the reason why there was a delay between identification of hearing loss and hearing aid fitting. The author questioned parents aged 22-54 that had children with a hearing loss. The 45 items of the
survey were divided into three parts, multiple-choice questions, open-ended items and their opinion. The majority of respondents were mothers-89%, fathers-7% and 4% included grandmothers and legal guardians. The median age of testing for hearing loss was 18 months and the hearing aid fitting occurred at 20 months. Parents reported the reasons for delay between identification of hearing loss and hearing aid fitting as follows: need for more appointments, waiting for follow up appointments, difficulties related to third-party payments, complications with child’s health, difficulties with ear molds, seeking second opinion, and not being ready. Sjoblad (2010) recommended cooperation between parents and audiologists to have benefits of hearing aids for their children. This cooperation according to Sjoblad, would be the key to successful outcomes for parents and their children (Sjoblad, 2010).

Lockey (2010) explored experiences surrounding hearing aid use and non-use in older women with hearing loss. The narrative approach was used to gather information about the issues that impact senior women’s use of hearing aids. The four women participating in this study were aged from 60 and 85. The results showed that meaningful participation could happen without using hearing aids, but when hearing aids were not used the women needed other support communication strategies such as “transferring the burden of communication to others” and “opting to use other communication methods” (Lockey, 2010, p. 5). The women faced three difficulties that kept them from participating in activities they desired to be a part of. The first difficulty was unfamiliarity with the problems of hearing loss. The second reason was a lack of understanding of negative social outcomes of hearing loss. The third reason was that
background noise can be a problem. The benefits of wearing hearing aids could be enhancing their social lives and engagement with others. Thus, these women altered their behaviors based upon their perceived abilities to experience meaningful engagement. One can conclude that since hearing loss is experienced independent of age, the results of this study have applied audiologic research, and practice (Lockey, 2010).

**Attitudes Toward Hearing Aids in the Developing World**

The study by Saunders, Cienkowski, Forsline and Fausti (2005) examined the attitude of patients toward hearing loss and hearing aids. The study showed that hearing aid usage is lower among elderly individuals. This study was based on data from 325 subjects, ages 45-86, with sensor neural disabilities. The study found that continued users of hearing aids reported using hearing aids to be less detrimental to their perceived personal image than new users. On the other hand, the author found that women think effective communication is more important than men and men more often refused to wear hearing aids than women. This study provides some useful explanations of people’s refusal to address hearing loss, negative associations, and negative coping strategies (Saunders et al., 2005).

Marttila and Karikoski (2006) conducted a study to examine the issues related to children’s use of hearing aids with a focus on hearing loss variables and detection delay. “The subjects were 328 children and adolescents( 58.5% boys and 41.5% girls) aged 1-18 years with hearing loss of ≥ 30 dB HL in the better ear fitted with hearing aid(s)” (p. 475). All the participants had hearing impairments. Bilateral use of hearing aids was more common than unilateral in the years preceding school entrance. The author found that the
number of children who do not use their hearing aids increases with age, and that the females used hearing aids more than males. Findings of the study showed that early detection of individuals with hearing loss helps to increase the number of bilateral hearing aid users and decrease nonusers. However, some children prefer not to use hearing devices because of several reasons. Some children rely totally on sign language, some who have not benefited from using hearing aids refuse to wear them, and some cope or communicate without wearing hearing devices because of their family’s lifestyle or attitudes (Marttila & Karikoski, 2006). This study suggests the most important part of successful treatment is early diagnosis for those with hearing problems. This article gives the researcher an idea of why students do not wear hearing aids. Students can be affected by their families’ negative attitudes. These negative attitudes can also impact the students’ perceptions of hearing aids as either positive or negative.

Jongejeugd, Verschuure and Evenhuis (2007) examined a different population to understand hearing aids use: individuals with intellectual disabilities (ID). Often rehabilitation with hearing aids among those with ID fails despite the fact that there seems to be an increased risk of hearing difficulties among that population. The basis of this study is formed around two questions: first, does the general population contribute to the satisfaction or disabilities of people with IDs? Second, what is the relationship between those with IDs who also have hearing difficulties and satisfaction with hearing aids? This study was focused on sixteen adults who had both intellectual disabilities and hearing impairments. The study presented a descriptive analysis over a six-month period. Results of this study showed that 14 out of 16 participants’ respond were reliable
answers. Some of these participants expressed desire for having hearing aids that were more cosmetically attractive, and very few had positive expectations about their hearing aids. Most were, in some way, depending on careers that assisted them. The conclusion that this study produced was that most people with IDs are capable of expressing their views about hearing aids. Users’ expectations do seem to play a role in their general satisfaction of hearing aid use (Jongejeugd, Verschuure & Evenhuis, 2007).

A study by Meister, Walger, Brehmer, Van Wedel and Van Wedel (2008) showed that a connection exists between pre-fitting expectations and willingness to use hearing aids. In the past decade, digital hearing aids have been manufactured for those with hearing impairments. Assistive technology that improves hearing challenges the mixed reactions of would-be users of hearing aids. For example, the cost of hearing aids is one of the issues that people had mixed reactions about. There are many negative attitudes that are formed among non-users about those who use hearing aids. Fewer women had negative stereotypes toward hearing aids than men. The results showed that most of those tested were older than 60 years of age. Hearing aids help users to improve the quality of life (Meister et al., 2008).

The study by Metselaar, Maat, Krijnen, Verschuure, Dreschler and Feenstra (2009) was conducted to assess whether hearing aid fitting improved general and psychological well-being and reduced hearing problems and handicaps. The participants of this study were 163 males and 91 females whose ages ranged from 29-95 years old and all of them had hearing impairments. Two different procedures, unilateral and bilateral, for fitting hearing used in the study, both procedures were useful for participants reducing
self-reported hearing loss. The results showed that there was no significant difference between a group that used hearing aids for the first time and a group that was not able to adjust their hearing aids. Wearing hearing aids is more important than the particular method used to fit them. This study indicated that the use of hearing aid fitting did not change the value of people’s lives and happiness. Wearing hearing aids is the most important part than the partial method used to fit them (Metselaar et al., 2009).

Stephens, Lewis, Davis, Giannopoulos and Vetter (2001) examined the issue of using hearing aids. Senior people in this study felt isolated when wearing hearing aids for several reasons. The first reason was that there was an inferior market for seniors to get hearing aids from. Another reason was hearing aids users were not receiving the full potential of hearing aids. People worried about the social acceptance of using hearing aids. Over time, the United Kingdom has made a good gain and development of hearing aids and has seen improvement of services of hearing aids. As a result of the increase in the training of professionals, improvements have been made with hearing aids. The results of the survey indicated 14.7% of the adult population had a hearing problem. The results of this study showed 3.99 % fit in the category of patient, aged 65 and over. The survey was completed by patients three months after hospital discharge. The survey contained 127 questions on several of the soicomedical reasons during their hospital experience and consequent support (Stephens et al., 2001).

There was an examination as to why people who need hearing aids do not get them. The study by Trychin (2003) was performed by “the National Institute of Deafness and Other Communication Disorders (NIDCD)” (p. 1). They found that out of the 28
million Americans that probably needed hearing aids, only six million users actually had them. The study found that some simply did not know that they had hearing loss while others were in denial. Other answers revealed negative attitudes toward hearing aids, such as fearing being seen as incompetent. Others said that family pressure was the reason that they did not get hearing aids. Often family members would encourage them to either put it off or say that their hearing was not really that bad (Trychin, 2003). This study shows that there is a great need to educate people and their families about the benefits of hearing aids and to counter prejudices concerning hearing aids.

According to Wilson and Stephens (2003), attitudes toward hearing aids and whether a doctor's referral affects patients’ attitudes toward hearing aid usage were examined. The article on the study begins by stating that hearing loss is the leading sensory impairment in the world. Next, the article goes on to describe the survey that the researchers used to judge their results. They sent out a survey to prospective hearing aid users who were about to visit their doctor to find out if they were affected by his advice. One hundred and forty questionnaires were answered and the results showed that the majority of hearing aid users were in fact motivated to obtain hearing aids by an outside source or doctor's referral. This did not seem to have any bearing on whether the users continued usage after actually getting the hearing aid (Wilson & Stephens, 2003).

The article by Stephens, Stephens and Eisenhart-Rothe (2005) examined the attitude toward hearing impairment and hearing aids in less-developed countries. The authors methodically examined this issue by sending questionnaires to different countries in Africa, Latin American and Asia. The results of those questionnaires were compared
to those of Western Europe. This study shows that most people felt that people with hearing impairments should be taught in special schools. This was especially true in Asia. The study shows that people in both Western Europe and developing countries generally favor hearing assistance for the hearing impaired. Their attitude toward hearing aids often reflected the economic status of their countries. Affordability goes with the earning capacity of users, and as such most people in developing nations cannot afford to use those (Stephens, Stephens & Eisenhart-Rothe, 2005).

Mansfield and Infeld (2006) conducted a study to explore the availability of financial coverage for hearing aids both from federal and state systems and private insurance. The researchers stated that half of the people above the age of 75 had hearing impairments and that as people were aging, the percentage of hearing problem was increasing. Findings of the study showed that the use of hearing aids for the elderly was very low not only because of the cost, but also because people had difficulty using them due to discomfort and other inconveniences such as background noise and inability to adjust the settings. Another barrier discussed in the article was the patients’ fear of “calling attention to the handicap” (Mansfield & Infeld, 2006, p. 50). This study is beneficial because it draws attention to the obstacles that exists for individuals with hearing impairments.

People in economic crisis try to spend money carefully, according to the study “Benefits to Wearing Hearing Aids Worth the Cost” (Benefits to Wearing Hearing Aids, 2009, p. 1). The articles discusses that unfortunately, when it comes to audiological problems like hearing loss, people think they are saving money by not purchasing hearing
aids even though it is recommended by a physician. Many fail to see that the improvement in quality of life, including their professional success, usually far outweighs the initial investment. Many people are not conscious of the positive advancements of hearing aid technology over the past decade, when there exist improvements in quality and choice. Some of these improvements include background noise reduction capability, directional microphones, multiple memory settings for different environments and remote controls (p. 1). Hearing aids nowadays are better and different from the ones in the past. Neglecting the treatment of hearing loss could lead to such bad effects on people’s life like missing interaction with other people. People who wear hearing aids feel happier because they can work and interact with others in daily life (Benefits to Wearing Hearing Aids, 2009).

Bertoli, Staehelin, Zemp, Schindler, Bodmer and Probst (2009) discussed the efficiency of the Swiss hearing aid dispensing system and found out reasons contributing to successful hearing aid provision. The survey was distributed to “20%” of hearing aids stores that represent all parts of Switzerland and the age of customers was “18” years and older (p. 184). The response rates were higher in men than in women. Eighty percent of people who used hearing aids were satisfied with their aids. The percentage of Swiss adults who use hearing aids is 2.6%, though 3% of hearing aids users never utilize their hearing aids after purchasing. The results showed that rates of regular use of hearing aids and satisfaction were high in Switzerland when compared to other countries because they pay a larger contribution to cover the full cost of the devices and give the user hearing aids options in terms of providers (Bertoli et al., 2009).
Attitudes Toward Cochlear Implants

A cochlear implant is a surgically implanted electronic device that enables a person who is nearly deaf to be able to hear. In this way, a cochlear implant can be thought of as a type of hearing aid as it tries to allow those who cannot hear to be able to hear (Chee, 2004).

A study by Vural and Erkam (2003) conducted in Ankara, Turkey gauged the perspectives of parents, in relation to cochlear implants, after their children had been implanted for a minimum of one year. A questionnaire was sent to families and addressed the following aspects: “the decision to implant, process of implantation, positive effect of the implant, communication, supporting the child’s self-confidence, well-being and happiness, social relationships, education, and pre-and post-operative services” provided by the place where the implantation took place (p. 605). Most parents noted that the decision about whether or not to go forward with the cochlear implantation was among the most stressful decisions of their lives. Anxiety about going through with the process, device malfunctions, and maintenance issues were the most prevalent concerns. The report showed that the parents found “outstanding” improvements in their children’s hearing, communication skills, self-confidence, and social relationships. This study shows that parents were very satisfied with the overall outcome of the cochlear implantation process. The study suggested that more information and specialists are needed to ease the parents’ concerns prior to the procedure (Vural & Erkam, 2003).

According to Chee (2004), a survey of a group of early deafened cochlear implant adults reported the benefits that were expected. The perception questionnaire was
distributed to 42 adults who fulfilled the criteria of the study and also was analyzed by a researcher. The result showed that most of the participants used their cochlear implants during all waking hours. Many of these people were still dependent on lip reading and hearing aids as the main way of communication. Eleven out of 42 participants reported that they found new jobs because of their cochlear implants. Ninety-seven percent of the participants were satisfied with their implants, and 93% said they would undergo surgery. The participants also stated that they gathered a lot of support from their family and peers (Chee, 2004).

Christiansen and Leigh (2004) aimed to examine and describe the changing perspectives related to cochlear implantation among parents and deaf children. The researchers based their results on two main study designs. The first study design was from the Gallaudet University Research Institute, which was conducted in 1999; and the researchers administered a 12-page questionnaire to 1,841 parents, of which 439 questionnaires were completed. In the second study, 56 interviews were with 62 parents of the children with cochlear implants. The results of this study showed that the parents often obtained conflicting information regarding possible solutions to improve their children’s hearing problems. Most of the survey respondents favored the cochlear implant; in fact, they wished that their children would have received the implantation earlier so that most of their children could have continued with their education in a regular classroom atmosphere. This study shows that opposition to cochlear implants within the deaf community is dwindling, but more information on the parents’
perspectives needs to be expressed in a more efficient matter to make more education available on the subject of hearing impairments (Christiansen & Leigh, 2004).

According to Wheeler, Archbold, Gregory and Skipp (2007), in order to determine people’s perception of cochlear implants’ effectiveness, a group of 29 teens between 13 and 16 years old were given a questionnaire. It asked about their understanding and whether they were happy or not with their implants. The overall feeling among this group was that they felt the implant was essential to their lives, as they could not hear without it. The participants found that their identities are not based on the use of hearing assistance. An example of this was when one participant found that “when I had hearing aids when I was little (they) did not help at all … but cochlear implant wow! It’s amazing to hear everything” (Wheeler, 2007, p. 306). Another participant found that “it helps me relax, really well, and I miss talking” (Wheeler, 2007, p. 307). The other said he/she had “improved interaction with family and friends” (Wheeler, 2007, p. 307).

*Sat\satisfaction with Hearing Aids*

In the article by Sink, Neijenhuis and Hoekstra (2001), the range of hearing sound young children experience when wearing hearing aids was discussed. “The DSL (Desired Sensation Level)” is a hearing aid prescription method that helps three groups of children with moderate, severe, and profound hearing loss to begin hearing aid fitting in ages three years and older (p. 62). The authors found that hearing aids improved children’s abilities to hear sounds when indentifying hearing problems earlier. The DSL prescription tool provides an essential job in assisting children with hearing aids. The authors
recommended more studies to see the progress in children with hearing aid fittings (Sink, Neijenhuis & Hoekstra, 2001).

Humes, Wilson, Barlow and Garner (2002) conducted a study to report the outcomes of the benefit of hearing aid usage during the first year. The participants of this study were 134 elderly who use hearing aids and whose ages ranged from 60 to 89. All the participants had hearing impairments. Findings of the study did not show much occurrence of benefits from familiarity among participants. This study indicated that improvement of hearing from wearing hearing aids does not occur with all wearers. Some people’s benefits from wearing hearing aids improved over time while others did not (Humes et al., 2002).

Anderson and Goldstein (2004) compared how two types of listening devices help students with hearing aids to hear spoken language in a classroom with background noise. The eight participants of this study were children aged nine to 12 and all of the participants had hearing problems. The fm system was more useful than infrared in preventing background noise in the classroom and improving children’s hearing. (Anderson & Goldstein, 2004). This study shows how important it is to provide educational amplification technology to allow student access to verbal teaching in the classroom.

Vuorialho, Karinen and Sorri (2006) examined the effects of fitting a hearing aid through measuring the advantages that come from the use of hearing aids. The participants of this study were 98 elderly people whose ages were 65 years old and all of them had hearing disabilities. Findings of the study showed that the use of hearing aids
decreased the social, communication, and emotional issues for those with hearing impairments users (Vuorialho, Karinen & Sorri, 2006). This study shows hearing aids would help students with hearing impairments improve their lives in society by having a fewer social and emotional issues.

Johnston, Beard and Carpenter (2007) discussed the types of hearing impairments and divided them into six types. The first type is prelingual deafness, which happens before a child learns to talk; parents learn the child has a hearing impairment through hearing assessment by an audiologist. Because language development is dependent on hearing others, the child’s language will not develop. The second one, postlingual deafness, is a hearing impairment which occurs after a person develops language. Students with postlingual deafness have difficulties learning in the same ways as other students and in communication with others. A third type is unilateral (one ear) or bilateral (both ears) hearing loss. In unilateral hearing loss, a person can still communicate similarly to the hearing person, while a person with bilateral hearing loss has more difficulty communicating with others. The fourth type of hearing impairment is conductive hearing loss, which occurs when sounds are not transferred from the outer ear to other parts of the ear. The fifth type of hearing impairment is sensorineural hearing loss, which happens when the inner ear does not receive sounds from the outer and middle ear. The last type of hearing impairment is mixed hearing loss, which is a combination of both conductive hearing loss and sensorineural loss. Knowing the types of hearing loss can help parents, teachers, and audiologists treat individuals and teach
them to effectively use hearing devices. For example, teachers and audiologists can collaborate to improve the child’s hearing ability (Johnston, Beard & Carpenter, 2007). Wong, Hickson and McPherson (2009) examined satisfaction with hearing devices from the viewpoint of what influences a consumer to buy a particular device. Obtaining consumers’ expectations before hearing aid fitting, gaining hearing aid performance after fitting and then comparing the two allowed researchers to collect the results of prospective consumers and statistically study them. Results from this study showed that there was, in general, no correlation between expectations and satisfaction. Those who held a more negative attitude toward hearing aids did not report a lower level of satisfaction. This study is important because it shows that the performance of hearing aids is the biggest factor in determining satisfaction. Preconceived notions do not statistically figure into whether or not there is a high level of satisfaction. The study showed how hearing aid satisfaction has progressed over the last 20 years. “New hearing aid users in Hong Kong (N_42) were tested with a newly developed self-report measure (PHACS: profile of hearing aid consumer satisfaction) that included items focused on hearing ability, problems, cost, and service” (p. 405). The following variables affected consumers’ hearing aid satisfaction: personality and attitude, usage, listening situations, type of hearing aids, and hearing aid performance (Wong, Hickson & Mcpherson, 2009).

Perceptions of Those with Hearing Impairments

A study by Zheng, Caissie and Comeau (2001) discussed young people who are deaf or have hearing impairments attitudes’ toward hearing aid use. The Abbreviate Profile of Hearing Aid Benefit (APHAB) was the only tool used to determine the
perception of day-to-day communication problems among people with and without hearing impairments. People who wear hearing aids have reported that hearing aids are necessary devices for them to hear sounds around them. Teachers and parents have reported that there is no problem with deaf students or people who have hearing problems in daily communication with other people. Parents, peers, and teachers who interact respectfully in daily communication with those who are deaf or have hearing impairments are very important. APHAB was sent to young people between the ages of 12 and 19 who attended school (Zheng, Caissie & Comeau, 2001).

The result contained 81 respondents with hearing problems, 37 of whom were males, 44 of whom were females with an average age of 14.9 years. Twenty-two reported never or rarely wearing hearing aids and 51 wore hearing aids all the time or the majority of the time at school and home and who wore hearing aids at school but not at home. Parents of children who have hearing problems and wear hearing aids believe their children have hearing problems, but the children think not. Parents of children who did not wear hearing aids think their children have hearing problems, but the children do think not so. Teachers of children with hearing impairments think that students can hear them better than they actually can. Children who can hear well understand the problem facing their peers with hearing problems better than teachers do (Zheng, Caissie & Comeau, 2001). Ultimately, teachers should understand the difficulty for deaf students or those who have hearing impairments and be more respected to students’ problems.

Lunner (2003) conducted a study to explore the correlations between perception function and the use of hearing aids. There were 72 participants who were initially using
hearing aids. Thirty-two were women and 40 were men; their ages ranged from 33 to 89 years old. The method used in this study was two experiment designs. The author has found that the users of hearing aids who have high mental abilities reported the advantages of using hearing aids in noisy conditions; the results reported from users with low mental capacity were not as positive. Findings of the study showed that the cognitive status of hearing aid users may have a great impact on their capability of using hearing aids (Lunner, 2003). This study suggests the most important part of successful uses or benefits of hearing aids pertains to the high and low mental abilities of those with hearing problems. This article gives the researcher an idea why individuals do not have equality regarding the benefits of using hearing aids. Teachers should realize the difference in the level of hearing dependency on cognitive function among students who have hearing loss and use hearing aids. These negative attitudes toward the high or low level of hearing abilities can also impact the students’ perceptions of hearing aids either positively or negatively.

Another article examines the reading and retelling stories performed by 21 children between three and six years old over a period of six weeks. Researchers found that 10 of these children were using assistive technology and the auditory–verbal approach to learning language, but that the remaining 11 had typical hearing. When one has a hearing problem that will impact on his/her progress when learning spoken language, they will not be able to develop their language learning. Therefore, people who have hearing problems also have a very limited grasp of spoken language. For example, speech reading can be useful for children with hearing deficits who use hearing aids or
cochlear implants. The test was given to 10 children, both boys and girls; seven of them wore hearing aids and the other three had received cochlear implants. Children who had typical hearing also participated in the study. Ultimately, the study concludes that the adults should use questions when communicating with children and be conscious of preparing that child to be a good reader (Robertson, Dow & Hainzinger, 2006).

The study by Ryan, Johnson, Strange and Yonovitz (2006) examines hearing aid effects (HAE), which are the negative connotations related to wearing hearing aids. The subjects of this study were Australians between the ages of five and 12. They viewed their peers who used hearing aids negatively compared to those who did not wear hearing aids. The result of this study showed the stigma toward those who use hearing aids.

Brigitte, April, Amanda & A (2006) indicated that 40% to 80% of indigenous Australian children in rural and remote communities suffer from a conductive hearing problem (p. 55). Social and cultural values, age, and gender, which are found particularly important in younger adults, can affect perceptions toward hearing problems. The main reason of not wearing hearing aids is related to a person’s appearance, embarrassment, and because it is not accepted by society. Therefore, social acceptance, vanity, and personal appraisal about aging can improve the daily life for those who have a hearing problem. Brigitte, April, and Amanda (2006) found the main reasons of feeling sadness, depression, and anxiety when not wearing hearing aids was due to the impact on daily communication and participation in the classroom. The current research found “15% of people who have hearing impairments wear hearing aids and 29% do not wear hearing aids” (p. 55). It was
concluded from this study that the bad attitude toward indigenous Australian children who wear hearing aids prevents them from wearing them (Ryan et al., 2006).

Components of Attitudes toward the Use of Hearing Aids

Effectiveness

The users of hearing aids benefit from using hearing aids effectively in their lives. The studies below shed light on how hearing aid use improves people’s hearing. The study by Ryan, Johnson, Strange and Yonovitz (2006) examined hearing aid effect (HAE), which are the negative connotations related to wearing hearing aids. The subjects of this study were between the ages of five and 12 and they were Australian children. They viewed their peers who used hearing aids negatively compared to those who did not wear hearing aids. The result of this study showed the stigma toward those who used hearing aids. The authors indicated that 40% to 80% of indigenous Australian children in rural and remote communities suffer from a conductive hearing problem (as cited in Brigitte, April, and Amanda, 2006). Perceptions toward a hearing problem can be affected by social and cultural values, age and gender and is also found particularly in younger adults. This study sought to find out the perceived benefits of hearing aid usage among children and parents and used a questionnaire handed out to children and their parents in order to assess the perceived benefits of hearing aid usage. Children seemed to perceive a more significant benefit of wearing hearing aids (Ryan et al., 2006).

Appleton and Bamford (2006) found students who saw benefits in wearing hearing aids were more likely to wear and take more of a positive attitude toward them. There was, however, a significant difference between the two views of children and
adults. Children seemed to perceive a more significant benefit of wearing hearing aids. There are many factors that could contribute to this outlook, one being that the effects of social stigma's relation to hearing aid usage is less among children than adults, and another is that the sample size of their study was simply too small (Appleton & Bamford, 2006).

**Social life**

The study by Bauman (2004) examined whether users have any expectations when using hearing aids. The author concluded that hearing aids are tools to decrease hearing loss, but there is no cure for hearing loss. People who wear hearing aids need time to adjust to them and their sounds. They cannot discern unclear sounds unless they are in quiet area. People who wear the hearing aids should be ready psychologically and accept the fact that they need them (Bauman, 2004). The study by Cox, Alexander and Gray (2005) also found that the elderly who used hearing aid reportedly led longer, happier, and healthier lives.

**Denial**

Some people with hearing impairments refuse to wear hearing aids or put them” in their drawers” because of several reasons such as social stigma, cost and comfort. Hendricks (2005) discusses how seniors are treated in the society in terms of getting a job. There is always a bias against the elderly that they cannot do what young people do in their jobs. An opinion poll from 2002 (Hendricks, 2005) conducted by the office of management and budget, shows that when people get older, there are fewer benefits from them than from the young people. Regarding this study, the old people do not choose to
wear hearing aids because they are afraid that other people would become more biased against them (Hendricks, 2005).

**Adaptation**

The study by Bauman (2004) examined whether users have any expectations when using hearing aids. Hearing aids are tools to decrease hearing loss, but it is no cure for hearing loss. People who wear hearing aids need time to adjust to them and their sounds. They cannot discern unclear sounds unless they are in quiet area. People who wear the hearing aids should be ready psychologically and accept the fact that they need them. They need them to find the best hearing aids to fit his/her needs. Ultimately, when they become familiar with using hearing aids, they would realize the usefulness of the aids which have brought convenience to their daily routines (Bauman, 2004).

**Attitudes (dependent variable)**

Jerram and Purdy (2001) conducted a study to examine” the influence of technology, demographic factors, prefitting expectations, attitudes, and adjustment to hearing loss on hearing aid outcome” (p. 64). The participants in this study were 200 adults whose ages were between 31-88 years. The survey was distributed to 200 participants questioning them about the effects of using hearing aids. Eighty-one males and 81 females out of 200 filled out the survey. The benefit of hearing aids is defined as an improvement in hearing competency while providing a hearing aid. Twelve private and seven public hospital audiology clinics participated in the study. Three ways were used to assess the results of hearing aids: the period of using hearing aids, the advantages of hearing aids, and general satisfaction. The results of this study suggest hearing aid
technology influences the satisfaction of people with hearing impairments by improving their abilities to hear in a variety of situations. Counseling before and after fitting may be useful in terms of expectations of hearing aids. The study helps the researcher to include the recommendation of new technology, which will lead to more positive reactions toward the use of hearing aids (Jerram & Purdy, 2001).

Davis (2003) conducted a study to explore individuals whose ages ranged from 55 to 74 years old would have advantages from hearing aids, particularly for those who do not use hearing aids or give serious thought to using them even in noisy situations. The method used in this study to choose the participants included four components: those who possessed a hearing aid, those who replied yes they have a problem with their hearing, those who replied no they do not have a problem with their hearing, and those who agreed to come to the clinic for a hearing test. For clarification, 623 people were selected for in-depth interviews concerning their hearing attitudes to hearing and hearing services of whom 506 were subsequently visited by an interviewer in their own home. This resulted in 351 participants agreeing to come to the clinic for a hearing test. The results showed that 6% of individuals with hearing loss wore their hearing aids. The study revealed that more participants do not use their hearing aids, and that users who had great cognitive function may benefit from hearing aids (Davis, 2003). The study helps this researcher understand the different perceptions between hearing aid users and what the actual hearing test indicated about the hearing loss (Davis, 2003).

Vestergaard (2006) conducted a study to examine the self-report outcome in new hearing-aid users, twenty-five of whom currently used hearing aids or had used them in
the past. The users who initially wore hearing aids for more than four hours a day reported that there was greater effectiveness from hearing aid usage on their hearing problem, compared to returning users or those who used hearing aids less than four hours a day. This study indicated that the effectiveness of using hearing aids by students or other users of hearing aids consistently improved hearing for those with hearing impairments if the hearing aid is used more than four hours per day.

Haley and Hood (1986) made a study to evaluate young adolescents’ perception of their peers who wear hearing aids. The subjects of the study were two 13-years-old students. They were individually videotaped reciting the “Pledge of Allegiance” “under each of these three conditions: “(1) wearing a body type hearing aid, (2) wearing a postauricular aid, and (3) wearing no aid at all” (p. 452). The researcher of the study indicated that junior high school students ages of 12 and 15 tended to rate their hearing impairments in negative way or more negatively than their peers with normal hearing. The results of the study showed that youngsters’ attitude toward their peers with hearing impairments is related mostly to the presence or absence of hearing aids and quality of their peers’ speech. This study helps researchers to figure out the reactions of peers toward their peers who wear hearing aids. It also points out their attitudes toward the speech that is produced by them.

Gender

The article by Lockey (2010) discusses experiences around hearing aid use and non-use in senior women with hearing loss. The narrative approach was used to gather information about the issues that impact senior women’s use of hearing aids. The four
women participating in this study were aged from 60 and 85. The results showed that meaningful participation can happen without using hearing aids, but when hearing aids are not used the women need other support communication strategies such as “transferring the burden of communication to others” and “opting to use other communication methods” (Lockey, 2010, p. 5). The women faced three difficulties that kept them from participating in activities they desired to be a part of. There were three reasons for that: 1) unfamiliarity with the problems of hearing loss; 2) a lack of understanding of negative social outcomes of hearing loss; 3) background noise that could be a problem. The results showed that the benefits of wearing hearing aids could enhance their social lives and engagement with others. Thus these women altered their behaviors based upon their perceived abilities to experience meaningful engagement. One can conclude that since hearing loss is experienced independent of age, the results of this study can be applied to students’ population (Lockey, 2010).

Sjoblad, Harrison, Roush, and McWilliam (2010) aimed to find the age when young children should be diagnosed with hearing loss and fitted with a hearing aid and the reason why there was a delay between identification of hearing loss and hearing aid fitting. The authors questioned parents, 22 to 54 years of age that had children with a hearing loss. The 45b items of the survey were divided into three parts: multiple-choice questions, open-ended items and their opinions. The majority of respondents were mothers -89%, with fathers being 7%, and grandmothers and legal guardians being 4%. The median age of testing for hearing loss was 18 months and the hearing aid fitting occurred at 20 months. Parents reported the reasons of delaying between identification of
hearing loss and hearing aid fitting as follows: 'need for more appointments’, waiting to follow up appointments, delays in third-party payments, child’s health problems, difficulties with ear molds, seeking second opinion, and being not ready. The authors recommended cooperation between parents and an audiologist to provide benefits of hearing aids for their children. This is the key to successful outcomes for parents and their children (Sjoblad et al., 2010).

**Dependent variable:** the dependent variable of this study are boys’ and girls’ attitudes toward the use of hearing aids. To measure this variable, the researcher will use five predictors to explain how these predict students’ attitudes.

Gender is included as independent variables to predict students’ attitudes toward the use of hearing aids for boys and girls in Saudi Schools. Gender is correlated to students’ attitudes according to the results of the pilot study. The other reason is that hearing aids cannot be seen for girls because they wear a veil (Hijab) to cover their head in Saudi school beginning at age 9, while hearing aids can be seen for males because they do not cover their head.

**Use of Sign Language**

An innovative study discusses the use of sign language in deaf adults and children’s education. Swanwick and Tsverik(2007) mentioned previous studies have failed to discuss the role of sign language to support deaf children or adults’ linguistic and emotional development. The sign bilingual approach, which uses both spoken and sign language, has been identified as being beneficial for deaf children in a learning environment, because respect for children’s personal identity and language are used. Half
of the deaf students who enter school have cochlear implants, which give an opportunity for them to improve speech perception. Cochlear implants sometimes do not work well for students who are deaf or who have hearing impairments. They attend sign language class additionally for assistance. (Swanwick, Tsverik, 2007).

Studies conducted in Saudi Arabia on the Attitudes toward and Benefits of Hearing Aids

According to Najd Online Academy (2006), the Kingdom of Saudi Arabia was founded in 1932 by King Abdulaziz Al-Saud and education was very limited. Education mainly focused on religious law and literary skills. By 1951, the curriculum had improved and there were 226 schools with 29,887 students. Today in Saudi Arabia there are over 24,000 schools. The literacy rate is over 90% for men and 70% for women. There are also schools for the blind, deaf and those with physical and mental handicaps.

The new educational policy of the government in Saudi Arabia is focused on providing new principles and services for children with special needs, such as children with hearing impairments. These include the regulations of the Ministry of Education that do not allow dismissing students from school for repeated failure. These improvements of new units and facilities help individuals to use ongoing services for special needs, and the improvement of special needs curriculum (Ministry of Education in Saudi Arabia, 1990).

This segment Deaf Education Programs in the Kingdom of Saudi Arabia takes up the issue of education programs in Saudi Arabia for the deaf. It states that education for children with hearing loss began in 1964 by the Ministry of Education. The Ministry opened two institutes in Riyadh, one for boys and one for girls. These two institutes opened doors for more to be opened throughout the country. By 2000, 3,470 students
took part in the speech education classes. The name of the institute is Al-Amal and they provide programs for four levels: Preparatory school, Primary, Intermediate and Technical Education (Al-Mosa, 1999). Alzahrani (2005) mentioned hearing disability programs in regular schools. There are currently 435 students in the Elementary to Intermediate stage in Riyadh, Saudi Arabia. There are hearing and speech centers in Riyadh and Jeddah.

Al-Abduljawad (2002) conducted a study to find parents’ perception of the benefits of using hearing aids for boys and girls with hearing impairments. Al-Abduljawad states that a hearing aid’s function is to increase sound to a level such that a hearing impaired person can both perceive and use the auditory signals. The researcher distributed a survey to the parents of 900 students with hearing impairments: 85% of the students wore hearing aids. The students’ ages ranged from 6.3 to 16.7 years old at the Al-Amal institute for deaf boys in Riyadh city. The parents of 400 out of 450 girls completed the survey, as did the parents of 300 out of 450 boys. Findings of the study showed that “76.57% of the parents reported positive attitudes toward the use of hearing aids for improving speech, and 63.14% of the students benefited from using the hearing aids” (Al-Abduljawad, 2002, p. 1). This study indicates that when parents have positive attitudes toward hearing aids, it helps their children have a positive attitude as well. It also shows that hearing aids are beneficial for anyone who uses them.

Daghistani, Jamal and Zakzouk (2002) conducted a study to examine Saudi children’s managing of hearing impairments. There were 9540 participants in this study; 1241 had hearing impairments and 782 were likely to develop hearing impairments. The
method used in this study was a survey distributed to 9540 Saudi children, whose ages were less than 15 years old, about the management of their hearing problem. Findings of the study revealed that children with hearing impairments needed more than one modality for the suitable treatment of their hearing impairments. The study found that a large number of Saudi children had hearing problems; the authors suggested both surgery and hearing aids as possible ways to improve the children’s hearing (Daghistani, Jamal & Zakzouk, 2002). The study helps the researcher to consider the complexities involved in the treatment of the hearing problems of Saudi children.

Al-Abduljawad (2003) conducted a study to find the benefit of hearing aids on individuals with middle ear pathology, their effect on those individuals’ verbal communication with regard to speaking and hearing, and children’s attitudes toward the use of hearing aids. The participants of this study were 150 Saudi children with hearing impairments whose ages ranged from 6.1 to 13.7 years old at the Al-Amal institute for deaf boys in Riyadh, the capital of Saudi Arabia. Findings of the study showed that 33 persons with right ears and 22 with left ears had a problem in the middle ear. Four participants were discounted due to a discharge and perforated ear drum. There was a negative attitude toward the use of hearing aids; 51.3% of the participants believed that hearing aids did not help them with their oral communication. However, hearing aids were significant for improving the person’s hearing, daily life, and verbal communication, as about 50.6% students benefited from wearing hearing aids (Al-Abduljawad, 2003). This study indicated that 500 million people in the world have
hearing impairments. Parents, experienced audiologists, and speech therapists need to play an important role in managing children’s use of hearing aids.

Alzahrani (2005) conducted a study to explore the social development skills among hearing impaired students in both special schools for deaf students and public schools in Riyadh, Saudi Arabia. The study attempted to examine whether or not there were differences in social competency and social adjustment based on the kind of program and gender. The participants of this study were 375 students of both genders: 194 were from special schools for the deaf, 96 male and 98 female students; 50 male students were from self-contained public schools for the deaf; and 131 students came from self-contained classes for the hard of hearing in public school oral programs, 84 male and 47 female. Students’ ages ranged from 7 to 17 in grades one through six. The total number of male students with hearing impairments was 324 and the total number of female students with hearing impairments was 454. According to Alzahrani (2005), “the findings of this study indicated that there were no significant differences in peer relations, academic behavior, self-management, and social adjustment of students with hearing impairments relative to the educational setting and program” (p. iii). The results also indicated that there were no significant differences associated with the students’ gender in students’ school attitudes and self-care. The findings of this study did show that there were significant differences between students’ gender in peer relations and social adjustment.

The study only focused a little on the use of hearing aids, but it gave an overview of students with hearing impairments and provided a vision of what was happening in
Saudi Arabia. The study showed how the government, schools, and teachers assist students with hearing impairments in integrating into the public school system and the use of hearing aids. There was an important gender difference in peer relations and social adjustment which is related to the study (Alzahrani, 2005). This study gives a hint of gender’s influence on building relationships so more research should be done to study the differences of students’ gender in peer relation and social adjustment. This study shows that female students are generally better adjusted in Saudi school in terms of peer relations and social adjustment skills.

Al-Abduljawad (2008) conducted a study to explore the impact of age on the auditory threshold shift among children in two schools for the deaf in Saudi Arabia. Al-Abduljawad (2008) states that regular audiological observation of children with hearing impairments is crucial to amplification benefits. The researcher distributed a survey to children with hearing impairments in one urban school and one non-urban school. The participants of this study were 385 Saudi boys with hearing impairments whose ages ranged from 6 to 17 years old. Findings of the study showed that 147 out of 234 (62%) boys in the metropolitan school used hearing aids, and 42 out of 151 (28%) boys in the non-metropolitan school in Saudi Arabia used hearing aids. This study indicated that students in the metropolitan school used hearing aids more than those in the non-metropolitan one. It shows that hearing aids are beneficial for anyone who uses them and students obtain hearing aids by the age of six. Similar to his other arguments, Al-Abduljawad states that hearing aids should be sold at a cheap price or for no charge at a primary age (Al-Abduljawad, 2008).
Rifaie and Al-Abuljawad (2009) conducted a study to explore the impact parental care had on the early detection and prevention of hearing impairments in Saudi children. There were 134 female participants included in this study, ranging in age from 6 to 14 years. All of the participants had hearing problems and attended the Al-Amal Institute for deaf girls. The authors used the survey method to question parents who had children with hearing loss about social level, mother’s education, hearing loss diagnoses, hearing aid usage, age of hearing aid users, and hearing aids costs. The survey examined parents’ personal attitudes toward hearing aid use, as well as their child’s perceived attitudes toward hearing aids and the impact the aids had on their child’s speech and language capabilities. The results showed that many children with hearing loss were of a low socioeconomic level; most mothers were housewives with little formal education. Overall, parents’ attitudes toward the use of hearing aids were more positive than negative. The author found that the parents’ care was strongly related to the language outcomes (Rifaie & Al-Abuljawad, 2009). This study suggests that early detection and rehabilitation are the key factors in successful hearing aid use.

Conclusion

Previous studies in the field have shown that assistive technology devices (hearing aids) provide a solution for students with hearing impairments to learn by accessing the same information as regular students. Special educators have the opportunity to encourage hearing aids in the classroom for students with hearing problems. Assistive technology devices can be customized to meet the needs of these students in order to improve their learning and their lives. Moreover, it leads students
with hearing deficits to become good learners and adapt to the general education curriculum. For example, students who have hearing impairments can use hearing aids, fm systems, and auditory trainers to assist in their learning. The Technology Assistive Act of 1998 provides grants for special programs for states that need help for their constituents with disabilities. These programs provide devices such as hearing aids to be used in and outside of schools and encourage people with disabilities and other families to adapt to these devices. In addition, the programs provide a way for all people with disabilities to access the same education and non-education fields that people without disabilities do. The use of assistive technology devices in education has been of immense value to teaching and learning; which students with disabilities have benefited from them.

The 14 areas of assistive technology as defined in the Technology Act of 1998 have provided several types of assistance for all disabilities. These assistive technology categories help to improve independence in students with disabilities, such as those who use hearing aids to facilitate academic success, involvement in classroom activities, improvement of job skills and opportunities, solutions to transportation problems, and an increase in social interaction.

The literature indicates significant obstacles for the effective use of hearing aids such as social stigma, denial, and fear of appearance for students and non-students with hearing impairments. Accordingly, there is a need for future research investigating the reasons for not wearing hearing aids and the negative attitudes from users and non-users toward the use of hearing aids in schools in Saudi Arabia; and the benefits of wearing them such as effective communication among peers, students and teachers, and students
and their families. Furthermore, there is a significant need to explore specific details about students’ attitudes toward the use of hearing aids. Based on the needs of students in Saudi schools to use hearing aids, there is a necessity for future research to investigate Saudi students’ attitudes toward the improvement of hearing in their daily lives and education environment.

Finally, educators in the Kingdom of Saudi Arabia are not yet fully aware of the issue of hearing aids used by students with hearing impairments. The purpose of this study is to explore students’ positive and negative attitudes toward the use of hearing aids in the schools for the deaf and in public school settings in Al-Ahsa City in Saudi Arabia. The findings of this study are intended to show several outcomes that may increase the awareness of the benefits of hearing aids for students in Saudi Arabia with hearing impairments. By developing a methodology specific to the purpose of investigating student attitudes toward hearing aids, the researcher can find the most accurate and specific results.
CHAPTER THREE: METHODOLOGY

It can be obviously seen, in chapter two, that different descriptions were used to investigate the attitudes of children, other young people and adults toward using hearing aids. This chapter includes the purpose of the study, the description of the methods used to answer the question of students’ attitudes toward the use of hearing aids, the procedures that were used to conduct the study and the statistical strategy that was used to analyze the data. A survey was conducted to collect data from students in grades K-12. To identify these responses or possible concerns of students who wear hearing aids, K-12 students were chosen as subjects for this project. The upcoming segments address: 1) the students’ setting, including information about the area; 2) the selection of the subjects; 3) the questionnaire used to obtain information about students’ emotional response to their use of hearing aids; 4) the way in which permission and data were gathered to answer the questions; and 5) the analysis of the results and also how they will be described.

Purpose of the Study

The present study investigated the attitudes of students toward hearing aids as perceived by a group of Saudi students. It made a comparison between boys’ attitudes and girls’ attitudes toward the use of hearing aids. This study focused on students’ attitudes toward the devices that are most important for those with hearing impairments. The importance of these hearing aids was that they allow those students to access information like their normally hearing peers.

Unfortunately, most students with hearing impairments and their parents are not aware of the benefits of using hearing aids while at school. The Kingdom of Saudi Arabia
has begun to educate students with hearing impairments by integrating them into public schools with their hearing peers and by educating their parents about the benefits of hearing aids for their children. The Kingdom has provided students with free hearing aids to use with teachers’ assistance at schools. This study helped students with hearing impairments, their parents, and society as a whole to understand the benefits of hearing aid use.

Research Questions

This study aimed to examine the following research question. Five predictors, perceived—effectiveness, perceived social life, perceived denial, perceived gender and perceived adaptation—were included. The dependent variable was attitudes of students toward the use of hearing aids.

Do these predictors—gender, perceived effectiveness, perceived social life, perceived denial, and perceived adaptation—predict attitudes of students toward the use of hearing aids?

Statement of Research Hypotheses

Based on the research question above, the following hypotheses were tested for the research question. The research question analyzed using a multiple regression.

Ho: The independent variables, factors of students’ attitudes toward the use of hearing aids—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—are not significant predictors of the dependent variable, students’ attitudes toward the use of hearing aids in Saudi Arabia.
HA: The independent variables, factors of students’ attitudes toward the use of hearing aids—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—are significant predictors of the dependent variable, students’ attitudes toward the use of hearing aids in Saudi Arabia.

Research Design

According to Warner (2008), research design is a way to include different elements or variables into a design that allows the researcher to answer the research questions (Warner, 2008). Methodology in itself is a way to produce a systematic process in which the researcher can conduct his or her study. The method of this study was quantitative research, which commonly uses descriptive and inferential statistical methods. According to Light, Singer, and Willet (1990), one of the following three research designs (descriptive, relational, or experimental designs) should be used in quantitative studies. These designs have their unique functions. For example, a descriptive study describes the conditions without explaining why those conditions were the way they are; relational design in the research study tends to explain the relationship between two or more variables; and experimental researchers look for a causal relationship between an action and an outcome (Light, Singer, & Willet, 1990). The research design of this study is relational.

It was the goal of this chapter to describe the research method that used in this study to analyze the data. A sample of Saudi students in public and special schools, grades K-12, in Saudi Arabia was surveyed about their attitudes toward the use of hearing aids. The researcher believed that the most appropriate design for this study is a relational
study using the quantitative research method and multiple regression to answer the research question. The researcher used the quantitative data process to provide a general picture of the research problem.

Survey research has some advantages. Gathering information through a survey from the research subjects is concerned with “attitudes, opinions, preferences, demographics, practices, and procedures” (Gay & Airasian, 2003, p. 275). There are many advantages when using the survey research method. It can describe large populations’ characteristics and reach a large number of participants with little effort and resources. Surveys, especially those self-administered, are relatively affordable to administer as they can be administered from a distance via mail, e-mail, or telephone (Dillman, 2000). There are some disadvantages of using the survey research” Sampling Error, Coverage Error, Measurement Error, and Nonresponse Error” (Dillman, 2000, p. 11). Very large samples are feasible as a result of the administered surveys and this increases the likelihood of results that are statistically significant, even in cases when multiple variables are investigated. Standardized surveys ensure that various groups’ uniform data can be interpreted after it is collected and be compared through an exact method (Babbie, 1990; Fowler, 2002).

Operational Definition of the Variables

The participants in this study were boys and girls in Al-Ahsa City Schools in Saudi Arabia. The study was included students with hearing impairments who use hearing aids. The survey question contained five independent variables and one dependent variable.
Effectiveness

The users of hearing aids benefit from using hearing aids effectively in their lives. The studies below shed light on how hearing aid use improves people’s hearing. Ryan, Johnson, Strange and Yonovitz (2006) examined hearing aid effects (HAE), which are the negative connotations related to wearing hearing aids. The subjects of this study were between the ages of 5 and 12 and they were Australian children. They viewed their peers who used hearing aids negatively compared to those who did not wear hearing aids. The result of this study showed the stigma toward those who used hearing aids. The authors indicated that 40% to 80% of indigenous Australian children in rural and remote communities suffer from a conductive hearing problem (as cited in Brigitte, April, and Amanda, 2006). Perceptions toward a hearing problem can be affected by social and cultural values, age and gender and is also found particularly in younger adults. The study sought to find out the perceived benefits of hearing aid usage among children and parents. A questionnaire was handed out to children and their parents in order to assess the perceived benefits of hearing aid usage. Children seemed to perceive a more significant benefit of wearing hearing aids (Ryan et al., 2006).

Q3: People do not have to repeat themselves to me when I wear my hearing aids.

Q7: When I am in a quiet room, I can follow conversation easily with my hearing aids.

Q15: When I am in a classroom, I can hear what the teacher says.

Q18: When I wear my hearing aids, I can hear sounds effectively.
Social life

Q5: I do not feel like I have to “catch up” in conversation when I wear my hearing aids.
Q10: I go to more social events now that I have hearing aids.
Q11: I participate more in conversation now when I wear my hearing aids.
Q12: I do not have to pretend that I know what is being said when I wear my hearing aids.

Wearing hearing aids may be either socially encouraged or socially stigmatized. With this, the quality of life may be improved or decreased. The study by Bauman (2004) examined whether users have any expectations when using hearing aids. The author concluded that hearing aids are tools to decrease hearing loss, but there is no cure for hearing loss. People who wear hearing aids need time to adjust to them and their sounds. They cannot discern unclear sounds unless they are in quiet areas. People who wear the hearing aids should be ready psychologically and accept the fact that they need them (Bauman, 2004). The study by Cox, Alexander and Gray (2005) found that the elderly who used hearing aids reportedly led longer, happier, and healthier lives.

Denial

Q8: When I wear my hearing aids, my family has high expectations that I should hear everything.
Q9: I hear just as well without my hearing aids, as long as people do not mumble.
Q17: I do not want to wear hearing aids because my friends would not accept me.
Q19: I do not wear my hearing aid because it does not help me hear better.
Some people with hearing impairments refuse to wear hearing aids or put them” in their drawers” because of several reasons such as social stigma, cost and comfort. Hendricks (2005) discusses how seniors are treated in the society in terms of getting a job. There is always a bias against the elderly that they cannot do what young people do in their jobs. An opinion poll from 2002 (Hendricks, 2005) conducted by the office of management and budget, shows that when people get older, there are fewer benefits from them than from the young people. Regarding this study, the old people do not choose to wear hearing aids because they are afraid that other people would become more biased against them.

*Adaptation*

Q1: I am uneasy when I leave the home without my hearing aids.

Q2: I rely on my hearing aids to help me in everyday encounters.

Q4: It feels more natural for me to wear my hearing aids then not to wear them.

Q6: I rarely take my hearing aids off when I am out of the home.

The study by Bauman (2004) examined whether users have any expectations when using hearing aids. Hearing aids are tools to decrease hearing loss, but it is no cure for hearing loss. People who wear hearing aids need time to adjust to them and their sounds. They cannot discern unclear sounds unless they are in quiet area. People who wear the hearing aids should be ready psychologically and accept the fact that they need them. They need them to find the best hearing aids to fit his/her needs. Ultimately, when they become familiar with using hearing aids, they would realize the usefulness of the aids which have brought convenience to their daily routines (Bauman, 2004).
Gender

Q21: gender: male or female.

The article by Lockey (2010) discusses experiences around hearing aid use and non-use in senior women with hearing loss. The narrative approach was used to gather information about the issues that impact senior women’s use of hearing aids. The four women participating in this study were aged from 60 and 85. The results showed that meaningful participation can happen without using hearing aids, but when hearing aids are not used the women need other support communication strategies such as “transferring the burden of communication to others” and “opting to use other communication methods” (Lockey, 2010, p. 5). The women faced three difficulties that kept them from participating in activities they desired to be a part of. There were three reasons for that: 1) unfamiliarity with the problems of hearing loss; 2) a lack of understanding of negative social outcomes of hearing loss; 3) background noise that could be a problem. The results showed that the benefits of wearing hearing aids could enhance their social lives and engagement with others. Thus these women altered their behaviors based upon their perceived abilities to experience meaningful engagement. One can conclude that since hearing loss is experienced independent of age, the results of this study can be applied to students’ population (Lockey, 2010).

Sjoblad, Harrison, Roush, and McWilliam (2010) aimed to find the age when young children should be diagnosed with hearing loss and fitted with a hearing aid and the reason why there was a delay between identification of hearing loss and hearing aid fitting. The authors questioned parents, 22 to 54 years of age that had children with a
hearing loss. The 45b items of the survey were divided into three parts: multiple-choice questions, open-ended items and their opinions. The majority of respondents were mothers -89%, with fathers being 7%, and grandmothers and legal guardians being 4%. The median age of testing for hearing loss was 18 months and the hearing aid fitting occurred at 20 months. Parents reported the reasons of delaying between identification of hearing loss and hearing aid fitting as follows: ‘need for more appointments’, waiting to follow up appointments, delays in third-party payments, child’s health problems, difficulties with ear molds, seeking second opinion, and being not ready. The authors recommended cooperation between parents and an audiologist to provide benefits of hearing aids for their children. This is the key to successful outcomes for parents and their children (Sjoblad et al., 2010).

**Attitudes** (dependent variable)

Q13: I would worry about what everybody thinks of me when I wear my hearing aids.

Q14: I would not like wearing a hearing aid because it would make me look strange.

Q16: From what I know, hearing aids do not help a great deal.

Q20: Overall, I really like my hearing aids.

Jerram and Purdy (2001) conducted a study to examine the effectiveness of “technology, demographic factors,prefitting expectations, attitudes, and adjustment to hearing loss on hearing aid outcome” (p. 64). The participants in this study were 200 adults whose ages were between 31-88 years. The survey was distributed to 200
participants questioning them about the effects of using hearing aids. Eighty-one males and 81 females out of 200 filled out the survey. The benefit of hearing aids is defined as an improvement in hearing competency while providing a hearing aid. Twelve private and seven public hospital audiology clinics participated in the study. Three ways were used to assess the results of hearing aids: the period of using hearing aids, the advantages of hearing aids, and general satisfaction. The results of this study suggest hearing aid technology influences the satisfaction of people with hearing impairments by improving their abilities to hear in a variety of situations. Counseling before and after fitting may be useful in terms of expectations of hearing aids. The study helps the researcher to include the recommendation of new technology, which will lead to more positive reactions toward the use of hearing aids (Jerram & Purdy, 2001).

Haley and Hood (1986) made a study to evaluate young adolescents’ perception of their peers who wear hearing aids. The subjects of the study were two 13-years-old students. They were individually videotaped reciting the “Pledge of Allegiance” “under each of these three conditions: (1) wearing a body type hearing aid, (2) wearing a post auricular aid, and (3) wearing no aid at all” (p. 452). The researcher of the study indicated that junior high school students ages of 12 and 15 tended to rate their hearing impairments in negative way or more negatively than their peers with normal hearing. The results of the study showed that youngsters’ attitude toward their peers with hearing impairments is related mostly to the presence or absence of hearing aids and quality of their peers’ speech (Haley & Hood, 1986). This study helps researchers to determine the
Reactions of peers toward their peers who wear hearing aids. It also points out their attitudes toward the speech that is produced by them.

**Dependent variable:** The dependent variable of this study was boys’ and girls’ attitudes toward the use of hearing aids. To measure this variable, the researcher used five predictors to explain how these predicted students’ attitudes.

The variables gender and age were not selected as predictors in the pilot study. In the case of age, the pilot study demonstrated a weak relationship between age and attitude and thus age was excluded from further analyses. In regard to gender, it has a relatively high relation to attitude ($r = -.319$). However, as mentioned in chapter two, gender is considered as a predictor because of two reasons. First, many researchers have identified gender as a specific predictor for attitudes. Second, hearing aids cannot be seen for girls because they wear a veil (Hijab) to cover their head in Saudi school beginning at age 9, while hearing aids can be seen for males because they cannot cover their head. Therefore, more females used hearing aids than males do in Saudi Arabia.

Each variable was evaluated based on a five point Likert scale ranging from five to one: 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, to 1 = Strongly Disagree. The survey contained 22 items. Respondents were instructed to select only one response for each item. The items were based on four components: effectiveness, social life, adaptation, denial, and two demographic questions: gender and age. Questionnaire items from 1 to 20 were measured students’ attitudes and items from 21 to 22 were demographics. Items that measure effectiveness were 3, 7, 15, and 18; items that measure social life were 5, 10, 11, and 12; items that measure adaptation were 1, 2, 4, and 6; items
that measure denial were 8, 9, 17, and 19; items that inquires demographic are 21 and 22; and items that measure attitude (dependent variable) were 13, 14, 16 and 20.

The Setting of the Study

Population

The target population for this study was Saudi students in grades K-12 and who were located in the city of Al-Ahsa in the Kingdom of Saudi Arabia. The gender of the respondents was male and female, and their nationality was Saudis in Saudi schools. The ages of the respondents were ranged from seven to 22. Approval for this study was primarily acquired from the Human Subjects Committee at Ohio University. The Al-Ahsa Special Education Department contacted the General Secretariat of Special Education in the Ministry of Education for Boys and Ministry of Education for Girls to obtain approval to select subjects from schools that have students who wear hearing aids. After obtaining the approval (Appendix E and F), the researcher was able to obtain information about the total number of students who wear hearing aids in grades K-12. The primary subjects of this study were students with hearing impairments who wear hearing aids. Other participants were school administrators and teachers who distributed and collected the surveys, along with teachers who teach children who use hearing aids in Saudi schools.

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1 Al-Ahsa (city) is a traditional oasis region in the eastern part of the Saudi Kingdom. Al-Ahsa has a total resident population of 1,300,000. It is 328 km from the capital, Riyadh. Al-Ahsa has 27 elementary schools, 96 intermediate schools, and 61 high schools, and four colleges and universities.
Sample Description

The participants in this study included both genders in grade K-12 and aged seven to 22 who wear hearing aids. The study was included only students with hearing impairments who wear hearing aids in the city of Al-Ahsa. The researcher had to consider the power and effect size that the researcher wanted to reach in this study. Type I error occurs when the null is rejected when it should not be, and Type II error occurs when failing to reject the null although the null is false. Aron, Aron, and Coups (2008) defined the effect size as the measurement of the differences between the means of two populations, and the power as the probability to reject the null when the research hypothesis is true. The proper sample size should be selected in order to obtain an adequate power. G*Power is a software used to calculate the sample size. Based on five predictors as gender, perceived effectiveness, perceived social life, perceived denial, and perceived adaptation, and one dependent variable, attitudes, a medium effect size (around $f^2 = 0.15$), and alpha level of 0.05, G*Power showed that the total sample size should be $N=(92)$ total male and female students from special and public Saudi schools in order to get the desired power of 0.80. The researcher of this study anticipated having similar numbers of students in each group, male and female.

Procedure

After obtaining approval from the Institutional Review Board, the researcher contacted the adviser and reviewed the distribution process of the questionnaire. Athens schools were contacted to obtain permission to conduct a pilot study and then the Saudi schools were conducted to obtain permission to conduct research there for the main
study. Next, the researcher gave the questionnaire to school administrators and teachers who were assisting the researcher so that they could distribute them to the students in the classrooms and ensure confidentiality by placing them in envelopes and mailing them to the researcher. There were two ways to obtain the questionnaires: one was to pick them up from teachers or administrators, and the other way was through mail. The researcher started with Athens schools for a pilot study and Al-Ahsa schools in Saudi Arabia for the main study.

Instrumentation

In order to examine students’ attitudes toward the use of hearing aids, the researcher reviewed different components including effectiveness, social life, adaptation, denial and gender. The researcher designed the questions of the study depending on the information he obtained from the audiology clinic and previous literature in the field. There were 20 questions on the questionnaire and five responses for each question, excluding demographic questions about age and gender. According to Dillman (2000), demographic questions require simple yet not motivating answers. Questionnaires seldom start with demographic questions.

The survey contained 22 statements including demographic items such as: 1) I am uneasy when I leave the home without my hearing aids; 2) I rely on my hearing aids to help me in everyday encounters; 3) People do not have to repeat themselves to me when I wear my hearing aids. The survey was written in two versions, Arabic and English. The English version was translated from Arabic to English by Salah Elsheltami, and from English to Arabic by Abdullah Alshehri (Appendix A and B, 2010). Respondents used a
five-point Likert scale where 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree, excluding demographic questions, to express their attitude about each statement.

Piloting of the Questionnaire

The literature indicated that conducting a pilot study is a crucial strategy in survey development (Dillman, 2000; Appendix A). Dillman (2000) discussed that the pilot process, as well as evaluation of the content and format of the questionnaire, are crucial in identifying trouble in some areas within the questionnaire. Light, Willett, and Singer (1990) recommended conducting a pilot study in order to evaluate the questionnaire, augment it when necessary, and to assess its ability to obtain the relevant responses. The piloting process allowed the researcher to determine if he/she is asking the appropriate questions in an effective way and whether the participants of the study can respond to the research questions correctly. The pilot study was conducted to determine the reliability of the instrument. Oppenheim (1966) indicated that reliability indicates consistency. This consistency can be measured in the form of a statistical coefficient of reproducibility, often Cronback’s alpha, which is related to a correlation coefficient. Moreover, Oppenheim argues questionnaires should be “composed and tried out, improved and then tried out again, often several times over” until we are sure they perform the task required (Oppenheim, 2000, p. 47). According to Light, Willett, and Singer (1990), reliability ensures that the “instrument yields duplicate measurements” in order for those measurements to be consistent, and therefore reliable (p. 165). Furthermore, “the goals of developing reliable measure is to minimize the influence on the scores of chance or other
variables unrelated to the intent of the measure” (McMillan & Schumacher, 2001, p. 181). According to Crano and Brewer (2000), the validity of a scale refers to the connections between differences in scores recorded in the instrument and the variation of the respondents’ attitude to the “underlying construct being studied” (p. 45). (The validity is defined as “how well a measure actually assesses what you want it to” (Light, Singer & Willett, 1990, p.150). (The validity is defined as the degree to which a study accurately the information that the researcher measures (Sudman & Bradburn, 1982). The idea of validity related to questionnaire design indicates the methods taken by the researcher in order to ensure clarity, phrasing, and sequencing of the survey items.

Thirty participants are sufficient for a pilot study (Johanson & Brooks, 2009). The pilot questionnaire was distributed to students in Athens City Schools in Athens, Ohio, U.S.A. The researcher told respondents that they would not be part of the main study but their responses would be useful in assessing the survey. Based on participants’ responses, the researcher identified and corrected ambiguous questions, and the reliability of the instrument. The researcher conducted the pilot study based on the target population of this study, in other words, students with hearing impairments who wear hearing aids.

The questionnaire instrument was examined for reliability using 14 items to analyze the data for the pilot study. On July 2010, the researcher started the pilot study to explore the design, wording, relevancy, length, and potential issues, by distributing the survey to 30 students in the Athens City Schools District. Students were told by the principal of their school that they would not be in the main study, only in the pilot study. The researcher gave the participants two weeks to one month to complete the survey and
return it to the researcher. Aron, Aron, and Coups (2008) discussed that a reliability coefficient (desire power) should be .80 or higher. Light, Singer and Willett (1990) recommended having at least statistical power from .70 to .90. All 30 participants of the survey of the pilot study answered the questions completely (Appendix I).

The Findings of the Pilot Study

The pilot study provided information about potential areas of improvement that can be used to modify the survey. According to Tuckman (1999), “most studies benefit substantially from precaution of running pilot tests on their questionnaires, leading to revision based on the results of the test” (p. 256). Wiersma (2000) noted that a pilot study is a way to verify the utility of an instrument. Feedback from a pilot study can be used to inform item selection for the survey. According to the results of the pilot study and comments and suggestions from the respondents, some changes were made to the questionnaire by deleting or revising the items to avoid wordiness, vagueness, and low positive or negative correlations. As a result, two items were removed, while seven items were added. The items that were removed included items 7 and 13 under the categories denial and effectiveness. Based on the pilot study, item 13, which reads I only wear my hearing aids because my family and friends want me to, was not reflecting the students’ attitudes toward hearing aid use, but it was revealing the students’ behavior regarding obeying family and friends’ instructions. Based on a committee suggestion, the researcher removed items seven and thirteen. The researcher also added two new items to replace these removed items in order to maintain a consistent number of items in each component.
The reliability of all 14 items is .649, which is not a high level of reliability. After removing items seven and thirteen the reliability is .71. The researcher learned from conducting the pilot study that some items on the pilot survey were not transparent enough to measure students’ attitudes toward the use of hearing aids, and then deleted or reworded confusing items. The researcher added seven new items to the survey (items 14-21) based on committee suggestion. Each independent variable measures four items. The responses indicated that students have different levels of attitudes toward the use of hearing aids. This was evident in the difference in male and female students’ emotional perceptions toward their use of hearing aids.

Data Collection

Data collection was conducted through four particular steps. The researcher wrote a request letter to the Ministry of Education for boys and girls to obtain permission to conduct the survey (see appendices C, D, E and F). A letter of permission was submitted to the Ministry of Education in Saudi Arabia to allow the investigator to visit schools and distribute the survey to the study’s target population. After the researcher received permission from the Ministry of Education, the researcher visited the schools that had students who use hearing aids. For the girls’ schools, the questionnaire was mailed or delivered to schools with a cover letter asking the administration to give the questionnaire to teachers of students who wear hearing aids to distribute. The researcher could not conduct the study directly in these schools due to school segregation laws which separate students by gender. A letter explaining the purpose of the study, instruction, and the researcher’s personal address was included in the envelope. Students were given the
questionnaires via their teachers, and the teachers returned the responses to the researcher in at least two weeks.

After obtaining the second IRB approval of the survey, the researcher of this study gave the consent form to the administration of boys’ and girls’ schools in Al-Ahsa city of Saudi Arabia. Students with hearing impairments and their parents signed the consent form then give it back to school administration. The researcher received the consent form from the school administrator, then had the administrator distribute the survey to students for completion. They returned the responses to the administrator, and the researcher collected them in person from the boys’ school. The girls’ responses were mailed to the researcher (see appendix H).

Data Analysis Procedures

The researcher tallied the responses and provided descriptive statistics including the mode, mean, and median responses. Data management and statistical analysis were conducted using a statistical package for the Social Sciences (SPSS) version 17. Research question was examined using multiple regression. The purpose was to determine the extent and types of reactions that were most frequently present in children who have hearing impairments, as well as to focus on the concerns raised in the literature about the negative and positive response or reaction of children toward the use of hearing aids.
Assumptions for Multiple Regression Test

Assumptions of multiple regression techniques and tests must be taken into consideration during data analysis in order for that analysis to be valid. The set of assumptions was as follows:

1. One of the assumptions of multiple regressions is that the error terms are normally distributed. The method for testing this assumption is a plot method such as box plot, histogram, and stem-leaf or normality test, specifically through Kolmogorov-Smirnov, to examine if error terms are normally distributed (whereby a p-value of more than .05 means failure to reject the null hypothesis, indicating the error terms are normally distributed) (Warner, 2008).

2. The assumption of a linear relationship between independent and dependent variables is determined by examining the linearity of residual plots (with a null hypothesis of linear relationship) (Warner, 2008).

3. Another assumption is that there should be no multicollinearity among predictors. The method of this assumption is to check the value of multicollinearity by examining the correlation between any two predictors, which is indicated by the Variance Inflation Factor (VIF). Stevens (2002) states that if the VIF is greater than 10, and then there is multicollinearity (as cited in Meyers, Gamst & Guarino, 2006).

4. The homoscedasticity assumption is that the variance of errors should be equal at all independent variable levels. In order to check this assumption, a
plot of standardized residuals by the regression standardized predicted value will be made using SPSS and visually examined for variance by scatter plot (with a null hypothesis of variance of errors is equal across independent variable levels (Osborne & Waters, 2002).

The researcher used multiple regression as the statistical procedure to determine the most important factors contributing to the attitudes toward the use of hearing aids including effectiveness perceived, social life perceived, adaptation perceived, denial perceived, and gender. The null hypothesis would be $H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$. Multiple-regression should be used to deal with the five predictors.

Summary of the Chapter

The methodology chapter described the research methods used in this study. The chapter also addressed the design and statistical tests. The variables of the study, purpose of the study, research question, sub-questions, research design, operational definition of the variables, the setting of the study, and procedure were all presented in this chapter. This chapter also discusses the findings of a pilot study that was conducted in Athens City Schools among students who wear hearing aids and have hearing loss. This study clearly indicated that students’ reactions toward the use of hearing aids are initially a mix of negative and positive. This research design used multiple regression to respond to the research question posed for this study. The researcher hopes that in future studies, parents of children with hearing loss will be allowed to participate because of their influence on children’s attitudes.
CHAPTER FOUR: RESULTS

Introduction

In chapter four, the study was conducted to explore the findings of the students’ attitudes toward the use of hearing aids in Saudi Arabia. The researcher used quantitative methods (survey) to gain information about students’ perceptions. The survey was designed and conducted by the researcher to collect the data. The researcher was interested in determining which of the five predictors—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—could predict students’ attitudes. The main population of this study was Saudi male and female students hearing aid users. This chapter includes the following: the research question and hypothesis, instrumentation, reliability of the instrument, validity of the instrument, a description of the sample with descriptive data, demographic characteristics, statistical analyses to test null hypotheses, the testing of assumptions regarding multiple regression analysis, regression analysis, gender and attitudes difference, and a summary. Inferential statistics were used to test the null hypothesis. Results of it are given.

Research Question and Hypothesis

The following research question was used to explore the topic of this study:
Do the predictors of—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—predict attitudes of students toward the use of hearing aids?
In order to answer this question, tests were conducted to explore the null and alternative hypotheses:

Ho: $R^2 = 0$
HA: $R^2 \neq 0$

Ho: The independent variables, factors of students’ attitudes toward the use of hearing aids—perceived effectiveness, perceived social life, perceived denial, perceived adaptation, and gender—are not significant predictors of the dependent variable, students’ attitudes.

HA: The independent variables, factors of students’ attitudes toward the use of hearing aids—perceived effectiveness, perceived social life, perceived denial, perceived adaptation, and gender—are significant predictors of the dependent variable, students’ attitudes.

The researcher used multiple regression as the statistical procedure to determine the most important factors contributing to the attitudes toward the use of hearing aids, including perceived effectiveness, perceived social life, perceived adaptation, perceived denial, and gender. The null hypothesis would be $H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$. Multiple regression was used to analyze the research question with the five predictors of this study.

Instrumentation

In order to examine students’ attitudes toward the use of hearing aids, the researcher reviewed different components including perceived effectiveness, perceived social life, perceived adaptation, perceived denial, perceived adaptation and gender. The researcher tailored the question of the study depending on the information obtained from
the audiology clinic and previous literature in the field. There were 20 items on the questionnaire and five responses to measure students’ attitudes for each item, excluding demographic questions about age and gender.

The survey contained 22 items, including demographic questions and statements such as: 1) I am uneasy when I leave the home without my hearing aids; 2) I rely on my hearing aids to help me in everyday encounters; 3) People do not have to repeat themselves to me when I wear my hearing aids. The survey was written in two versions, Arabic and English; they were translated from Arabic to English by Salah Elsheltami and from English to Arabic by Abdullah Alshehri (Appendix A and B, 2010). Respondents used a five-point Likert scale where 5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, and 1 = Strongly Disagree, excluding demographic questions, to express their attitude toward each statement. According to Dillman (2000), demographic questions require simple answers but do not motivate participants to continue. Questionnaires seldom start with demographic questions. For this reason, the survey of this study ended with the demographic questions about age and gender.

Reliability of the Instrument

The main tool to collect data for this study was a survey. Based on G*Power 3 software, the adequate sample size for this study was N = 92 (male and female students) in order to meet the following criteria: a desired power of 0.80, a medium effect size (around $f^2 = 0.15$), and an alpha level of 0.05 significance. A total number of 200 surveys (100 for males and 100 females) was distributed among Al-Ahsa Schools of males and females. Only 138 parents received the consent form and five of them did not agree to
their children’s participation. Because the researcher was not directly involved in distributing the consent forms, it is not clear if all 200 consent forms were distributed by schools. The researcher could not be sure if the principals distributed all the surveys to the students, or if the students gave them to their parents as they were instructed to do. The researcher received 133 out of 138 surveys with complete responses, indicating a 96% usable response rate. Data from a total of 133 surveys were entered into the statistical software (SPSS version 17.0) for analyzing the study. The computer software Statistical G*Power 3 was used to determine the power of the present study. While the reliability of the instrument in Chapter 3 was calculated with piloted data, here the reliability of the instrument was calculated with the study data. After checking the outliers, the cases of 22, 24, and 91 should be deleted because the results were different with and without three outliers. The response rate became 92% instead of 96%. The values of the Cronbach (α) coefficient resulted from performing item analyses for 130 responses. The results were not supported by a high degree of reliability (Cronbach (α) for the overall survey items = .69, number of items = 20) for students’ attitudes toward the use of hearing aids in Saudi Arabia, but the reliability was higher than the reliability analysis for the pilot study (Cronbach (α) = .65, number of items =14). For the perceived effectiveness variable Cronbach (α) was .63 (4 items), the perceived social life was .45 (4 items), for the perceived denial .36(4 items), the perceived adaptation was .68 (4 items) and the dependent variable attitude was -.48 (4 items) (Table 1). After testing the reliability for ages 7-12 and ages 13-22, the results were .78 (N = 33) and .40 (N = 97), respectively. Originally, the researcher thought the younger students had more difficult
understanding or answering the survey items. However, based on the results of reliability of older and younger participants, it indicated that there was no difference between their understanding of the positive and negative items of the survey.

From the table of item-Total Statistics (see Appendix I), it shows that several items, like items 8, item 13, item 14, item 16, item 17, and item 19 had very low correlations with other items, which prevented the reliability of the survey to get .80. When revising these instruments to use in the future studies, it is recommended to avoid using the six items above.

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Reliability: Cronbach’s Alpha</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q: Attitudes</td>
<td>-.48</td>
<td>130</td>
</tr>
<tr>
<td>A: Effectiveness</td>
<td>.63</td>
<td>130</td>
</tr>
<tr>
<td>B: Social Life</td>
<td>.45</td>
<td>130</td>
</tr>
<tr>
<td>C: Denial</td>
<td>.36</td>
<td>130</td>
</tr>
<tr>
<td>D: Adaptation</td>
<td>.68</td>
<td>130</td>
</tr>
</tbody>
</table>

Validity of the Instrument

The instrument was given to six experts in the field who reviewed the structure and appropriateness of the language and the relevance of each item to its component. The instrument was modified based on their suggestions to ensure content validity. In
addition, surveys found in previous studies were used to determine the appropriate content validity of this study. Then, the pilot study targeted the items that needed to either be reworded or removed.

Data Collection

Data collection was conducted through a paper-based survey containing 22 items. The researcher wrote a request letter to the Ministries of Education for boys and girls in Saudi Arabia to get permission to conduct the survey (see appendices C, D, E and F). The researcher then submitted a letter to the Ministry of Education in Saudi Arabia asking for permission to visit the schools and distribute the survey to the study’s target population. After the researcher received permission from the Ministry of Education, the researcher visited the schools that had students who used hearing aids. For the girls’ schools, the questionnaire was mailed or delivered to schools with a cover letter asking the administration to give the questionnaire to teachers of students who wear hearing aids to distribute. The researcher could not conduct the study directly in these schools due to school segregation laws, which separate students by gender. A letter explaining the purpose of the study, instructions, and the researcher’s personal address was included in the envelope. Students were given the questionnaires via their teachers, and the teachers returned the responses to the researcher in four weeks.

After obtaining the second IRB approval of the survey, the data was collected by a paper-based survey of 22 items, including demographic questions about age and gender. The researcher of this study gave the consent form to the administration of boys’ and girls’ schools in Al-Ahsa, Saudi Arabia. Students with hearing impairments and their
parents signed the consent form then gave it back to the schools’ administrators. The researcher received the consent form from the school administrator, and then had the administrator distribute the survey to students for completion. They returned the responses to the administrator, and the researcher collected them in person from the boys’ school. Some of the girls’ responses were mailed to the researcher and others were sent to the Ministry of Education for girls (see appendix H). The choice of students was based on classes which had students with hearing impairments, a size of 20 to 30 students, and all classes gave enough responses for the survey.

The period of data collection for the main study took 30 days, beginning November 27, 2010 and lasting until December 27, 2010. The researcher explained to the students the purpose of the study, and during this one month period, the researcher received 133 responses from males and females. The researcher tested the data of the study prior to analyzing it to determine any errors that would result from coding, recoding, missing data, outliers and influential cases. The following items were removed because they were not necessary in the analysis: names of responders, date of response, and the previous responses to pilot study. Three cases were removed (22, 24, and 91) after checking the outliers. The total responses then became 130. The researcher entered all survey responses online using Qualtrics Survey Software as the data entry tool (Table 2).
Table 3. Frequency

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>70</td>
<td>53.8</td>
<td>53.8</td>
<td>53.8</td>
</tr>
<tr>
<td>Female</td>
<td>60</td>
<td>46.2</td>
<td>46.2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>130</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Demographics Characteristics

All Al-Ahsa city schools’ classes contained nearly the same number of students (about 30 in each regular class). The number of schools in Al-Ahsa city is: 27 elementary schools, 96 intermediate schools, and 61 high schools. There were around 15 students with hearing impairments in each of the elementary schools, 17 in each of the intermediate schools, and 14 in each of the high schools which had students who wear hearing aids, but not all schools had students with hearing problems. In this study, the required sample size was 92, and the researcher obtained 133 students’ responses before removing three cases of outliers, both male and female, with hearing impairments. The ages of participants were between 7 and 22, with a mean of age of 14.21 years. Seventy (53.8%) male participants and sixty (46.2%) female participants answered the demographic questions about age and gender (Table 3).
Table 4. Demographic Information of Participants

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>%</th>
<th>M</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>130</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Female</td>
<td>60</td>
<td>46.2</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Male</td>
<td>70</td>
<td>53.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Age</td>
<td>130</td>
<td>100</td>
<td>14.21</td>
<td>2.863</td>
<td>7-22</td>
</tr>
</tbody>
</table>

Statistical Analyses to Test Null Hypothesis

Data management and statistical analysis were conducted using a statistical package for the Social Sciences (SPSS) version 17. The research question was examined using multiple regression. Descriptive statistics were computed to examine the assumptions, and the study used correlation coefficient and multiple regression analysis to analyze the data of this study.

Missing Data

Based on the descriptive statistics provided by frequency analysis in SPSS, there was no missing data from the collected survey.

Checking Outliers, Extreme and Influential Points

Three outliers are shown in the boxplot below (Figure1). They are cases 22, 24, and 91. The researcher ran the analysis with and without these outliers values and obtained different results. Therefore, the researcher decided to remove the outliers in the
data analysis. After deleting the three outliers, a multiple regression was conducted. According to Tabachnick and Fidell (2007), outliers are cases that have a standardized residual of more than 3.3 or less than -3.3. Viewing the scatter plot (Figure 3), it was obvious that there was no severe concern with outliers. The scatter plot (Figure 3) showed that standardized residual values for all cases are within the range of -3.0 and 3.0.

![Boxplot for Attitude (dependent variable)](image)

*Figure 1.* Boxplot for Attitude (dependent variable).

The Testing of Assumptions regarding Multiple Regression Analysis

Before running the multiple regression, all statistical assumptions were tested and taken into consideration. These assumptions were as follows: multicollinearity, normality, linearity, and homoscedasticity.

*Test for Multicollinearity Assumption*

The first assumption of multiple regression refers to the relationship between the independent factors (multicollinearity). Tabachnick and Fidell (2007) explain that
“With multicollinearity, the variables are very highly correlated (say, .90 and above)” (p. 88). Therefore, multiple regression is sensitive to multicollinearity. Multicollinearity refers to the situation “when there moderate to high correlation is detected between two or more independent variables” (Stevens, 1990, p. 234). Stevens (1992) states that the violation of multicollinearity assumption is critical for various reasons. It limits the size of the multiple correlation coefficients, R, because of shared variance among overlapping factors. In addition, determining the independent factors would be difficult in this case, because of the overlaps between the factors. Lastly, the violation of this assumption increases the variance of the regression (as cited in Warner, 2008). Stevens (1996) states that “the violation of multicollinearity assumption is critical for various reasons. It severely limits the size of R, because the predictors are going after much of the same variance on y. Multicollinearity makes determining the importance of a given predictor difficult because the effects of the predictors are confounded due to the correlation among them. Multicollinearity increases the variance of the regression coefficients” (Stevens, 1996, p. 76).

The assumption of multicollinearity was checked from the Collinearity Diagnostics table in the SPSS output, using Tolerance and VIF. Tolerance determines the extent to which the variability of an independent variable cannot be explained by the other variables in the model. The equation for Tolerance is “TOL = 1-R^2” for each variable, where R stands for the multiple correlation, which is also known as the coefficient of determination, and R^2 is an approximation of the effect size. The method of this assumption is to check the value of multicollinearity by examining the correlation
between any two predictors, which is indicated by the Variance Inflation Factor (VIF) (Warner, 2008). Stevens (2002) states that if the VIF is greater than 10, then there is multicollinearity (as cited in Meyers, Gamst & Guarino, 2006). From the table below, the Tolerance scores for all the five factors (students’ attitudes toward the use of hearing aids in Saudi Arabia) ranged from .54 to .93, while the range of VIF values was from 1.077 to 1.85. Based on the Collinearity Diagnostics table in the SPSS output, the Tolerance and VIF values confirmed that there were no violations of the multicollinearity assumption, since TOL>.10 and VIF<10 for all factors. No violation of multicollinearity has been found, since Tolerance>.10 and VIF<10 for all factors (Table 4). The table of descriptive statistics showed that model D has the highest mean of 2.75 among the predictors with N=130 (Table 5).

Table 5. Tolerance and VIF for Regression Factors

<table>
<thead>
<tr>
<th>Model</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effectiveness</td>
<td>.69</td>
<td>1.46</td>
</tr>
<tr>
<td>Social Life</td>
<td>.54</td>
<td>1.85</td>
</tr>
<tr>
<td>Denial</td>
<td>.83</td>
<td>1.21</td>
</tr>
<tr>
<td>Adaptation</td>
<td>.63</td>
<td>1.59</td>
</tr>
<tr>
<td>Gender</td>
<td>.93</td>
<td>1.08</td>
</tr>
</tbody>
</table>
Table 6. Descriptive Statistics

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Attitude</td>
<td>2.70</td>
<td>.52</td>
<td>130</td>
</tr>
<tr>
<td>B: Effectiveness</td>
<td>2.48</td>
<td>.94</td>
<td>130</td>
</tr>
<tr>
<td>C: Social Life</td>
<td>2.40</td>
<td>.80</td>
<td>130</td>
</tr>
<tr>
<td>D: Denial</td>
<td>2.70</td>
<td>.69</td>
<td>130</td>
</tr>
<tr>
<td>E: Adaptation</td>
<td>2.30</td>
<td>.96</td>
<td>130</td>
</tr>
<tr>
<td>F: Gender</td>
<td>.46</td>
<td>.50</td>
<td>130</td>
</tr>
</tbody>
</table>

Test for Normality

According to Warner (2008) the normality assumption is met when the residuals are normally distributed about the predicted dependent variable scores (Students Attitudes toward the use of Hearing Aids in Saudi Arabia). The method used to test the normality assumption was Kolmogorov-Smirnov and Shapiro-Wilk. These tests to examine if error terms are normally distributed (whereby a p-value of more than .05 means failure to reject the null hypothesis, indicating the error terms are normally distributed) (Warner, 2008). The results of this study confirmed that the normality assumption was violated in all predictors: perceived effectiveness, perceived social life, perceived adaptation, perceived denial, perceived and adaptation. The normality assumption was violated because the residuals were not normally distributed about the predicted dependent variable scores (Students Attitudes toward the use of Hearing Aids.
in Saudi Arabia) and all variables were less than 0.05 statistically significant. To solve this problem, the sample size of this study should be increased (Figure 2).

**Figure 2.** Histogram of attitude.

**Test for Linearity, and Homoscedasticity**

The assumption of a linear relationship between independent and dependent variables is determined by examining the residual plots (with a null hypothesis of linear relationship) (Warner, 2008). The linearity assumption is met when the residuals have a straight-line relationship with the predicted variable scores. Examining the scatterplot showed that the assumption of linearity was not violated.

Homoscedasticity is satisfied when the variance of the residual errors about the predicted dependent variable scores is the same or equal for all independent variable levels and scores. In order to check the assumption of linearity and homoscedasticity, a
plot of standardized residuals by the regression standardized predicted value will be made using SPSS and visually examined for variance by scatter plot (with a null hypothesis of variance of errors equal across independent variable levels) (Osborne & Waters, 2002). In the table below a Scatterplot of ZPRED and ZRESID was used to measure linearity and homoscedasticity. The homoscedasticity assumption was not violated because the variance of the residual errors about the predicted dependent variable scores was approximately the same for all independent variable levels and scores.

The scatter plot of the standardized residuals showed that the residuals were roughly rectangularly distributed, with many of the scores concentrated in the center (along the horizontal line y = 0). In other words, the dots in the graph are randomly dispersed around a horizontal line of zero. The assumptions of linearity and homoscedasticity were not violated based on this distribution (Figure 3). A Normal P-P plot of regression standardized residual showed the same evidence of linearity and the homoscedasticity assumption (Figure 4).
Figure 3. Scatter Plot of Regression Standardized Predicted Values against Regression Standardized Residuals.

Figure 4. Normal P-P Plot.
Regression Analysis

The researcher used a multiple regression analysis to assess how well perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender predicted students’ attitudes toward the use of hearing aids in Saudi Arabia. The model as a whole was statistically significant, \( F (5, 124) = 5.83, p = .000 \). Based on the sample size An R\(^2\) of .18 was obtained from the analysis indicating that approximately 18% of the variance of the dependent variable (students’ attitudes toward the use of hearing aids) could be accounted for by the linear combination of perceived effectiveness, perceived social life, perceived adaptation, perceived denial, and gender. The adjusted (R\(^2\)) = .15 at \( \alpha =0.05 \) indicates that the combination of predictors could be used to predict around 15% of the variance in the dependent variable, students’ attitudes. The adjusted R\(^2\) is always slightly lower and more conservative than R\(^2\) because getting R\(^2\) from the sample instead of the whole population tends to overestimate the proportion of the variance in the dependent variable when considering the whole population (Table 7 and 8).

The significant levels of the regression coefficients which are assessed through t statistics indicated that of all the independent variables, perceived adaptation ( \( t = 2.9 \) ), contributed significantly to the regression (Table 8). The prediction model is illustrated by a Scatter plot of the residual ZRESID versus the predicted values ZPRED (Figure 3).

The adjusted R\(^2\) provides one estimate of the shrinkage. The adjusted R\(^2\) for regression, 15%, was sufficient to predict the variance and can be used to obtain new data in future studies and to generalize the findings from the sample.
The regression equation for model 1 is:

\[ \hat{y} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 \]

\( \hat{y} \) = Predicted value

Gender = Gender (0 = male, 1 = female)

HA = 2.26 + .08 + .08 - .13 + .16 + .14D

\( \beta_0 \) = constant

\( \beta_1 \) to \( \beta_5 \) = Coefficients of the regression (unstandardized)

<table>
<thead>
<tr>
<th>Table 7. Multiple Regression Analysis (N=130)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
</tr>
<tr>
<td>.43</td>
</tr>
<tr>
<td>Change</td>
</tr>
<tr>
<td>.000</td>
</tr>
</tbody>
</table>

The ANOVA table showed that p<0.05 significant, which means that a combination of all the predictors: perceived effectiveness, perceived denial, perceived social life, perceived adaptation and gender significantly predicted the dependent variable, students’ attitudes.
Table 8. ANOVA

<table>
<thead>
<tr>
<th>Variable</th>
<th>sum of squares</th>
<th>df</th>
<th>Mean square</th>
<th>F</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>6.33</td>
<td>5</td>
<td>1.27</td>
<td>5.58</td>
<td>.00</td>
</tr>
<tr>
<td>Residual</td>
<td>28.13</td>
<td>124</td>
<td>.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>34.46</td>
<td>129</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9. Multiple Regression Coefficients (N=130)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Std. Error</th>
<th>β</th>
<th>t</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.26</td>
<td>.20</td>
<td>0</td>
<td>11.09</td>
<td>.00</td>
</tr>
<tr>
<td>A: Effectiveness</td>
<td>.08</td>
<td>.05</td>
<td>.14</td>
<td>1.39</td>
<td>.17</td>
</tr>
<tr>
<td>B: Social Life</td>
<td>.08</td>
<td>.07</td>
<td>.12</td>
<td>1.08</td>
<td>.28</td>
</tr>
<tr>
<td>C: Denial</td>
<td>-.13</td>
<td>.07</td>
<td>-.17</td>
<td>-1.89</td>
<td>.06</td>
</tr>
<tr>
<td>D: Adaptation</td>
<td>.16</td>
<td>.06</td>
<td>.30</td>
<td>2.90</td>
<td>.00</td>
</tr>
<tr>
<td>E: Gender</td>
<td>.14</td>
<td>.09</td>
<td>.14</td>
<td>1.60</td>
<td>.11</td>
</tr>
</tbody>
</table>

Gender and Attitudes

To determine whether gender was a predictor of attitudes toward the use of hearing aids in Saudi Arabia, an independent t-test was conducted. The results showed that there was no statistically significant difference in attitude between male students \(M= 2.62, SD =.57\) and female students \(M= 2.79, SD =.43\); \(t(126.30) = -1.88, p=.06\).
This result indicated that females and males had the same attitudes toward the use of hearing aids.

Table 10. *Gender Differences in Means of Hearing Aids Attitudes*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes</td>
<td>M</td>
<td>70</td>
<td>2.62</td>
<td>.57</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>60</td>
<td>2.79</td>
<td>.43</td>
</tr>
</tbody>
</table>

Summary of the Chapter

The results chapter described the outcomes of the main study. The chapter defined the quantitative method using multiple regression analysis. This chapter also discussed the data collected using Cronbach’s Alpha to measure the internal consistency of the survey instrument, demographic data, correlation coefficient, and the outcomes of regression. The researcher attempted to analyze all the available evidence necessary using multiple regression to respond to the research question of this study, which had five predictors: perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender, to predict the attitudes of students toward the use of hearing aids. A Cronbach’s alpha procedure was performed to check the reliability of the questionnaire. Multiple regression assumptions (normal distribution, homoscedasticity, linearity, and multicollinearity) ensured a valid analysis was met.
The findings of the multiple regression analysis showed that only perceived adaptation was able to predict students' attitudes toward the use of hearing aids with statistical significance (N= 130, β = .3, p< 0.05). However, the other predictors were not statistically significant in determining the dependent variable. This chapter discussed the results of this study to make a bridge for a more analytical discussion in Chapter 5.
CHAPTER FIVE: SUMMARY, DISCUSSION, CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

In chapter five, the researcher provided a summary of the study and discussion of the findings followed by the main research question and hypothesis underlying the study. The chapter also discussed the researcher’s conclusions, limitations and recommendations for further research.

Summary of the Study and Discussion of Findings

The main purpose of this study was to explore students’ attitudes toward the use of hearing aids in Saudi Arabia. This study has been beneficial in learning these attitudes of students with hearing impairments in Al-Ahsa in the Kingdom of Saudi Arabia. The study examined which of the five predictors—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—were significant in predicting the attitudes of students toward the use of hearing aids.

A quantitative research methodology was used for the data collection in this study. One hundred and thirty-three Saudi students in Al-Ahsa Schools, which had students who use hearing aids, completed a survey that was collected as research data. The entire sample of the study was 138, and 133 respondents completed the survey. The overall response rate was 92% after removing three cases of outliers, making the total number of responses 130.

The results of the multiple regression analysis showed that, of the five predictors used to explain the dependent variable – students’ attitudes toward hearing aid use – only perceived adaptation could statistically and significantly predict students’ attitudes
toward the use of hearing aids; (N= 130, β = .30, p< 0.05). That means this predictor should be included in predicting students’ attitudes in future studies. The other predictors were not significantly successful in determining the dependent variable. Future studies should consider other factors, such as culture, when determining students’ attitudes toward the use of hearing aids.

The findings are consistent with the previous studies about perceived Adaptation as a valuable predictor of attitude. For example, research by Bauman (2004) examined whether users have any expectations when using hearing aids. Bauman (2004) stated that hearing aids are tools used to decrease hearing loss, but they are not a cure for hearing loss. People who wear them need time to adjust to them and their sounds. They cannot discern unclear sounds unless they are in a quiet area. People who wear hearing aids should be psychologically ready to accept the fact that they need them. They have to find the best hearing aids to fit their needs. Ultimately, when they become familiar with using them, they will realize the usefulness of the aids, which have brought convenience to their daily routines (Bauman, 2004). Students’ familiarity with and adaptation to hearing aid use led to more positive attitudes toward the use of hearing aids.

In terms of the items related to the perceived Effectiveness variable, the results did not match with previous studies, possibly because based on what teachers of schools said that respondents misunderstood or randomly selected their responses. One study by Vestergaard (2006) that was conducted to examine the self-report outcome in new hearing-aid users found that effectiveness was significant. Out of all the participants in that study, twenty-five wore hearing aids. This study indicated that the effectiveness of
using hearing aids by students or other users of hearing aids consistently improved hearing for those with impairments if they are used more than four hours per day (Vestergaard, 2006). Based on previous studies, if a person’s hearing improved, their attitude toward the use of hearing aids was more positive; however, the results of this study did not coincide with previous studies.

The participants of this study were male and female hearing aids users. The results demonstrated both genders with hearing impairments have the same perception of wearing hearing aids. Bertoli, Staehelin, Zemp, Schindler, Bodmer and Probst (2009) stated men aged 18 years and older reported using hearing aids more than women the same age. In contrast, Saunders, Cienkowski, Forsline, and Fausti (2005) found that women think effective communication is more important than men, and men had more often refused to wear hearing aids than women. This study provides some useful explanations of people’s refusal to address hearing loss, including negative associations and negative coping strategies (Saunders et al., 2005). Previous research has suggested that gender is still a factor in shaping students’ attitudes toward hearing aid use that might be necessary in some studies. However, the current study did not demonstrate a difference in attitude toward hearing aid use among male and female students.

The analysis was based on a five-point Likert scale ranging from 5= Strongly Agree, 4= Agree, 3= Neutral, 2= Disagree, to 1= Strongly Disagree, excluding demographic questions, to express students’ attitudes about each statement. To determine the gender difference in the use of hearing aids in Saudi Arabia, an independent t-test was conducted. The results showed there was no statistically significant difference in attitudes
between male students (M = 2.62, SD =.57) and female students (M = 2.79, SD =.43); t (126.28) = -1.88, p = .06. This result indicated that female and male students had the same attitudes toward the use of hearing aids. These findings did not find the similar results of mean gender with previous literatures. A possible explanation for this result may point to the cultural factor affecting.

The results of study did not support previous studies which found perceived Social Life to be a valuable predictor of attitudes. This could be because of the age of participants of this study and their understanding of the importance of social life, or there might have been other factors impacting their attitudes which were not used in this study. An example that supported social life as a predictor of attitudes was a study by Cox, Alexander and Gray (2005) which found that elderly people who used hearing aids reportedly led longer, happier, and healthier lives. A study by Lockey (2010) showed that the benefits of wearing hearing aids could enhance the users’ social lives and engagement with others. Thus, these women altered their behaviors based upon their perceived abilities to experience meaningful engagement. One can conclude that since hearing loss is experienced independent of age, the results of this study can be applied to students’ population (Lockey, 2010), but this was not the case.

In terms of previous studies Kent and Smith (2006) discussed that there was a negative stigma related to the use of hearing aids among the senior citizen population. People who refuse to wear their hearing aids are afraid of not being accepted and how they look. These factors may cause hearing aid users to have low self-esteem. Improvements for increasing the use of hearing aids focus on providing good quality,
reducing noise feedback, and improving the aid’s cosmetic appearance. It also suggests that improving society’s acceptance of hearing loss and hearing devices will improve listening stress management. Other solutions to improve the use of hearing aids are to make the devices more affordable and to stress that their use is necessary.

The findings are consistent with the previous studies findings that perceived Denial is not a significant predictor of attitude; the participants chose not to wear hearing aids because they were afraid that other students would become biased against them. For instance, Kochkin’s study (1993) stated that denial was not a significant predictor to predict attitudes. Kochkin (1993) indicated a few reasons why approximately twenty million people in the U.S. do not use hearing assistance instruments: 1) there is a stigma attached to hearing assistance instruments; 2) a person's hearing loss is not severe enough to require use of hearing instruments; and 3) hearing aids are not comfortable or perhaps they might not work (Kochkin ,1993).

There was an examination as to why people who need hearing aids do not get them. The study (Trychin, 2003) was performed by the National Institute of Deafness and Other Communication Disorders (NIDCD). They found that out of the 28 million Americans who probably needed hearing aids, only six million users actually had them. The study found that some simply did not know that they had hearing loss while others were in denial. Other answers revealed negative attitudes toward hearing aids, such as fearing being seen as incompetent. Others said that family pressure was the reason that they did not get hearing aids. Often family members would encourage them to either put
it off or say that their hearing was not really that bad (Trychin, 2003). As previous studies found, this study did not find Denial to be a factor to predict students’ attitudes.

The findings showed that there was no significant multicollinearity among predictors; that means there was no high correlation among the independent variables of this study, since Tolerance>.10 and VIF<10 for all factors. The normality assumption was violated because the residuals were not normally distributed, since all variables were less than 0.05 statistically significant. The scatterplot showed that the assumption of linearity was not violated. The homoscedasticity assumption was not violated due to the variance of the residual errors, which were the same or equal for all independent variable levels and scores. The ANOVA table shows $p<0.05$ significant, which means the combination of all the predictors —perceived effectiveness, perceived denial, perceived social life, perceived adaptation and gender —significantly predicted the dependent variable (Table 8).

The scatterplot of the standardized residuals shows that the residuals were roughly rectangularly distributed together, with many of the scores concentrated in the center (along the horizontal line $y=0$). In other words, the dots in the graph are randomly dispersed around a horizontal line of zero. The assumptions of linearity and homoscedasticity were not violated based on this distribution. Normal P-P plot of regression standardized residual shows the same evidence of linearity and the homoscedasticity assumption. The model as a whole was statistically significant, $F (5, 124) = 5.58, p = .00$. An $R^2$ of .18 was obtained from the analysis, indicating that approximately 18% of the variance of the students’ attitudes toward the use of hearing
aids can be accounted for, based on the sample size, by the linear combination of perceived effectiveness, perceived social life, perceived adaptation, perceived denial and gender. The adjusted \( R^2 = 0.15 \) at \( \alpha = 0.05 \) indicates that the combination of predictors resulted in determining around 15% of the variance in the dependent variable, students’ attitudes, when considering the whole population.

The multiple regression analysis failed to reject the null hypothesis for four of the independent variables, perceived effectiveness, perceived social life, perceived denial, and gender, which means they are not significant predictors of the dependent variable, students’ attitudes. However, the results indicate that perceived adaptation is a significant predictor of the dependent variable. That is, the participants who use hearing aids had high perceived adaptation toward the use of them. Perceived effectiveness, perceived social life, perceived denial and gender individually were not correlated significantly with students’ attitudes. In order for these factors to successfully examine the dependent variable, students’ attitudes, the future research should integrate parents into their children’s participation and culture as a factor. An instructor can use encouragements to motivate students wearing hearing aids in the classroom as a way of hearing well and learning. This study shows that there is a great need to educate people and their families about the benefits of hearing aids and to reduce prejudices concerning hearing aids.

Research Question and Hypothesis

The following research question was used to explore the topic of this study.
Do these predictors—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—predict attitudes of students toward the use of hearing aids?

In order to answer the research question above, tests were conducted to explore the null and alternative hypotheses:

Ho: $R^2 = 0$
HA: $R^2 \neq 0$

Ho: The independent variables, factors of students’ attitudes toward the use of hearing aids—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—are not significant predictors of the dependent variable, students’ attitudes toward the use of hearing aids in Saudi Arabia.

HA: The independent variables, factors of students’ attitudes toward the use of hearing aids—perceived effectiveness, perceived social life, perceived denial, perceived adaptation and gender—are significant predictors of the dependent variable, students’ attitudes toward the use of hearing aids in Saudi Arabia.

Conclusion

The purpose of this study was to discover students’ attitudes toward the use of hearing aids in Saudi Arabia by investigating whether these five predictors—perceived effectiveness, perceived social life, perceived denial, perceived adaptation, and gender—can predict students’ attitudes. Based on the results of this study, the perceived adaptation variable has emerged as a significant predictor of students’ attitudes. The study employed a quantitative method to obtain information about Saudi students’ perceived attitudes toward hearing aid use. The study suggests that, in future studies, parents should be
involved in evaluating their children’s attitudes because they know their children well and they can better explain their perceptions. The results indicated that female and male students had the same attitudes toward the use of hearing aids. The findings of this study contribute to the existing literature regarding the attitudes of students toward the use of hearing aids. The study has given crucial information to parents, peers, and teachers about students’ attitudes toward the use of hearing aids in Al-Ahsa, in Saudi Arabia. The results of an $R^2$ showed that approximately 18% of the variance of the students’ attitudes can be accounted for, based on the sample size, by the linear combination of perceived effectiveness, perceived social life, perceived adaptation, perceived denial, and gender. The adjusted ($R^2$) indicates that the combination of predictors resulted in determining around 15% of the variance in the dependent variable, students’ attitudes, when considering the whole population. The results can be generalized beyond the sample size and population of students’ attitudes.

The results of this study indicated that there was no significant difference in male and female students’ attitudes according to the mean of gender. A possible explanation for this result may point to the cultural factor affecting attitudes. These results suggest that the effects of gender on these attitudes are worthy of further investigation. In order to investigate the gender effect, more research is needed to study the attitudes of male and female students toward hearing aids use, particularly in the Kingdom of Saudi Arabia.
Limitations of the Study

The purpose of this study was to investigate the attitudes of Saudi students toward their use of hearing aids in Al-Ahsa city Schools of Saudi Arabia. The limitations of this study were:

1. The scope of the study was limited because it aimed to collect data from schools in one city, Al-Ahsa, in Saudi Arabia. This limited the generalization of the findings of this study.

2. The subject of the study, students’ attitudes toward the use of hearing aids, was subjective and difficult to measure.

3. The subjects of this study were only students and not teachers or parents, which may limit the scope of the data.

4. The survey for the pilot study was written in English, and the participants were Americans. But the survey for the main study was translated into Arabic by Abdullah Alshehri (2010) (Appendix A and B) and the targeted participants in the main study were Saudi students who could speak, write, and understand Arabic. This could have changed the students’ understanding of the survey items.

5. It was difficult for the researcher to measure the concept of students’ emotions. Furthermore, the study was prone to information bias because it may have been difficult for some of the students to express their emotions since other variables not included in the study may have influenced their perceptions.
6. Gender segregation is prominent in the Kingdom of Saudi Arabia in terms of separate schooling for boys and girls. There was an inability to deal directly with Saudi all-girls schools, thus limiting the researcher’s ability to explain the study. The oral explanation of how to fill out the survey was done only for male teachers who teach students with hearing impairments and who wear hearing aids. The investigator was not able to directly explain the purpose of the study to the female teachers.

7. This questionnaire, like any other strategy survey, did not measure actual attitudes of students; it only measured perceived importance of given attitudes. Other factors that could measure students’ attitudes well such as culture should be included in future studies.

8. After testing the normality assumption by running Kolmogorov-Smirnov and Shapiro-Wilk tests, the results showed that the normality of this study was violated due to the fact that p-values for all variables were less than 0.05 statistically significant.

9. Due to the reliability of the dependent variable attitude (-0.478), it was not a valuable item.

10. Some students may not be diagnosed, so they did not take part in this study.

Recommendations for Further Study

The following are suggested for further study:

1. There was no significant gender difference revealed by the current study regarding attitudes toward the use of hearing aids in Saudi Arabia. Gender
should be a requirement in future studies to find whether or not there is a significant difference between males and females’ attitudes. Such investigations helped educators understand some of the major reasons why there was no difference between male and female students’ attitudes.

2. The existing instrument indicates that the reliability is low for some components. It is recommended that this study be extended to include students from the other Saudi city schools so the sample size would be increased and the survey items could be reexamined.

3. More studies are recommended to investigate the impacts on students’ attitudes toward the use of hearing aids. It is recommended that this study be replicated and extended to other schools in Saudi Arabia involving all educational levels, including universities, so that the result would be generalizable to the whole world.

4. The sample of the current study was chosen only among students of Al-Ahsa schools, in Saudi Arabia. Future studies may need to include Saudi students from other cities and their parents to increase the sample size and to generalize the data. Including parents in future studies is a way to see how closely their own attitudes match those of their children toward the use of hearing aids.

5. Some variables in this study predicted students’ attitudes and others did not. Future studies need to use factors which determine the dependent variable in this study of students’ attitudes toward the use of hearing aids.
6. For future studies, principals and teachers should be held accountable for giving parents the consent forms, or they should make sure the parents take the consent forms seriously for better/higher participation.

7. Future studies should seek evidence that proves all consent forms have been distributed to all parents of students with hearing impairments.

8. The reliability of one component was negative, the other four were positive, and all were relatively low. The study should be repeated with improving some weak items of each component to increase the reliability and predict the dependent variable (students’ attitudes).

9. Items 8, item13, item14, item 16, item 17, and item19 should be reexamined in future surveys.

10. The Ministry of Education in Saudi Arabia should encourage students to wear hearing aids in the schools by providing a variety of styles of hearing aids that fit each student. It is recommended that each school give a lesson to all students to raise awareness and show the benefits of hearing aids.

11. The Ministry of Education should provide hearing labs for those with hearing impairments in each school that would promote the use of hearing devices through classes tailored to these students’ needs and encourage changes in teaching those with hearing impairments.

12. Since the new trend in educating students with hearing impairments in the Kingdom of Saudi Arabia is to educate these students in public schools with hearing peers, future research should further investigate the attitudes and
interactions between students with hearing impairments and their hearing peers.
REFERENCES


from http://www.suite101.com/content/learning-difficulties-for-the-hearing-impaired-a84153


APPENDIX A: THE SURVEY OF STUDY

This questionnaire consists of five components, which have to be rated by the respondents on a five point scale: Please circle the choice that best fits your attitude toward the use of hearing aids.

5-SA- Strongly agree.
4-A- Agree.
3-N- Neutral.
2-D- Disagree.
1-SD- Strongly disagree.

Instruction

This questionnaire contains questions which have to be rated on a 5-1 scale.

Enclosed is a survey being conducted for research purposes through Ohio University to evaluate students’ attitudes toward wearing hearing aids. If you would, please take a few minutes to fill out the questionnaire and send it back to 33 N McKinley Ave Athens, Ohio 45701, and apt #402 by December 17, 2010. Participation in this research is voluntary. Returning the completed questionnaire indicates that the respondents are students in the schools and consent for this information to be used for research purposes. They will be informed that their responses will only be used in the pilot study.
<table>
<thead>
<tr>
<th>Item</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I am uneasy when I leave the home without my hearing aids.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>2. I rely on my hearing aids to help me in everyday encounters.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>3. People do not have to repeat themselves to me when I wear my hearing aids.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>4. It feels more natural for me to wear my hearing aids then not to wear them.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>5. I do not feel like I have to “catch up” in conversation when I wear my hearing aids.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>6. I rarely take my hearing aids off when I am out of the home.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>7. When I am in a quiet room, I can follow conversation easily with my hearing aids.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>8. When I wear my hearing aids, my family has high expectations that I should hear everything.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>9. I hear just as well without my hearing aids, as long as people do not mumble.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>10. I go to more social events now that I have hearing aids.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>11. I participate more in conversation now when I wear my hearing aids.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>12. I do not have to pretend that I know what is being said when I wear my hearing aids.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>13. I would worry about what everybody thinks of me when I wear my hearing aids.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>14. I would not like wearing a hearing aid because it would make me look strange.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>15. When I am in a classroom, I can hear what teacher say.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>16. From what I know, hearing aids do not help a great deal.</td>
<td>5 4 3 2 1</td>
</tr>
<tr>
<td>17. I do not want to wear hearing aids because my friend would not accept me.</td>
<td>5</td>
</tr>
<tr>
<td>18. When I wear my hearing aids, I can hear sounds effectively.</td>
<td>5</td>
</tr>
<tr>
<td>19. I do not wear my hearing aid because it does not help me hear better.</td>
<td>5</td>
</tr>
<tr>
<td>20. Overall, I really like my hearing aids.</td>
<td>5</td>
</tr>
</tbody>
</table>

| 21- Gender | Male | Female |
| 22- Age |
APPENDIX B: ARABIC QUESTIONNAIRE

<table>
<thead>
<tr>
<th>الأسئلة</th>
</tr>
</thead>
<tbody>
<tr>
<td>لاوافقّ بقعة</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>1 - أنا لا أشعر بسهولة السمع عندما أغاير البيوت من غير المعينات السمعية.</td>
</tr>
<tr>
<td>2 - اعتمد على المعينات السمعية في مواجهة الأعماق البينية.</td>
</tr>
<tr>
<td>3 - لا يُثير الناس لإعادة مقالوّ لي عندما أرى المعينات السمعية.</td>
</tr>
<tr>
<td>4 - أشعر براحة أكثر في ارتداء المعينات السمعية عن بعد أكثر.</td>
</tr>
<tr>
<td>5 - أؤثر بضرورة أدرك المحادثة عندما أرى المعينات السمعية.</td>
</tr>
<tr>
<td>6 - أنا نادراً ماتخون المعينات السمعية عندما يكون خارج المنزل.</td>
</tr>
<tr>
<td>7 - عندما أكون في مكان مُحبب أستطيع استخدام المعينات السمعية عند ارتداء المعينات السمعية.</td>
</tr>
<tr>
<td>8 - يسود اعتقاد كبير عند عائلتي بأنني أستطيع سماع كل شيء عندما أراضي</td>
</tr>
<tr>
<td>المريض السمعي</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

- استطيع أن أسمع جيداً من غير المعينات السمعية طبلاً الاشخاص لا يتهاموا.
- حالياً أذهب الى مناسبات اجتماعية أكثر.
- مساعدتى المعينات السمعية.
- حالياً اشترى بفعالية المحادثة أكثر.
- ارتداء المعينات السمعية.
- أنا أست مست ضطر أن أرنى أتأتى أعرف.
- اشعار بالقلق حينما يعتقد الآخرون.
- عند ارتداء المعينات السمعية.
- لا أرغب في ارتداء المعينات السمعية.
- لا أرغب في ارتداء المعينات السمعية لأن أصدقائي لايقبلون وجودي معهم.
- تمييز الأصوات جيداً.
- لا استممع المعينات السمعية بسبب عدم.
- اجمالاً أنا أحب ارتداء المعينات السمعية.

المناخ:
- الجنس: ذكر
- العمر: 22

المناخ:
- الجنس: أنثى
- العمر: 23
APPENDIX C: A REQUEST LETTER TO MINISTRY OF EDUCATION FOR GIRLS

بسم الله الرحمن الرحيم

سعادة مدير التربية والتعليم للبنات بالأحساء

السلام عليكم ورحمة الله وبركاته

أفيدهكم إنني طالب دراسات عليا بجامعة أوهايو بالولايات المتحدة الأمريكية وأقوم حاليا بعمل بحث الدكتورا في التربية الخاصة أرد في اتجاهات الطلاب ذوي الإعاقات السمعية حول استخدام المعينات السمعية. ولهذه

الاستبيان بالدرجة الأولى إلى جمع بعض المعلومات الخفيفة من خلال تجربة الاستبيان من طالبات اللاتي يستخدمن المعينات السمعية. واعتقد اعتقادا جازما بأن نتائج هذا البحث ستكون مفيدة جدا لوزارة التربية والتعليم للبنات في التخطيط المستقبلي للوصول للاتجاه الإيجابي حول استخدام المعينات السمعية من قبل ذوي الإعاقات السمعية. علمها

أني لن أحتاج لأي معلومات شخصية عن طالبات ذوي الإعاقة السمعية فقط تعبيئة الاستبيان بدون ذكر أسمانهم

ومع ذلك سرية المعلومات ستكون محفوظة عند الباحث والوزارة.

إadem الله فضلكم وعزكم تحت قيادة مولانا خادم الحرمين الشريفين الملك عبدالله بن عبدالعزيز آل سعود حفظه الله

الباحث: عبد الله خليفة عبداللطيف العديل

رقم الحفظة: 1017925460

التاريخ: 5/5/1431

الوظيفة: معلم بمدرسة الإمام أحمد بن حنبل الابتدائية بالأحساء
APPENDIX D: A REQUEST LETTER TO MINISTRY OF EDUCATION FOR BOYS

Bismi'llah: la haddith shahid an feeh, wazir yushub la'ahsah

asalamu alayhi wa raahimahullilah

Allahu akbar

An Aamir, waliya al-mustafa al-azim, huffazul quran, huffazul hadith

Allahu akbar

Sunni, huffazul quran, huffazul hadith

Allahu akbar

Waadah, huffazul quran, huffazul hadith

Allahu akbar

Waadah, huffazul quran, huffazul hadith

Allahu akbar

Waadah, huffazul quran, huffazul hadith

1431-4-8

111522461
APPENDIX E: PERMISSION FROM MINISTRY OF EDUCATION FOR GIRLS TO COLLECT THE DATA
APPENDIX F: PERMISSION FROM MINISTRY OF EDUCATION FOR BOYS TO COLLECT THE DATA
APPENDIX G: IRB APPROVAL

The following research study has been approved by the Institutional Review Board at Ohio University for the period listed below. This review was conducted through an expedited review procedure as defined in the federal regulations as Category(ies): 7

Project Title: Students Attitudes Toward the Use of Hearing Aids in Saudi Arabia

Primary Investigator: Abdullah Kholidh Alodail
Co-Investigator(s):

Faculty Advisor: Teresa Franklin
(if applicable)

Department: Instructional Technology

Rebecca Cale, AAB, CIP
Office of Research Compliance

Approval Date 06/29/10
Expiration Date 06/25/11

This approval is valid until expiration date listed above. If you wish to continue beyond expiration date, you must submit a periodic review application and obtain approval prior to continuation.

Adverse events must be reported to the IRB promptly, within 5 working days of the occurrence.

The approval remains in effect provided the study is conducted exactly as described in your application for review. Any additions or modifications to the project must be approved by the IRB (as an amendment) prior to implementation.
The following research study has been approved by the Institutional Review Board at Ohio University for the period listed below. This review was conducted through an expedited review procedure as defined in the federal regulations as Category(ies): 7.

**Project Title:** Students Attitudes Toward the Use of Hearing Aids in Saudi Arabia

**Primary Investigator:** Abdullah Kholifh Alodail

**Co-Investigator(s):**

---

**Faculty Advisor:** Teresa Franklin

**Department:** Instructional Technology

**Approval Date:** 06/29/10

**Expiration Date:** 06/25/11

Rebecca Cale, AAB, CIP
Office of Research Compliance

This approval is valid until expiration date listed above. If you wish to continue beyond expiration date, you must submit a periodic review application and obtain approval prior to continuation.

Adverse events must be reported to the IRB promptly, within 5 working days of the occurrence.

The approval remains in effect provided the study is conducted exactly as described in your application for review. Any additions or modifications to the project must be approved by the IRB (as an amendment) prior to implementation.
APPENDIX H: CONSENT FORM

Ohio University Consent Form

Title of Research: Students Attitudes Toward the Use of Hearing Aids in Saudi Arabia

Researchers: Abdullah Kholifh Alodail.

You child is being asked to participate in research. For you to be able to decide whether you want your child to participate in this project, you should understand what the project is about, as well as the possible risks and benefits in order to make an informed decision for you and your child. This process is known as informed consent. This form describes the purpose, procedures, possible benefits, and risks. It also explains how your child’s personal information will be used and protected. Once you have read this form and your questions about the study are answered, you will be asked to sign it. This will allow your child’s participation in this study. Your child should receive a copy of this document to take with him/her.

Explanation of Study

The purpose of the study is to explore your child’s attitudes toward the use of hearing aids. If you agree for your child to participate, he/she will be asked to answer the survey questions by choosing one of five scale items that present their attitudes. This should take approximately 15-20 minutes.

Your child should not participate in this study if he/she does not have hearing problems or does not wearing hearing aids.

Risks and Discomforts

Your child may experience discomfort when exploring the attitudes of students toward hearing aids. The researcher hopes that developing a rapport with the students will diminish any anxiety.

Benefits

The study can help determine the students’ perception of their hearing problem and the use of hearing aids. It can help society to be more aware of advantages wearing the hearing aids, and help bring a more positive atmosphere to the overall situation to those who wear hearing aids.

Confidentiality and Records
The data collected will be kept confidential and will be used for research purpose only. All data will be stored in the office of researcher’s adviser, Dr. Teresa Franklin in McCracken Hall. Your child’s name will not be attached to this data.

Compensation:
There is no compensation.

Contact Information:
If you have any questions regarding this study, please contact:
Abdullah Kholifh Alodail
33 N McKinley Ave
Athens, Ohio 45701
Apt#402
aa137206@ohio.edu
740-274-0782
Advisor:
Teresa Franklin
Ohio University, McCracken Hall
franklit@ohio.edu
740-593-4561
If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740)593-0664.
By signing below, you are agreeing that:
• you have read this consent form (or it has been read to you) and have been given the opportunity to ask questions
• known risks to your child have been explained to your satisfaction.
• you understand Ohio University has no policy or plan to pay for any injuries your child might receive as a result of participating in this research protocol
• you are 18 years of age or older
• your child’s participation in this research is given voluntarily
• you and/or your child may change your mind and stop participation at any time without penalty or loss of any benefits to which your child may otherwise be entitled.

Parent or Guardian Signature ..................... Date ............

Printed Name ........................................................................

Student Signature...................... Date............

Printed Name........................................................................
نموذج قبول مشاركة بحثي من جامعة أهاليو

عنوان البحث: اتجاهات الطلاب والطالبات نحو استخدام المعينات السمعية في المملكة العربية السعودية

الباحث: عبد الله خليفة عبد اللطيف المديد

لقد تم طلب مشاركة وسأتم في هذا البحث. وعليك أن تكون قادرا على تحديد ما إذا كنت ترغب في المشاركة في هذا البحث وتمكين ذلك يقتضي منك، فهم ماهية البحث، ومعرفة المخاطر و كذلك الفوائد الممكنة. وتلك تتم الموافقة وفقاً عليها. يسمى هذا الإجراء بالقبول بعلم سابق للمحتوى؛ يصف هذا النموذج كلاً من الهدف من البحث والإجراءات المتبعة وكذلك بين المخاطر والفوائد المحتملة من المشاركة. وأيضاً يشرح كيفية استخدام المعلومات الشخصية للفائدة و طرق حمايتها. ومجرد الانتهاء من قراءة هذا النموذج وإذابة الأسئلة حول هذه الدراسة، سوف يطلب منك التوقيع عليها. وبذلك يسمح للفائدة المشاركة فيها وأخذ نسخة لها لتعبئتها.

شرح موضوع البحث والدراسة

النوع من هذه الدراسة هو استكشاف اتجاهات طلابك نحو استخدام أجهزة المعينات السمعية. إذا تمت الموافقة على المشاركة، سوف يطلب منك / منها الإجابة على أسئلة الاستبيان عن طريق اختيار واحد من خمسة عناصر تنبع الرغبة في استخدام المعينات السمعية. ينبغي أن يأخذ ذلك حوالي 15-20 دقيقة لتعبئته.

لا ينبغي مشاركة ابنك / ابنتك في هذه الدراسة إذا كان هناك عدم حاجة أو معانة من مشاكل في السمع.

المخاطر والضايقات

قد يعاني ابنك / ابنتك عدم شعور بالراحة عند معرفة بعض الأراء نحو ارتداء المعينات السمعية عند الكثيرين ولكن يأمل الباحث في تطوير علاقة ودية مع الطلبة لتخفيف إزالة أي سوء فهم.

الفوائد

الدراسة تستند في بعض نماذج واتجاهات الطلاب والطالبات نحو مشكلة السمع واستخدام المعينات السمعية. الدراسة أيضاً تستند على إجراءات جهاز المعينات السمعية، وتم وضعها على تحقيق منها أكثر إيجابية في الحالات العامة لأولئك الذين يردن هذا النوع من الأجهزة.

المراجع والوثائق

ستتيق سرية البيانات التي تم جمعها وسوف تستخدم لأغراض البحث فقط وسنتخزين جميع البيانات في مكتب المشرف على البتاء، الدكتور بيديرز فرانكلين في كلية التربية. اسم ابنك أو ابنتك لن يتم إرفاقه مع هذه البيانات.

التعويض:

لا يوجد أي تعويض.
معلومات الاتصال:

إذا كان لديك أي أسئلة بخصوص هذه الدراسة أو البحث، يرجى الاتصال ب:
عبد الله خليفة عبداللطيف العديل
33 North McKinley Ave
Athens, Ohio 45701
Apt#402
U.S.A
Email: aa137206@ohio.edu
Phone: 740-274-0782
09666507241407
Adviser
Teresa Franklin
Ohio University, McCracken Hall
Email: franklit@ohio.edu
Phone:740-593-4561

إذا كان لديك أي أسئلة بخصوص حقوقك كمشارك البحث، يرجى الاتصال
بالتوفيق أدناه، فانك توافق على ما يلي:

- كنت قد قرأت نموذج الموافقة (أو تم قراءتها لك)، وأعطيت الفرصة لطرح الأسئلة
- يجب أن تعرف أن جامعة أوهایو ليس لديها سياسة أو خطة لدفع ثمن أي إصابات لطفلك قد تتلقى نتيجة
المشتركة في هذا البروتوكول من البحوث
- لديك 18 سنة من العمر أو أكثر
- تعتبر مشاركة طفلك في هذا البحث تطوعاً
- يحق لك / أو الطفل أن تغيّر رأيك وتتوقف المشاركة في أي وقت دون عقوبة أو فقدان أي فوائد على خلاف ذلك
والتي قد تكون من حق طفلك.

توقيع الوالد أو الوالدةدلاءاً............. تاريخ
الاسم..........................................

توقيع الطالب.................................. التاريخ
الاسم........................................
APPENDIX I: RELIABILITY COEFFICIENTS’ ANALYSIS

Reliability analysis – scale (alpha)

<table>
<thead>
<tr>
<th>Item Statistics</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- I am uneasy when I leave the home without my hearing aids.</td>
<td>2.27</td>
<td>1.305</td>
<td>130</td>
</tr>
<tr>
<td>2- I rely on my hearing aids to help me in everyday encounters.</td>
<td>2.12</td>
<td>1.324</td>
<td>130</td>
</tr>
<tr>
<td>3- People do not have to repeat themselves to me when I wear my hearing aids.</td>
<td>2.65</td>
<td>1.257</td>
<td>130</td>
</tr>
<tr>
<td>4- It feels more natural for me to wear my hearing aids then not to wear them.</td>
<td>2.10</td>
<td>1.238</td>
<td>130</td>
</tr>
<tr>
<td>5- I do not feel like I have to &quot;catch up&quot; in conversation when I wear my hearing aids.</td>
<td>2.72</td>
<td>1.337</td>
<td>130</td>
</tr>
<tr>
<td>6- I rarely take my hearing aids off when I am out of the home.</td>
<td>2.51</td>
<td>1.511</td>
<td>130</td>
</tr>
<tr>
<td>7- When I am in a quiet room, I can follow conversation easily with my hearing aids.</td>
<td>2.12</td>
<td>1.310</td>
<td>130</td>
</tr>
<tr>
<td>8- When I wear my hearing aids, my family has high expectations that I should hear everything.</td>
<td>3.48</td>
<td>1.307</td>
<td>130</td>
</tr>
<tr>
<td>9- I hear just as well without my hearing aids, as long as people do not mumble.</td>
<td>2.97</td>
<td>1.403</td>
<td>130</td>
</tr>
<tr>
<td>10- I go to more social events now that I have hearing aids.</td>
<td>2.28</td>
<td>1.393</td>
<td>130</td>
</tr>
<tr>
<td>Question</td>
<td>Title</td>
<td>Mean</td>
<td>std. dev</td>
</tr>
<tr>
<td>----------</td>
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<td>I participate more in conversation now when I wear my hearing aids.</td>
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<td>2.48</td>
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<td>I would worry about what everybody thinks of me when I wear my hearing aids.</td>
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<td>1.542</td>
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<td>3.34</td>
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<td>When I am in a classroom, I can hear what teacher say.</td>
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<td>Scale Variance if Item Deleted</td>
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<td>I am uneasy when I leave the home without my hearing aids.</td>
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<td>2</td>
<td>I rely on my hearing aids to help me in everyday encounters.</td>
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<td>72.571</td>
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<td>3</td>
<td>People do not have to repeat themselves to me when I wear my hearing aids.</td>
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<td>It feels more natural for me to wear my hearing aids then not to wear them.</td>
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<td>71.837</td>
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<td>5</td>
<td>I do not feel like I have to “catch up” in conversation when I wear my hearing aids.</td>
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<td>72.527</td>
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<tr>
<td>6</td>
<td>I rarely take my hearing aids off when I am out of the home.</td>
<td>49.57</td>
<td>68.805</td>
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<td>7</td>
<td>When I am in a quiet room, I can follow conversation easily with my hearing aids.</td>
<td>49.96</td>
<td>70.704</td>
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<tr>
<td>8</td>
<td>When I wear my hearing aids, my family has high expectations that I should hear everything.</td>
<td>48.60</td>
<td>91.002</td>
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<tr>
<td>9</td>
<td>I hear just as well without my hearing aids, as long as people do not mumble.</td>
<td>49.11</td>
<td>74.841</td>
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<tr>
<td>10</td>
<td>I go to more social events now that I have hearing aids.</td>
<td>49.79</td>
<td>69.344</td>
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<td>11</td>
<td>I participate more in conversation now when I wear my hearing aids.</td>
<td>50.13</td>
<td>69.773</td>
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<td>72.181</td>
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<td>18</td>
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<td>73.537</td>
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## Correlations

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<th>SocialLife</th>
<th>Denial</th>
<th>Adaptation</th>
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<td>.237 **</td>
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</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).