CONSIDERING AND SUPPORTING THE IMPLEMENTATION OF UNIVERSAL DESIGN

FOR LEARNING AMONG TEACHERS OF STUDENTS WHO ARE DEAF AND HARD OF

HEARING IN SAUDI ARABIA

By

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Majed Abdulrahman Alsalem

B.A., King Saud University, 2001
M.A., California State University, Northridge, 2010

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degree of Doctor of Philosophy.

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Chairperson, James Basham

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Sean Smith

_____

Sally Roberts

_____

Bruce Frey

_____

Jennifer Kurth

Date Defended: April 27th , 2015

The Dissertation Committee for Majed Abdulrahman Alsalem

certifies that this is the approved version of the following dissertation:

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ABSTRACT

The purpose of this study was to investigate the variables associated with the implementation of Universal Design for Learning (UDL) and identify the barriers that could prevent the implementation of UDL. This study included the initial perceptions of teachers of students who are deaf and hard of hearing in Riyadh, Saudi Arabia. The study discussed implications for integration of UDL in day-to-day practices as well as in the country's education policy. Therefore, this study was divided into two major stages to obtain a better understanding of UDL through teachers' practice. The first stage was to investigate and conduct a broad assessment of the current implementation level of the three UDL principles (engagement, representation, and action and expression) and the barriers to implementing UDL among teachers in Saudi schools. The total participants in this stage were 269 teachers. The second stage was a follow-up procedure after assessing the teachers' needs through a specially designed intervention that provided training sessions for 67 teachers. The results of the intervention indicated significant differences among teachers before and after taking the training sessions associated with their understanding and level of concern. Teachers have indicated interest in knowing more about UDL and adopting it into their practices; they reported that UDL has benefits that will enhance their performance for supporting student learning.

DEDICATION

I dedicate this work to:

My beloved Mother and Father. Even you have left my world, but I can still see you in every part of my life. Thank you for your support, love, encouragement, and supplications.

My beloved wife, Faten. Thank you for being with me during this journey as I have worked to reach my dream. Your encouragement, patience, and support have led me to this achievement. You bring out the best in me.

My beloved son, Nawaf. You are my source of inspiration; you bring joy, hope, and happiness to my life. Thank you, my little friend.

My brothers and sisters. Thank you for your encouragement, endless support, and belief in me. Thank you.

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In the Name of Allah, the Beneficent, the Merciful

My thank, praise, veneration, and gratitude are due to Almighty Allah (God) my creator and sustainer, who has given me the health, wellness, patience, and ability to complete this work. This endeavor cannot be done without the help, blessing, and guidance of Allah.

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CHAPTER I

INTRODUCTION

The growth of the education sector in Saudi Arabia has led to a shift from traditional education to evidence-based research that is experimental and simulates the best practices in educational systems. During the last ten years, the education sector has changed in Saudi Arabia, and as part of that, the Ministry of Education is trying to emphasize the role of the research to build curriculum so that the entire educational system will align with recent theoretical frameworks and best practices in education (Ministry of Education, 2015). The instructional designs that have been used by teachers should be aligned with this change in order to reach target goals. Changing or improving instructional designs is a fundamental means of shaping the educational system in order to meet the various needs for learners. Thus, improvements to instructional design need to be part of the professional learning framework in order to ensure it attains the highest quality possible.

The improvements that have been made are taking place in the system, so that it touches every part of education, including special education. Within special education, these changes are impacting the primary processes of accommodation, transportation, raising awareness of different kinds of disabilities, and allowing special education students to continue their learning in higher education. Because of these changes, the expectations for individuals to participate in society are increasing. This transformation is producing pressure on teachers and practices to shift their day-to-day classroom practices. Unfortunately, there is an increasing gap between what is expected and what is happening in the classroom. What are still missing are components that are necessary for all learners, including increased self-efficacy, self-determination, or personalization of learning (Mayer, Fennell, Farmer, & Campbell, 2004). A primary first step to

fulfill this gap is to reorganize the instructional design and practices being used in day-to-day instruction.

A major thrust of this work comes from the "The King Abdullah Bin Abdul Aziz Public Education Development Project" (called Tatweer, which means development). It was established in 2014 with 21 billion dollars by the Saudi Arabian government. Tatweer aims to improve and enhance the educational outcomes in Saudi Arabian schools through greater use of technology to establish the identity of the digital citizenship for all people including students with disabilities. This project has many goals including but not limited to adapting technology in classrooms, improving teachers through professional learning, building research centers, developing the teaching of science, technology, engineering, and mathematics (STEM) and other subjects, and improving special education services. Paying attention to Tatweer projects through the special education lens will reveal that special education is moving towards an inclusive education for students with disabilities. It should be noted that the biggest part of Tatweer project aims to foster the use of technology in schools to be of daily use for all students whether they are special needs or not (Tatweer, 2015).

The system of education in Saudi Arabia is adapting technology in order to provide better services for students with disabilities. This will include enhancing instructional designs that harmonize with these changes. Deaf education, which is part of this system, is facing many challenges that must be addressed in order to be in sync with this change. Deaf and hard of hearing students are still receiving their education in self-contained classrooms, which are separate classrooms for deaf or for hard of hearing in regular schools, or in other institutions for deaf students only. The effort of the Ministry of Education to provide more inclusive education for students with disabilities including deaf and hard of hearing comes under the Tatweer project.

The belief is that deaf and hard of hearing students require some services such as interpreters (Antia & Kreimeyer, 2001; Marschark et al., 2006), visual materials (Marschark, Pelz, Convertino, Sapere, Arndt, & Seewagen, 2005), and universal design for learning (UDL) (Dolan, Hall, Banerjee, Chun, & Strangman, 2005). These services will be important in order to have successful inclusive education in the general education classroom (Marschark, Sapere, Convertino, & Seewagen, 2005).

Problem Statement

The education system in Saudi Arabia currently does not integrate many common practices supported in the United States including co-teaching, response to intervention (RTI), positive behavioral support (PBS), and professional learning standards. This challenge places special education in general and deaf education in particular in a critical situation to adopt new practices without having supporting services. To address these needs, the education system must allow research to take a significant role in schools in order to provide empirical results. Applying an evidence-based framework will impact students, teachers, parents, and districts, and in fact touch the entire system of education. Instructional design as a critical element of the educational process will provide a coherent framework to teach all learners with their different needs and particularly deaf and hard of hearing students.

Rationale and Significance

Deaf and hard of hearing students require instructional designs that can be successfully implemented to cover their various needs. These needs vary from one student to another; therefore, it is necessary to be ready to use several techniques to meet their needs. Teachers who use a variety of instructional practices must be aware of the standards of professional practice while also being aware of the various variables that impact implementation. In addition, these

instructional designs should be built on a solid framework that has been tested and used successfully with the deaf and hard of hearing; possibly such a framework could be used with all learners. Universal Design for Learning (UDL) is a common term in education in the United States that has yet to be expanded in Saudi Arabia. By definition, UDL (Rose & Meyer, 2002, 2006) is a powerful model and framework for instructional design that enables all students, including students with disabilities to access the education curriculum. UDL considers how information is represented, how students are engaged, how they express their knowledge to others, and the tools (e.g., technology or materials) that promote their interactions with content and their communication of knowledge. UDL is designed to provide multiple means of engagement, representation, and action and expression that should be embedded in curricula and lessons prior to their implementation (Rose & Gravel, 2010). The next chapter discusses UDL in depth and provides more examples.

UDL is a framework that draws on cognitive neuroscience and the latest learning sciences (Rose & Meyer, 2002, 2006). UDL has been successfully adopted in many districts in the United States; teachers are being made aware of and are adapting the principles of UDL (Ralabate, Dodd, Vue, Karger, Smith, Carlisle, & Eidelman, 2012). As a term, UDL was integrated into the U.S. Higher Education Opportunity Act (HEOA, 2008) and in the Common Core State Standards (CCSS, 2012). UDL is able to enhance learners' achievements and reach marginalized groups in educational settings including English language learners, students from diverse cultures backgrounds, students with disabilities, and students in rural areas (U.S. Department of Education, 2010). This attention to UDL comes after seeing the improvement in teaching and students' achievements when it has been used and studied during the last ten years.

Thus, teachers need to provide instruction through UDL to meet the needs of diverse learners (Israel, Ribuffo, & Smith, 2014).

Various UDL implementation projects report higher achievement and overall better student outcomes (Basham, Koehler, & Israel, 2011). UDL can benefit students with various needs and interests in the classroom and pave the road to more successful inclusive education (Messinger-Willman, & Marino, 2010). While growing in the United States, UDL has also started to emerge in conversations globally. For instance, during the researcher's service to the UDL-Implementation and Research Network (UDL-IRN), it was noted there are members throughout the world on at least six continents. UDL has been adopted in many countries, including Canada, Australia, South Korea, Spain, and Portugal (Hall, Meyer, & Rose, 2012). Also, it has been initiated in an Arabic country through the Algerian education system (World Learning Algeria, 2015). This success has led researchers and educators worldwide to study UDL and how it might be effective in other places around the world.

Currently, Saudi Arabia's education policy has a focused initiative on the implementation of practices and theories from developed countries such as the United States. With a focus on the implementation of UDL in Saudi Arabia, the aim of this dissertation is to identify the current status of UDL and the barriers of its implementation in Saudi Arabian schools. Due to funding of the researcher, this study will focus on teachers who work with deaf and hard of hearing students in elementary, middle and high schools in Riyadh City, Saudi Arabia. As a first step toward implementation, this dissertation will assess the level of teacher understanding, perceptions of and potential for UDL in Saudi Arabian schools.

The rationale and significance of this dissertation is that it will be the first known research that targets UDL in Saudi Arabia; furthermore, it will deal with UDL in depth to set the

path for further studies in the Middle East. From a perspective of content, this study considers teachers' implementation knowledge, skills, and concerns of implementation. This dissertation deals with effective instructional designs that have not been presented in any conferences, workshops, teacher preparation and professional development programs in Saudi Arabia. Specifically, Saudi Arabian schools are challenged to design inclusive schools and practices as well as to support all students' academic skills development. This research will be a first step in both these areas by providing a clearer understanding of how to implement UDL as a framework into the education system.

Conceptual Framework

The conceptual framework of this study will be built by relying on different theories and models that enhance the quality of the work and make the design more coherent (see Fig. 1).
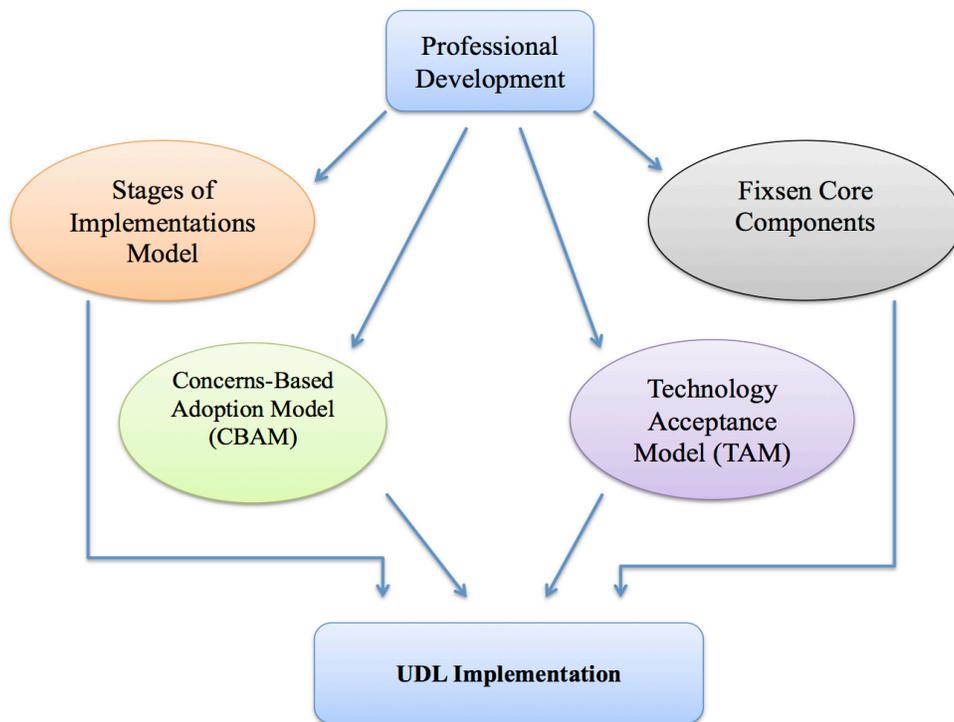
Figure 1. The conceptual framework of this study.

This dissertation will support the professional development among teachers by adopting theories that help to explain how learning occurs. In addition, this study will look at the successful stages to implement UDL by keeping in mind teachers' concerns in the adoption of a new model. Building the conceptual framework to make connection among these theories and models will lead to effective and successful practices (Ravitch & Riggan, 2012). It will be the first research on UDL and its relationship to change, teachers, and instructional designs in Saudi Arabia to be studied. Consequently, it will support the basis for future research on the framework of UDL that could be considered by a larger segment of teachers. The elements of the conceptual framework will be discussed in more details in the next chapter. Also, there will be a discussion of how each theory will be integrated into UDL implementation in order to enhance professional development among teachers.

Theoretical Framework

In order to increase the value of the work, this study includes theories and models that shape the work as seen through various lens (Reigeluth, 1999). This study will discuss UDL from multiple viewpoints, starting with how UDL came to exist and the theories behind it; it will also consider how UDL is being implemented in practices based on the available literature. This dissertation will consider the stages of implementation of UDL in Saudi schools. Moreover, it is critical to address teachers' concerns about UDL through a model such as the Concerns-Based Adoption Model (CBAM), as well as looking at teachers' acceptance of technology based on the Technology Acceptance Model (TAM). Therefore, the following are the theories and models that have been adopted for this study:

Fixsen Core Components

Any implementation in education should go through different steps and stages to be successful (Fixsen, Blase, Naoom, & Wallace, 2009). These practices should also be aligned with four major core components that start from theory to practice, which will be discussed in the next chapter. Core components are theory-based and empirically derived principles, contextual factors, structural elements, and specific intervention practices (Blase & Fixsen, 2013; see Fig. 2). These core components are the essential functions that any intervention or implementation must follow in order to reach a successful outcome (Blase & Fixsen, 2013). To have successful implementation of UDL in Saudi Arabian schools, the model of core components and stages of implementation by Fixsen et al., (2005) will be adapted to reach the desired consequences. These consequences include but are not limited to shaping the intervention of this study through a strong and solid base of theories and evidence-based practices.
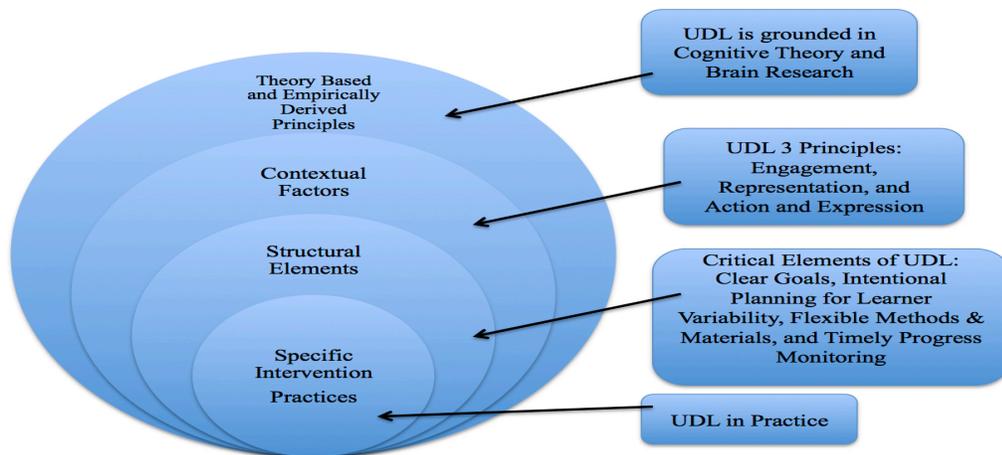
Figure 2. Fixsen core components.

The education system needs to be attentive to the details of these components in order to be effective. Therefore, this study will take into consideration the four critical components, discuss theories behind UDL, contextualizing UDL based on the research that been done, reviewing the literature on UDL, and examining UDL being used in practice. In addition, this study looks in-depth at teachers' professional development and instructional design.

Stages of Implementations Model

For any new model of intervention to be successful, the process of implementation should be considered as a critical point. Implementation is complex when it comes to human services, especially when it moves science to service and theory to practice (Fixsen et al., 2009). Implementation requires time to occur in any system, and educational systems such as Saudi Arabia that have not been exposed to UDL and modern technology in learning will need time for implementation. According to Fixsen et al., (2009), the stages of implementation have six functional stages beginning with the exploration stage, installation stage, initial implementation stage, full implementation stage, innovation stage, and reaching the sustainability stage. These stages are not linear (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005), but they can be viewed as core components that refer to the essential functions for any intervention that seeks to produce a desired outcome (Blase & Fixsen, 2013). These core components start with principles that emerge from theories and are turned into practices, then develop contextual factors to have a solid structural element, and finally are tested through intervention and practices (Blase & Fixsen, 2013).

The implementation of UDL should be done based on these core components to provide a better understanding of how to apply UDL in a new environment such as the Saudi system. This can be linked to the work of Fixsen et al. (2005) on how core components can help to pave the

road for UDL implementation to occur correctly. As previously discussed, UDL is grounded in cognitive neuroscience and incorporates empirically derived principles. Thus, UDL has its own contextual factors, and this emerges in its three principles of engagement, representation, and action and expression (Rose & Meyer, 2002). Also, UDL as a framework has strong structural elements that include clear goals, intentional planning for learner variability, flexible methods and materials, and timely progress monitoring (UDL-IRN, 2011). Finally, reaching the intervention practices where UDL takes place inside the classroom and knowing how UDL come to play through these core components will enhance the ability for UDL to be put into practice.

Stages of Implementations by CAST

The National Center on Universal Design for Learning has integrated Fixsen et al. (2005) stages of implementation. Creating professional learning through UDL as well as integrating research-based that can be customized to provide assistance to schools by coaching, supports, facilitation, tools, and resources. These stages of implementation are explore, prepare, integrate, scale, and optimize; each phase includes UDL principles that align with the other stages (CAST, 2015; see Fig. 3).
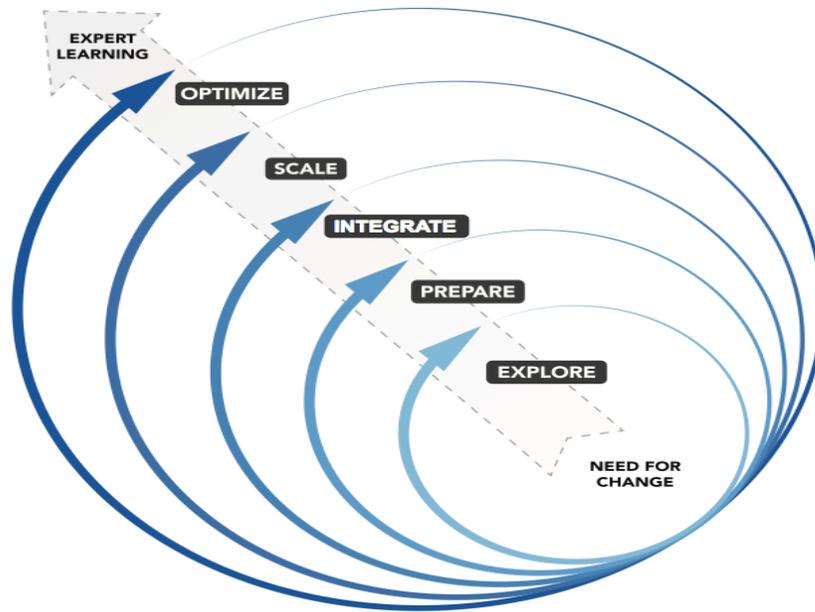
Figure 3: UDL implementation process.

Based on the Fixsen model, this study will apply these stages that have been adapted by CAST. Since the change requires time to occur, this study will focus on the exploration phase to introduce UDL to the teacher's community in Saudi Arabian schools.

Technology Acceptance Model (TAM)

Teacher's attitude and acceptance toward using technology can be evaluated through the lens of the Technology Acceptance Model (TAM; Davis, 1989). UDL makes significant use of technology, which should be referenced when considering the barriers of using technology among teachers. TAM focuses on two elements among teachers, which are usefulness and ease of use towards adopting technology into teaching practices. TAM is based on Fishbein and Ajzen's Theory of Reasoned Action (TRA; 1975; see Fig. 4). According to Masrom (2007), the TRA is "individual behavior is driven by behavioral intention where behavioral intention is a function of an individual's attitude toward the behavior and subjective norms surrounding the performance of the behavior" (p. 2).
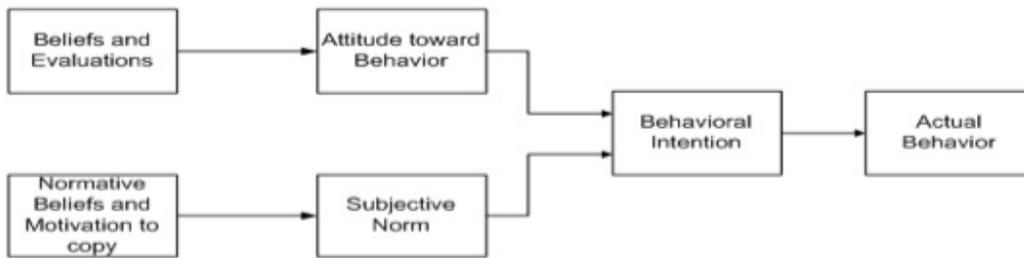
Figure 4: Theory of reasoned action (TRA)

      Davis (1986) explained that the motivation across the users relies on three major factors. The first is perceived ease of use, which refers to less effort to use technology. The second factor is perceived usefulness, which refers to the increase of performance, and the third factor is the attitude toward using the system (Chuttur, 2009; Davis,1986; Davis, Bagozzi, & Warshaw, 1989) (see Fig. 5).
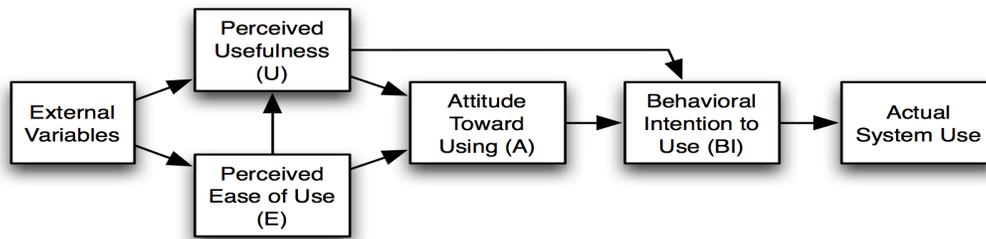
Figure 5. Technology Acceptance Model (TAM)

      TAM has been applied in many studies that aim to measure users' acceptance of technology. This dissertation has applied TAM to measure the barriers among teachers of students who are deaf and hard of hearing towards acceptance of technology in the classroom in Saudi Arabian schools. Some items delivered to the teachers were based on ideas of TAM regarding the usefulness and ease of technology use; other items were based on cultural shifts

and teachers' perspectives towards using technology in the classroom as a primary source to deliver knowledge to students.

Concerns-Based Adoption Model (CBAM)

Concerns-Based Adoption Model (CBAM) helps to explain and describe the concerns of teachers through their process of change, implementing new interventions, or adopting innovations that they are not aware of (Hall & Hord, 1987; Hall & Hord, 2001; Hall, 2013). CBAM goes through seven stages of concerns: awareness, informational, personal, management, consequence, collaboration, and refocusing stages (Hall, George, & Rutherford, 1977; see Fig. 6).
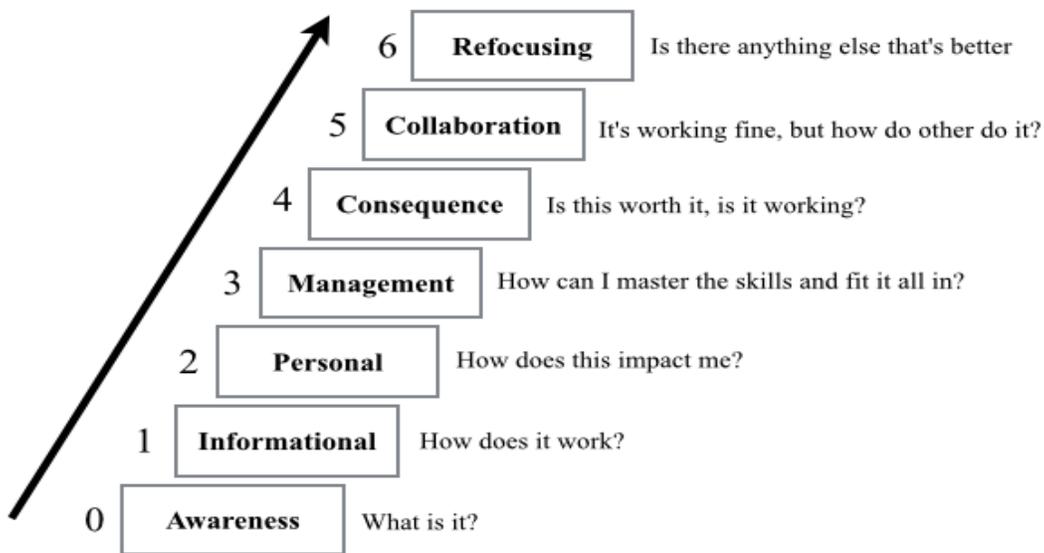
Figure 6. Concerns-based adoption model (CBAM) (Stages of Concern)

CBAM has been used in different studies that measure the concerns among teachers when they implement interventions or are part of a study to promote change through their practices. Within this study CBAM will be used to measure the concerns of teachers in regards to the adoption of UDL. Specifically, CBAM is used to measure the cultural shifts of teachers'

practices from traditional methods to advanced practices based on technology use rooted in implementation of UDL.

<div align="center">**Purpose of Study**</div>

Professional Development of Teachers

A teacher's primary job is to increase students' performance by fostering strategies through collaborative teamwork among learners, higher-order thinking, and effective use of new information technologies (Hargreaves, 2000). Currently, teaching in Saudi in the midst of a major transformation that seeks to promote the professionalism among teachers (Ministry of Education, 2015). Hargreaves argues there are four phases of professionalism and professional learning that most teachers go through. The first phase is the pre-professional phase, where teachers are required to know their subject matter but without knowing their students' learning needs. The second phase is the autonomous professional phase, where teachers work separately without interaction with other teachers, generally this is matched with little ability to deal with unexpected changes within the learning environment. The third phase is that of the collegial professional, where one emerges to create professional cultures of collaboration within the profession. The last phase is that of post-professional or postmodern, where digital revolution comes to play a significant role in this phase (2000).

Knowing these phases will help to build a deep concept of the professional learning that relies on effective standards to promote the professionalism among teachers. The Professional Learning Association (2015) was founded to promote leadership among educators in order to increase continuous learning that will enhance students' achievements. This association has developed seven standards for professional learning, which are learning communities, leadership, resources, data, learning designs, implementation, and outcomes; these will be discussed in the

next chapter (The Professional Learning Association, 2015). Knowing these standards will allow teachers to move toward more professional learning that impacts positively on students. In addition, teachers' understanding of each stage of implementation will help to increase their professional skills to integrate effective frameworks of teaching that include design, implementation, and assessment of learning experiences.

Building More Successful Teachers

Teachers who are essential elements in the learning process should be aware of effective instructional designs that will help their student's outcomes and achievements (Hattie, 2003) Historically, teachers in Saudi Arabia receive limited support from the Ministry of Education regarding teaching methods; this leaves teachers open to practice approaches that are not built on a strong educational foundation. Therefore, this study will seek to understand how teachers of students who are deaf and hard of hearing can teach their students by providing UDL training sessions. This procedure will give teachers opportunities to be exposed to new way of building their lessons based on concepts that have not been used before in the Saudi Arabian system. Teachers as primary leaders in the learning environment should be aware of new methods, approaches, and frameworks of teaching in order to apply them to their instruction. Teachers need to be exposed to the most recent practices of teaching as well as build a solid understanding of the current research and evidence-based materials in their field. In Saudi Arabia, the role of research has not yet been an influential or effective position for most teachers, either in general or special education. Thus, the primary purpose of this study is to build this awareness and foster the culture of research in the learning environment inside the classroom (Hollins & Guzman, 2005).

Improving Instructional Designs

The design and implementation of instruction is one of the most critical parts of teaching overall, and particularly for students with disabilities. Most of the instructional designs that been put into use for teaching students who are deaf and hard of hearing do not build on best practices nor do they consider the variations among deaf and hard of hearing needs. For example, it is important to consider the relative impoverishment of language experienced in early stages for deaf and hard of hearing students (Marschark, Sapere, Convertino, Mayer, Wauters, & Sarchet, 2009). Strategies of higher-level processes like metacognition that been used for deaf and hard of hearing have been examined only in the context through print texts, while their application through sign and speech remains unexplored (Jeanes, Nienhuys, & Rickards, 2000; Marschark et al., 2007). The traditional ways of teaching have not provided sufficient progress for these students, and this is made obvious in research that shows how deaf and hard of hearing students are challenged to keep up with the requirement for each grade (Luckner & Bowen, 2006).

Changes in the Saudi Arabian educational system are leading to improvements in the instructional methods for all learners (Ministry of Education, 2015). The current instructional methods and design should enhance all students' learning process. This means that instructional design should allow students to be more creative and motivated to learn in different and attractive new ways. Thus, UDL can serve as a framework that helps both students and teachers at the same time to build a better learning environment and shape the instructional design in order to enhance outcomes for all students (Rose, Meyer, & Hitchcock, 2005).

A UDL framework will provide all learners with enriched learning by creating a modern environment that help students to engage with the content. Creating UDL through technology will empower the learning process and provide opportunities for teacher and students to learn

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and interact with content in many ways. It personalizes learning by motivating learners to gather and learn information in several ways with the strength of technology (Basham & Marino, 2013; Rose & Gravel, 2010; Smith, 2012). Technology provides the ability to capture the learner's attention and provide significant data that allows teachers to track students' learning. Technology becomes a fundamental and vital element that enhances the learning outcomes for students regardless of their weaknesses and strengths. Therefore, technology, when integrated under a UDL framework, will be effective and could improve learners' outcomes (Edyburn, 2010; Hall, Strangman, & Meyer, 2003).

Deaf and Hard of Hearing Limited Skills

Generally, deaf and hard of hearing students have limited skills due to the poor instruction. Often, students who are deaf never catch up to their non-disabled peers and drop out of school. For instance, studies in the United States, reported fewer than 50% of 17 to 21-year-old deaf students graduate from high school at a fourth-grade level in literacy (Parault & Williams, 2009; Qi & Mitchell, 2012). Approximately 20% of the deaf and hard of hearing students leave school with a reading level at or below the second grade (Dew, 1999). Few studies have been done in Saudi Arabia that investigate how deaf and hard of hearing students have significant differences in outcomes when compared to non-deaf or hard of hearing students (Abu Shaireh, 2008; Al-Ayed, Abdulla, Asfour, & Althbiti, 2010; Al-Shamsan, 2013; Kabaga & Koraz, 2008). Their skill differential indicates that they are not meeting educational requirements and standards. Therefore, the Ministry of Education needs to make a change, particularly by looking more carefully at instructional designs, that are focused on successfully educating all students.

Inclusive Education

The new issue being debated in Saudi Arabia is whether the ministry of education will allow inclusive education for students with disabilities, including students that deaf and hard of hearing (Gulf Kids, 2015). Inclusive education has many advantages that would enable deaf students to interact with their hearing peers. Inclusive education for student with disabilities will allow them to reach educational goals, which is the seen positively everywhere in the world as a way to promote "equal opportunities, economic self-sufficiency, independent living and full participation" (Turnbull, Stowe & Huerta, 2007, p. 11-12).

Inclusive education requires that schools provide for all students, especially those with disabilities, and particularly for deaf and hard of hearing students (Antia, Stinson, & Gaustad, 2002). At the current time, Saudi Arabian schools do not offer services and strategies that ensure the success of inclusive education. For example, Saudi Arabian schools rarely offer co-teaching strategies, where general education teachers work with special education teachers in the same class (Murawski & Swanson, 2001) or highly qualified sign language interpreters so that deaf and hard of hearing students are able to facilitate communication with general education teachers and their hearing peers (Evans, 2004; Schick, Marschark, & Spencer, 2006; Schick & Williams, 2007). In addition, the lack of professional collaboration between special and general education teachers impedes the potential of inclusive education. To be successful, it would be necessary to have supported services that meet the needs of students who are deaf and hard of hearing to include them in inclusive settings. This indicates that the general classroom is not the most effective environment with these missing services (Easterbrooks, 2008), which could have negative educational outcomes for deaf and hard of hearing students. UDL comes to fill this gap, as it will allow teachers to reach all students, not only students with disabilities. Therefore, to

increase the potential of having successful inclusive education in Saudi schools, UDL should be implemented in all teachers' practices.

Research Questions

Saudi Arabia schools have not yet considered the actual impact of UDL on the learning environment. One implication of this is that researchers and educators do not understand the benefits that may be garnered from such a transformation in student learning. Addressing this scenario poses four major questions that form the basis for this current study.

1. What is the current level of implementation of the three UDL principles in Saudi schools? (Engagement, Representation, and Action/Expression).

2. What are the barriers to implementing UDL in Saudi schools?

3. How does professional development impact teachers' level of understanding regarding implementation of UDL?

4. How does professional development impact teachers' concerns towards implementing UDL?

Definitions of Variables

Assistive Technology (AT): AT refers to any item, piece of equipment, or product system, whether acquired commercially, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities (Edyburn, 2004).

Augmented Reality (AR): This is defined as "technology that superimposes a computer-generated image on a user's view of the real world" to allow the learners to interact with 3D information in a natural way in the real environment by providing direct interaction with virtual objects in the real environment (Liarokapis, Petridis, Lister, & White, 2002; Reitmayr & Schmalstieg, 2001).

Co-teaching: This is defined as a service delivery model where special education teachers and general education teachers share accountability and responsibility for a group of students with and without disabilities who are educated in the same class (Murawski & Swanson, 2001).

Deaf: This study refers to deaf students who receive their deaf instructions in a self-contained classroom or deaf institute through sign language as the communication and interaction tool with teachers, peers, and other school personnel. Students with a hearing loss of 75 decibels and higher are eligible to be in the deaf program.

Deaf Institute: This refers to the deaf school that has only deaf students with a hearing loss of 75 decibels and higher. It includes elementary, middle, and high school in one building where deaf students interact with their peers and teachers with sign language.

Differentiating Instruction: Providing students multiple ways for taking in information through understanding their differences and observing their similarities by collecting data that will form the basis of design instruction in order to meet this variability (Tomlinson, 2001; Tomlinson et al., 2003).

Digital Books: This is defined as electronic materials that come in a digital version rather than original printed books; it includes animation, graphics, pictures, texts, 3D, and videos to represent the content in multiple ways (De Jong & Bus, 2004).

Digital Content: Digital content is the high-quality academic material that is able to deliver knowledge and information by using technology. It could be delivered as a digital object, online source, or an e-book to increase the interaction and engagement level (Digital Learning Report Card, 2012).

Digital Learning: Any instructional practice that uses digital technology to support learning (Alliance for Excellent Education, 2015).

Evidence-based Practice: This refers to any intervention, teaching program, instructional strategy, or implementation that provides consistent positive results in an experimental environment (Mesibov & Shea, 2011; Simpson, 2005). High quality research is required in order to be an evidence-based practice (Odom, Brantlinger, Gersten, Horner, Thompson, & Harris, 2005).

Hard of Hearing: In this study, hard of hearing students are those who receive their learning in in self-contained classroom with peers who also have a hearing loss; these students use the spoken language with the aid of hearing aids. Students with hearing losses of 20-70 decibels are eligible to be in the hard of hearing programs.

Inclusive Education (Full Inclusion): Inclusive education refers to the practice of educating of students with disabilities in the general curriculum through the principle of the least restrictive environment by providing inclusive or integrated placement for a child with a disability (Turnbull, Stowe, & Huerta, 2007).

Instructional Design: This is defined as designing information that can be applied in different ways to support academic diversity and variability among learners that explicitly addresses knowledge in various methods through the use of technology (Edyburn, 2009).

Multimedia: This is defined as a combination and integration of video, animation, audio, graphics, and 3D in order to develop effective presentations for students through different software, hardware, and platforms that help various learners to achieve at a higher level (Fenrich, 1997).

Self-contained Classroom: This refers to classrooms in regular schools where deaf and hard of hearing students can interact with the rest of the school during academic and extracurricular activities, but not during classes. Teachers use different methods of communication such as sign language or different tools to teach students, such as regular hearing aids or digital hearing aids.

Sign Language: In this study, sign language means the Arabic sign language that been used as the primary tool to teach deaf students through K-12.

Teachers of Students who are Deaf and Hard of Hearing in Saudi Arabia: Teachers of students who are deaf and hard of hearing are graduates from a university with a bachelor's degree for teaching deaf and hard of hearing students. Teachers study four years of general and special educations classes as well as intensive courses and classes in deaf and hard of hearing education such as sign language, language acquisition, and other methods of communication.

Teaching System in Saudi Arabia (SA): The teaching system in SA is divided in male and female sections that are run by the Ministry of Education. Both sections teach the same curriculum, but male students are taught by male teachers and female students are taught by female teachers. Also, special education is divided in male and female divisions. Students spend 12 years in school in order to graduate from high school; Table 1 shows how many years a student is in each grade.

Table 1:

School System in Saudi Arabia

School Grade	Number of years
Elementary School	6 years
Middle School	3 years
High School	3 years
Total	**12 years**

Technology: This refers to the use of different digital tools, software, and hardware for learning that includes but is not limited to media, computers, assistive technology, online learning and platforms (Koehler & Mishra, 2009).

Universal Design: This is defined as "a concept or philosophy for designing and delivering products and services that are usable by people with the widest possible range of functional capabilities, which include products and services that are directly accessible (without requiring assistive technologies) and products and services that are interoperable with assistive technologies" (Assistive Technology Act, 1998). It includes different methods and approaches of instruction and assessment as well as the physical environment that is accessible for all individuals including students with disabilities.

Universal Design for Learning (UDL): This is defined as the framework in the area of learning sciences based on cognitive neuroscience that meet the diverse needs of learners through the following three points:

1. Multiple means of representation to allow students different ways to gain information.

2. Multiple means of expression to offer students alternatives ways to express their understanding.

3. Multiple means of engagement to motivate students and keep them engaged. (CAST, 2015; Rose & Meyer, 2002).

Conclusion

This chapter provides a framework that states the problem, provides the rationale and significance of this research, indicates the purpose of the study, defines the variables, and identifies the research questions. In Chapter 2, a review of the relevant literature is presented in

the related areas of the Saudi Arabian educational system including teacher development and the

implementation of UDL in the system.

CHAPTER II

REVIEW OF LITERATURE

Saudi Arabian Educational System

The education system in the Kingdom of Saudi Arabia was established in 1932, at a time when education was available to only a few people who lived in major cities. Both K-12 and higher education has rapidly grown to be within easy reach of most urban and suburban areas. From the original small number of schools, around 226, that provided education for children in wealthy and elite families in 1951, it has grown to now more than 30,000 schools that provide free education for all citizens (Royal Embassy of Saudi Arabia, 2010). The entire system and policies of the Kingdom of Saudi Arabia including education emanates from the state belief in Islam that influences law, ethics, worship, and a life integrated system (National Report on Education Development in Saudi Arabia (NREDSA; 2008).

The educational system in Saudi Arabia is divided into two categories, general education and higher education. General education consists of elementary education that lasts for six years and intermediate and high education that last for three years each. The educational curriculum is diverse and includes a variety of subjects, including science, literature, math, history, Arabic, and Islamic studies. General education includes public schools that are free and private schools that have a fee; both follow the same curricula, methods of instruction, and general policies. Higher education consists of public or private universities, colleges, or vocational training institutions (U.S.-Saudi Arabian Business Council, 2009). Within this system, students with disabilities fall under the general education system.

In the K-12 education system, the Ministry of Education sets standards and oversees both general and special education. The biggest portion of the government's annual general budget goes for education (Ministry of Education, 2008); this amount exceeds more than 25% of Saudi

Arabia's annual budget (Al-Mousa, 2010). Similar to other leading countries, such as the United States, the education system in Saudi Arabia strives to maximized learning for all students. Unfortunately, the K-12 system does not meet many diverse students' needs (Alzamal, 2008). In fact, the gap that exists in all K-12 levels is the new focus of the Ministry of Education. The overarching new goal is to provide students with life skills that match their interests as well as personalizing learning for diverse learners (Tatweer, 2015).

Governmental funding continues to support growth in the education sector in order to transform it. Tatweer is a project that been funded by the government to improve and enhance the educational outcomes for education in Saudi schools. Tatweer looks to extensively build education through developing curriculum, training teachers, creating educational leadership, enhancing the educational environment, and promoting extracurricular activities (NREDSA, 2008). To help create a strong and solid educational environment, this new effort must be aligned with and based on research so that its policies are built on best practices that emphasize the elimination of any gaps in the system. This improvement touches many parts of education, and special education is one of the primary focuses of Tatweer (Ministry of Education of Saudi Arabia, 2008; Tatweer, 2015).

Special Education

Special education began in Saudi Arabia in 1960 when the Ministry of Education established the first special education institute for the blind in Riyadh. Then in 1962 the Ministry of Education established the Department of Special Learning that focused on three primary types of disabilities, which include a focus on learners that are cognitively impaired (historically referred to mental retardation), deaf, and blind (Afeafe, 2000; Al-Mousa, 2010). Over the years, special education programs and institutions have spread throughout the rest of the country. The

majority of these segregated programs have been housed in public schools that were enacted in self-contained classrooms (Al-Mousa, 1999). Eventually a limited number of students with disabilities moved from self-contained classroom to be in more mainstream settings, where students spend limited time with their peers in regular classroom (Al-Mousa, 2004). The Ministry of Education started to implement mainstreaming in 1991 on a small scale and based on disability types. For instance, students with very low vision or hard of hearing and deaf were included in some regular classrooms (Al-Mousa, 2010).

In 2001, the Ministry of Education through the General Secretariat for Special Education in Saudi Arabia published a guide called "Regulations for Special Education Institutions and Programs in Saudi Arabia" (General Secretariat for Special Education, 2001). This guide helps all stakeholders, which includes parents, teachers, principals, districts, and students themselves, understand their rights as well as services that should be provided. These regulations allow all students with disabilities to receive an education and have their own Individualized Education Program (IEP) based on their personal needs. Also, with these regulations, students with disabilities should be placed with their peers in the least restrictive environment (LRE), but the regulations include different placements depending on the type of disability and other factors. These regulations apply in the regular classroom, in a resource room where the students spend no more than 50% of time in self-contained, special programs where students spend their time with others who share the same disability, and in private institutions where students spend their time for education and rehabilitation all day (General Secretariat for Special Education, 2001).

Special education in Saudi Arabia has shifted from a theoretical educational principle and concept to more practical implementation, as it is moving away from segregated settings towards inclusive education (Al-Mousa, 2008). This movement to enhance the field of special education

through services and rehabilitation programs came after legislation and regulations were created to support the rights of individuals with disabilities (Alquraini, 2010). In 2000, The Provision Code for Persons with Disabilities in the Kingdom of Saudi Arabia was passed to ensure and guarantee rights in all life aspects, which include a free appropriate public education, appropriate rehabilitation, psychological, employment, social, recreational, and medical services through public agencies (Prince Salman Center for Disability Research, 2004). In 2002, the Ministry of Education issued the Document of Rules and Regulations for Special Education Institutes and Programs. It explains how special education programs work, services that are provided by these programs, rights for special students and teachers (which for the first time includes Individualized Education Programs for each student). It includes more details that ensure students with disabilities will receive an education equal to those of other students (The Document of Rules and Regulations for Special Education Institutes and Programs, 2002).

The field of special education in Saudi Arabia is moving from just providing service and education to more comprehensively considering law, research, and best practices (Ministry of Education, 2015). Particularly, deaf education in Saudi Arabia is part of the educational system that was developed as the Ministry of Education made an effort to build its programs (General Directorate for Special Education, 2015). One of the improvements in the field of special education is enhancing the quality of teachers' development through programs on a regular basis (Alquraini, 2010). Even with these improvements, deaf and hard of hearing students are still in need of services such as providing interpreters, increasing visual materials, hearing aids, and other related services (Hanafi, 2008).

Deaf Education in Saudi Arabia

The first initiative for teaching students who are deaf and hard of hearing was in 1964, when the Ministry of Education opened the first institutes for deaf and hard of hearing students, one for boys and another for girls, to help them start their education and training (General Secretariat for Special Education, 2015). These institutes aim to prepare deaf and hard of hearing students for life skills and enable them to be part of the country's workforce. In 1972, the first regulations for deaf and hard of hearing programs were released, which included services the deaf and hard of hearing should receive, building curriculum for deaf and hard of hearing, and other services such as transportation and accommodations (Alturkey, 2005). By 1989, the first self-contained classrooms opened within regular schools in the city of Riyadh, with small numbers of deaf and hard of hearing students and special education teachers. This has since been increased to be more than 90 programs (self-contained classrooms) and institutes for both deaf and hard of hearing across the country (Saudi Association for Deaf, 2015).

At the beginning, deaf and hard of hearing students at K-12 had different curriculum than did their peers in general education. In 2000, the curriculum for deaf and hard of hearing students changed to be the same curriculum that their hearing peers use in general education (General Directorate for Special Education, 2015). This change came as a first step toward inclusive education and to prepare deaf and hard of hearing students for higher education. In 2001, the first initiative was enacted to allow deaf and hard of hearing to start enrolling through universities, community college, or technical and vocational institutes across the country (Alturkey, 2005). In spite of this effort, these institutes still do not provide all the services that deaf and hard of hearing students need to be successful. For instance, services such as interpreters in the classroom are still very limited. King Saud University (KSU) was the first Saudi university to

allow deaf and hard of hearing students to enroll with support by providing a preparatory year for deaf and hard of hearing to enhance their reading, writing, and knowledge of academic life (King Saud University, 2015). KSU also provides interpreters that facilitate deaf and hard of hearing to communicate with faculty members, logistics support, and other services to ensure success for deaf and hard of hearing students in higher education.

Teachers of Students who are Deaf and Hard of Hearing in Saudi Arabia

Like the states, individuals preparing to be teachers for individuals who are deaf and hard of hearing receive their four-year teacher education degree in the Department of Special Education. Like other special education teachers, teachers for the deaf and hard of hearing do not study content areas. Teachers graduate with bachelor's degree without being an expert in any content area, such as math, science, or history. Instead, pre-service teachers spend the entire four years learning about deafness, language acquisition for deaf and hard of hearing, and different methods of communication. Teachers leave the programs after four years with a lack of knowledge of the content area that they will teach, which is not the only problematic issue. Special education teachers are also not exposed to different instructional designs, methods of teaching, and technology use in the classroom. Therefore, teachers who graduate with a bachelor's degree will teach only elementary school (General Directorate for Special Education, 2015), because the content area is believed to be relatively easy to teach without specialized content training. On the other hand, teachers for middle and high schools will spend their four years program studying their content area, and then take a nine-month training program to learn methods of communication or sign languages.

While, in-service teachers should be aware of their role as an agent of change to make a positive impact on the educational process this is not always the case. Similar to other countries,

teachers in Saudi Arabia have a lack of knowledge of the professional development standards and critical elements of professional development, which has negative impact on the students' achievement. Again, teachers are not exposed to instructional design, teaching strategies, effective technology use, or the professional learning required so that teachers are unaware of standards and elements needed in an educational setting.

Teacher Development and Growth

Teacher Practices

Teacher practices have a huge impact on the learning processes that allow students to reach high achievements, although teachers are not the only source of information and knowledge inside the classroom (Powell & Anderson, 2002). Students have leading roles that shape their characteristics as learners in the digital world. Technology has brought many changes that impact practices in the classroom through the implementation of various instructional designs (O'Hara, Pritchard, Huang & Pella, 2013). These changes have not always taken into consideration teachers' thoughts and attitude of these new practices or even the acceptance of these practices in the real-world classroom. The key element to successful reform in education starts with teachers' awareness of change (Richardson, 1996).

Promoting Changes

Change is not restricted to only those who are considered experts; instead, it is the responsibility of every member of society to effect change (Fullan, 1993). Teachers as part of the education system could make changes that improve and enhance the education system for all students. Thus, to implement any intervention successfully relies on teachers' awareness of understanding these standards and applying them through elements of professional development in order to create a productive environment and effective instructional designs. Based on the

conceptual framework of this study, the need to change would come as a cultural shift of education in Saudi Arabia, particularly for students who are deaf and hard of hearing. The educational shifts of practices from a traditional base into a framework and theory base, plus the increased use of technology in education, will help address these changes. Therefore, this study takes in consideration social validity by developing interventions intended to integrate the demands of the social community for teachers into their practices (Schwartz, 1996). To help promote the change among teachers, it is important to understanding teacher concerns toward the new change. Therefore, a conceptual framework is required to identify teachers' concerns prior to adopting practices. The Concerns-Based Adoption Model (CBAM) is an appropriate model to promote change among teachers and enhance professional development by understanding teachers' needs and concerns (Hall & Hord, 1987).

The Concerns-Based Adoption Model (CBAM)

CBAM demonstrates how teachers affected by the change process react to the implementation of any innovation, such as UDL in this study (Hall & Hord, 1987). The CBAM was developed on the work of Fuller (1969) in response to concerns related to educational changes. At the beginning, Fuller (1969) had four stages: unrelated concerns, self-concerns, task concerns, and impact concerns. Later, the work of Hall and Hord (1987) identified seven stages based on Fuller's work. These seven stages of concern are awareness, informational, personal, management, consequence, collaboration, and refocusing concerns (see Fig. 7). CBAM is a technique that enables leaders to measure staff concerns toward any new program, innovation, or strategy of teaching. CBAM has become a change model that is widely used in the implementation of educational innovations around the world.

Related to the effects of training on teachers' concerns towards innovation, CBAM developers have stated that individuals who receive any form of training sessions, either formal or informal, will support innovation more than those who do not obtain any training sessions. Training could transfer teachers' concerns from self-stage to a higher level, the impact stage (Hope, 1997). Therefore, this study provided a training session for the teachers and gathered data through both a pre and post survey. The purpose of this survey was to measure the changes with teacher concerns both before and after the training session.

Fuller's stages	Stages of Concern		Expressions of Concern
	6	Refocusing	I have some ideas about something that would work even better.
Impact	5	Collaboration	I am concerned about relating what I am doing with what my co-workers are doing.
	4	Consequence	How is my use affecting students?
Task	3	Management	I seem to be spending all of my time getting materials ready.
Self	2	Personal	How will using an innovation affect me?
	1	Informational	I would like to know more about the innovation.
Unrelated	0	Awareness	I am not concerned about the innovation.

Figure 7. Stage of Concerns: Typical Expressions of Concern about an Innovation (Hall & Hord, 2006).

Professional Development Standards

The purpose of learning development is not only to study and implement instructional innovations; it is a larger issue that seeks a culture with a strong base of collaborative work that will ensure long term change at all levels (Fullan, 1991). Teachers as an agent of change help to

make this occur by understanding standards and critical elements that foster collaboration among teachers to reach the desired outcome. Therefore, development for teachers should be built on a strong base to help change to occur and to be effective. The Professional Learning Association (2015) has created seven standards to increasing the effectiveness of professional development and learning. These standards are as follows:

Learning Communities

Learning communities refers to the culture of working as team to foster relationships among members in collaborative and productive environments in order to enhance their practice to develop collective responsibility (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006).

Leadership

Leadership comes as result of professional learning, which increases educators' effectiveness in instructional and organizational levels (York-Barr & Duke, 2004). Professional learning creates support systems that enable teachers to play critical roles starting as expert teachers in the class, leading teamwork in school, building connections with families, and handling these roles in professional way.

Resources

Professional learning can help create teachers who are able to provide resources that align with the variability of diverse learners and have positive effect on their learning. Teachers, through prioritizing, monitoring, and coordinating resources, will reach high levels of professionalism that will reflect on the progress of their learners (Professional Learning Association, 2015).

Data

Teachers are able to make successful decisions when they use multiple sources of data through formative and summative assessments, observations, self-reports, and students' portfolios and performances. Professional learning aims to create more comprehensive analysis from various data, which leads to enhanced students' performance (Lewis, Madison-Harris, Muoneke, & Times, 2010).

Learning Designs

Teachers as professional should be aware of integrating theories, research, and best practice through teaching to reach desired outcomes as a critical part of professional learning (Horowitz et al., 2005). Learning design is the vehicle that leads students to be more engaged and promote the role of innovation. UDL is a framework that helps to design learning through its critical elements by providing clear goals, flexible methods, materials, and evaluation for diverse learners (UDL-IRN, 2011). In addition to its three principles that help to design an effective, productive, and accessible learning environment for all learners (CAST, 2015).

Implementation

Teachers as professionals should be knowledgeable of the process of implementation at different stages. Teachers by implementing seek for applying research, practice to make change and to sustain support for implementation to increase student learning. For example, teachers' understanding of the stages of implementation by Fixsen, Naoom, Blase, Friedman, and Wallace (2005) will help them to implement successful interventions for their students.

Outcomes

Professional learning requires teachers to increase students' performances by expecting that students will achieve high levels. Thus, teachers should consider students' performance

standards and address high learning outcomes for all learners (The Professional Learning Association, 2015). Teachers as professionals should allow create different ways and paths to reach the outcome; this can be done by knowing students' performances standards. This aligns with the UDL notion by designing various materials, methods, and assessments to reach the desired outcomes.

Elements of Professional Development

It is necessary to align professional development with the aforementioned standards. According to Darling-Hammond, Wei, Andree, Richardson, and Orphanos (2009), there are four basic principles that help to promote designing professional learning. First, professional development should be extensive, intensive, ongoing, and linked to practices to make it up-to-date. Second, professional development should be focused on student learning as well as addressing the teaching of specific curriculum content. Third, professional development should be aligned with the priorities of school improvement and its objectives. Fourth, professional development should create solid working relationships among teachers (Darling-Hammond, Wei, Andree, Richardson, and Orphanos, 2009). Applying these elements alongside the standards of professional development will create expert teachers who are knowledgeable of appropriate practices for their students.

Teachers as Experts of Appropriate Practices

The challenges that the classroom brings lead educational professionals to think deeply about how to create new strategies to teach students and to facilitate their learning process. These new challenges compel educational professionals to find evidence-based strategies and research-based instruction methods that help teachers to deal with diverse learners who are at risk of falling behind in class and to open minds by experimenting with different resources from

different studies (Rathvon, 2008). Teachers' awareness of developmental knowledge is essential to help teachers construct tasks that meet the students' development needs. This knowledge will provide teachers the underlying understanding of how students think, work, grow, learn, and behave (Darling-Hammond, Chung, & Frelow, 2002).

Successful teachers must be aware of the general progression in development and pay attention to all aspects of development, such as physical, emotional, personal, social, cognitive, and linguistic. Understanding the different developmental pathways and their interactions will help teachers to identify where the students are in their development and how to best support their learning needs (Horowitz et al., 2005). Teachers as designers of their classrooms should be conscious of the personal and social development of their students in addition to knowing academic standards that will allow students to be more successful inside the classroom (Barna & Brott, 2011). A teacher's primary goal is to deliver knowledge to students by organizing it in order to support developmental progress of each student. Teachers also need to plan educational programs that take into account growth dynamics and the concepts of different theories to meet the diverse needs of learners.

Teachers' Awareness of Theories of Development

Teachers can foster development in their teaching by understanding the fundamental structures, different theories, and students' development process in order to create an educational setting that helps students to attain skills. Through the use of these structures, teachers are able to better understand how to design instruction and shape student growth. For instance, Piaget's theory of cognitive development (1953) notes that children go through different stages from infancy through adulthood that sharpen their ability and their interactions with the society around them. Piaget's stages explain the thinking process and how children think about specific subjects.

This development process will help students to acquire the knowledge that teachers provide (Piaget, 1953). Understanding the strong relationships between development, knowledge, and learning lead to being a more effective teacher in interactions with students. As a result, knowing the developmental stages will help teachers to create lessons and a classroom to meet the students' needs (Flavell, 1992; Horowitz et al., 2005).

Teacher's awareness of theories help them to provide best practices in the classroom and know how these practices can be based on different theories. Also, this awareness gives teachers a better understanding of their students' needs and how much help they as teachers should optimally provide. In another example, the Zone of Proximal Development (ZPD) by Vygotsky play a central role in explaining the difference between what a child can do with and without help (Vygotsky, 1978). Based on the concept of ZPD, Vygotsky's work provides and understanding of how teachers integrate tasks that meet the children's levels of development. From this point, teachers can further stretch children's performances with assistance. ZPD helps teachers increase developmental progress by understanding the amount of help they need to provide for their students (Horowitz et al., 2005).

In order to improve the developmental aspects of learners in the classroom, teachers should create instructional designs that are based on students' needs. Teachers of students who are deaf and hard of hearing should be aware of how language acquisition and development happen under severe conditions, such as deaf students. Thus, beyond Piaget and Vygotsky, the work of Chomsky and his nativist theory of language will help teachers to teach their students language (Chomsky, 1972). The understanding of different development pathways is not only important for effective teaching, but it is also critical to help teachers to create a constructive

classroom, which in turn helps students to develop and increase their abilities to enhance their skills in different areas (Horowitz et al., 2005).

Teachers should be aware of the theories, practices, and research in their fields: for example, having read the theories on how the brain works will help teachers to create instructional designs that work for their students (Caine & Caine, 1990; Korthagen & Kessels, 1999). Drawing on brain-based research and current learning sciences, researchers will able to distribute learning through brain networks (Bransford et al., 2006). One theory that considers these different theories is (UDL), which promotes methods and strategies that fit with a specific learning approach through various instructional goals, materials, methods, and assessments that can be set up to work for every learner (Rose & Meyer, 2002, 2005). Teachers need to have an understanding of differentiated instruction as a teaching theory that relies on various instructional methods, which in turn can be aligned with diverse learners inside classrooms (Strangman & Meyer, 2003; Tomlinson, 2001). Teachers should use effective materials and methods with their students by encouraging them to perform different activities that measure their students' abilities and understanding (Messinger-Willman & Marino, 2010).

Dealing with Diversity in the Classroom

Increased classroom diversity has brought many challenges for teachers. Knowledge of cultural influences and the nature of learning for diverse learners will provide prospective teachers to have a better sense of the learners' needs when dealing with them (Banks et al., 2005). As a result of this diversity, teachers must start in the classroom by creating and managing an effective and emotionally safe classroom that meet the students' needs. Teachers need to develop vast knowledge about students' interests, needs, and strengths in order to adapt

instruction, curriculum, materials, and assessment to match the prior experiences of different groups of learners to make learning more accessible for students (Mazur & Doran, 2010).

The teachers' main job is to help students with their different abilities, experiences, backgrounds, emotional reactions, attention spans, and learning styles to develop their skills. Teachers need to provide the right services and interventions for students who need extra help. For example, students may reach an advanced understanding of some skills and should be provided with a learning environment to increase and sharpen these skills (Horowitz et al., 2005). Students with disabilities are a diverse group that comes from different cultures, and our understanding as educators of culture must be more flexible to cover wider cultural contexts. Culture includes history, family, designations of ethnicity and race, community, geographical location, gender, and religion. All of these factors shape social expectations and the behaviors of social interaction of the learner (Rogoff, 2003).

Teacher Preparation Programs

Teacher programs around the world seek to provide the utmost in preparation based on research and best practices so that they can produce teachers with high qualifications. For example, the education reform in the United States in the last two decades has come to ensure that schools include highly qualified teachers who are prepared with a high level of knowledge (Darling-Hammond, 1997; Easterbrooks & Putney, 2008). This reform not only encompasses teachers' preparation and development, but it also emphasizes evidence-based practices in order to guarantee that students have high quality instruction that will increase their achievement (Mosteller, Light, & Sachs, 1996). Evidence-based practices emerged in No Child Left Behind Act (NCLB, 2001) and recent research has demonstrated the positive outcome of these practices. This all led to the integration of these practices into the Individuals with Disabilities Education

Act (IDEA, 2004). The National Council for Accreditation of Teacher Education (NCATE) (2008) requires a list of standards in order to receive accreditation, and this list includes skills and knowledge of teacher preparation programs for specific areas.

In 2012, the College of Education at KSU received accreditation from NCATE (King Saud University, 2015) by applying the standards that NCATE required. This is the first time that the College of Education at KSU received an accreditation, which means the College of Education provides pre-service teachers with best practices that NCATE requires. This effort comes under the higher education framework, but the critical question here concerns K-12 teachers who graduated before 2012: are they aware of the evidence-based practices and research role in the education? Therefore, the need exists for more K-12 teachers to gain the knowledge and skills associated with standards and evidence-based practices.

Teachers of Students who are Deaf and Hard of Hearing

Teachers of students who are deaf and hard of hearing need to know their students' stages of cognitive and mental capabilities (Easterbrooks, 2008), as well as their language acquisition nature (Miller, 2007). Having this knowledge in addition to teachers' awareness of the social and educational implications for their students (Chute & Nevins, 2006) and valuing the role of technology in the classroom will produce successful teachers (Akamatsu, Mayer, & Farrelly, 2006; Lang & Steely, 2003; Roeser, 2002; Stewart & Kluwin, 2001). This awareness is embedded by knowing that deaf and hard of hearing students are visual by nature; therefore, they need the help of visual organizers in order to enhance and increase their language (Easterbrooks & Stoner, 2006), as well as to facilitate deaf thinking processes (Luckner, Bowen, & Carter, 2001). This requires that teachers are aware of the various strategies of teaching and learning that

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deaf and hard of hearing need. Specifically, they need to be aware of how evidence-based

practices play a fundamental role in development (Easterbrooks & Putney, 2008).

Teachers play a central role in enhancing deaf and hard of hearing academic outcomes by

understanding the methods that align with their students' characteristics (Spencer & Marschark,

2010). Even if deaf or hard of hearing students' language skills appear to be sufficient in the

classroom this does not mean that their language skills are similar or optimal to other hearing

peers (Convertino, Marschark, Sapere, Sarchet, & Zupan, 2009). Teachers' awareness goes

beyond just providing instructional practices; it also includes applying different ways to assess

the student's understanding rather than relying only on the traditional assessment (Quenemoen,

Thurlow, Moen, Thompson & Morse, 2003). UDL provides all learners multiple ways as well as

options to engage in the learning process, this includes various ways to demonstrate the

understanding of the content. Teachers who are prepared to use UDL can assess deaf students'

performances in many tasks by using progress monitoring through ongoing and frequent

measurement of student skills and knowledge (Luckner & Bowen, 2006). Most recently Luckner

and Bowenr (2010) reported using progress monitoring to help improve students' motivation and

evaluate the effectiveness of their instruction.

Universal Design for Learning

The notion of Universal Design for Learning (UDL) is based on Universal Design (UD),

which is often applied in architecture. UD aims to create an environment that allows people with

and without disabilities to move around without any barriers. It also provides mobility, usability,

and accessibility for individuals with disabilities as a means to increase their independence. The

concept of UD takes into consideration how to facilitate the life of people with disabilities or

those who need help; examples of this are building ramps that allow individual with physical

disabilities to enter and exit or automatic doors that allow individuals with wheelchairs to access the building (Bowe, 2000; Edyburn, 2010; Rose & Meyer, 2002). UD helps individuals with disabilities to reach the greatest level of usability and accessibility for the widest range of individuals with or without disabilities (Story, Mueller, & Mace, 1998).

In 1998, the Center for Applied Special Technology (CAST) took the concept of UD a step further by applying it to a framework for classroom instruction and curriculum. UDL is the result of brain-based research, and it aims to provide flexibility in teaching and curriculum by erasing the barriers and establishing multiple means of engagement, representation, and action or expression. According to CAST (2015), UDL is defined as a set of principles for curriculum development that give all individuals equal opportunities to learn. UDL provides a blueprint for creating instructional goals, materials, methods, and assessments that work for everyone by providing flexible approaches that can be customized and adjusted for individual needs (CAST, 2015). It is at this stage that the term universal design for learning (UDL) was born and became widely used in the field of special education (see Fig. 8).

UDL Principles
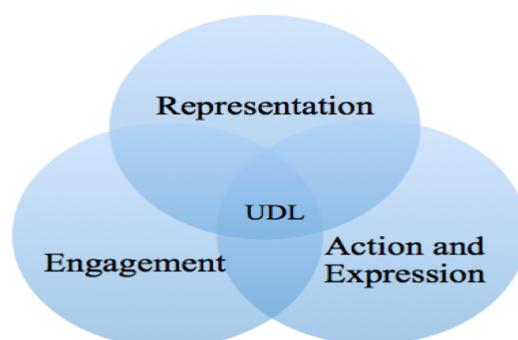
Figure 8. UDL principles

UDL is strongly related to cognitive neurological research (Rose & Meyer, 2002; Rose, Meyer, & Hitchcock, 2005), which plays a vital role in the education settings. It aligns with how

brains are able to respond to different tasks and missions that happened during the learning process (Bransford, Brown, & Cocking, 2000; Bransford et al., 2006; Driscoll, 2005; Posner & Rothbart, 2007; Raz, A. & Buhle, J., 2006). In addition, UDL is grounded in cognitive theories (Rose & Meyer, 2002; 2005), which proves the significance of UDL as a framework rather than as a simple approach to teach students. UDL aims to foster metacognition by providing many options for learners by giving choices, collaborative opportunities, and increasing motivation and engagement with the content. Rose and Meyer (2002) explained that three primary brain networks come into play:

1. Affective Networks: the "why" of learning, how learners get engaged and stay motivated. How they are challenged, excited, or interested. These are affective dimensions and to reach this network is by providing multiple means of "Engagement."

2. Recognition Networks: the "what" of learning, how we gather facts and categorize what we see, hear, and read. Identifying letters, words, or an author's style are recognition tasks, and to reach this network is by providing multiple means of "Representation."

3. Strategic Networks: the "how" of learning, planning and performing tasks. How we organize and express our ideas. Writing an essay or solving math problems are strategic tasks and to reach this network is by providing multiple means of "Action and Expression" (CAST, 2015; Rose & Meyer, 2002).

These three elements, the what, how, and why, are the major components of UDL; many studies of the brain and cognitive theories are integrated into the concept of UDL in order to help students receive and deliver the information in multiple ways. Moreover, UDL aligns with the notion of utilizing digital technologies in the educational process, which makes UDL a powerful framework to teach diverse learners (Burgstahler, 2008; see Fig. 9):

Universal Design for Learning Guidelines

Provide Multiple Means of
Engagement
Purposeful, motivated learners

Provide options for self-regulation
+ Promote expectations and beliefs that optimize motivation
+ Facilitate personal coping skills and strategies
+ Develop self-assessment and reflection

Provide options for sustaining effort and persistence
+ Heighten salience of goals and objectives
+ Vary demands and resources to optimize challenge
+ Foster collaboration and community
+ Increase mastery-oriented feedback

Provide options for recruiting interest
+ Optimize individual choice and autonomy
+ Optimize relevance, value, and authenticity
+ Minimize threats and distractions

Provide Multiple Means of
Representation
Resourceful, knowledgeable learners

Provide options for comprehension
+ Activate or supply background knowledge
+ Highlight patterns, critical features, big ideas, and relationships
+ Guide information processing, visualization, and manipulation
+ Maximize transfer and generalization

Provide options for language, mathematical expressions, and symbols
+ Clarify vocabulary and symbols
+ Clarify syntax and structure
+ Support decoding of text, mathematical notation, and symbols
+ Promote understanding across languages
+ Illustrate through multiple media

Provide options for perception
+ Offer ways of customizing the display of information
+ Offer alternatives for auditory information
+ Offer alternatives for visual information

Provide Multiple Means of
Action & Expression
Strategic, goal-directed learners

Provide options for executive functions
+ Guide appropriate goal-setting
+ Support planning and strategy development
+ Enhance capacity for monitoring progress

Provide options for expression and communication
+ Use multiple media for communication
+ Use multiple tools for construction and composition
+ Build fluencies with graduated levels of support for practice and performance

Provide options for physical action
+ Vary the methods for response and navigation
+ Optimize access to tools and assistive technologies

Figure 9. UDL 3 principles. (CAST, 2015)

Engagement

Engagement includes motivation and stimulating students' interest to learn through meaningful instruction, hands-on activities, and creativity in order to employ students' interests and sustain their level of engagement (Courey, Tappe, Siker, & LePage, 2013). A good learning tool should have multiple means of engagement to tap into learners' interests and motivate them to learn (Spencer, 2011). It seeks to involve students in the content and encourages them to learn, communicate, and solve problems with a high desire to learn. Therefore, teachers as designers of the learning environment need to be concerned about how the students are engaging within the learning process. This would start through simply being concerned about the accessibility and usability of the materials to support a wider understanding of engagement that includes whether students are actively engaged, working collaboratively in a group, or working separately on their own (Israel et al., 2014).

Engagement under UDL provides options for self-regulation through promoting beliefs, expectations that optimizes learning motivation, develops reflection, and self-assessment. UDL aims to provide choices for sustaining efforts and persistence that foster the collaboration and increase mastery-oriented feedback. In addition to recruiting interests, it seeks to optimize learners' options and autonomy and to minimize distractions and threats (CAST, 2015). Engagement was the third principle in the previous guideline version (CAST, 2011), but the fundamental role that engagement plays in the educational process comes as the first principle in the new version, as it leads to successful outcomes (see Fig. 9).

Representation

Every teacher should give students various ways to represent how they acquire knowledge that target their interests in a manner that best fits how students receive information. Representation refers to making the content more accessible for the majority of students by designing instructional materials to reach a broader range of diverse learners (McGuire, Scott, & Shaw, 2006). In addition, it involves linking students' prior knowledge and experiences to the new concept and making strong connections with related and already mastered concepts. Representation involves giving learners multiple means of acquiring new facts and knowledge in acceptable and flexible ways (CAST, 2015). The learner chooses the most appropriate method of acquiring information that best suits him or her according to that student's abilities or disabilities. This means that the learner has a wide variety of alternative ways to access information until he or she finds the method that will make it easier to understand the content (Center for Training Enhancements, 2015).

As a form of representation, electronic materials are widely used for students to enhance their achievement levels and to allow more interaction with these materials (Moody, Justice, &

Cabell, 2010). Electronic materials are a digital version of the original printed books and materials that includes animation, texts, pictures, 3D, and videos that allow more opportunities to represent the materials in multiple ways (De Jong & Bus, 2004). Electronic materials garner increased attention (Shamir & Korat, 2006) by proving enhancements that could occur in students' achievements, and these e-books are a valuable replacement for traditional paper books (De Jong & Bus, 2004). Digital materials allow students with disabilities to access information and knowledge as well as increasing the level of engagement and interaction with these materials among students. For example, students who are deaf and hard of hearing whose reading levels are behind their hearing peers (Marschark, Sapere, Convertino, Mayer, Wauters, & Sarchet, 2009) will be able to acquire language skills through visual means of acquiring knowledge (Dalton, Shlepper, Kennedy, Lutz, & Strangman, 2005). UDL relies on technology to provide different ways to allow students to learn, interact, and engage with the content that they want to learn (Dalton et al., 2002).

Action and Expression

Action and expression refers to any form of alternative methods that allow learners to demonstrate their learning and understanding in many ways, rather than relying on traditional forms of assessment, such as exams and regular assignments (Courey et al., 2013). This aims at giving learners alternatives means for demonstrating what they know. Through UDL, learners are encouraged to show how much they possess intellectually through different means. Students with disabilities often lack the skills that build the transitional bridge to access the general education curriculum and be successful in school. Evidence suggests that using technologies such as digital texts and translational supports enhances the outcomes for students with disabilities (Anderson-Inman & Horney, 2007). By implementing multiple means of action and

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expression, learners can access new ways to respond by providing many options to complete assignments through different media such as speech, text, or other forms (IRIS, 2015).

Learners are systematically different in the way that they function strategically; dealing with diverse learners whether they are novices and experts is challenging. Therefore, UDL provides many options that match the learners' variability across a variety of executive functions. UDL shapes the learning process through action and expression by showing learning embodied in many ways that allow learners to express their understanding in the best way that fits with their abilities (Meyer, Rose, & Gordon, 2014). Thus, UDL encourages students to be more creative and to think more critically (Hehir, 2009). Innovation means using different strategies in the classroom that engage learners to participate and be effective members (Hitchcock, Meyer, Rose, & Jackson, 2002). UDL emphasizes the role of innovation in teaching to create an atmosphere that allows individuals to be more creative and help to reduce barriers (Israel et al., 2014), which in turn help students to more easily express their understanding.

UDL as Framework

UDL is a framework that makes the transition from inaccessible design to universally accessible design (Basham, Israel, Graden, Poth, & Winston, 2010; Basham, Meyer, & Perry, 2010; Edyburn, 2010; Rose & Meyer, 2000). Rose and Meyer's (2002) work helps to elaborate the conceptual framework of UDL and its role in helping in the identification of emerging trends with regard to cognitive concerns and learning. UDL is a framework and design that can be shaped in multiple ways that fit with any environment and learners' variability (Israel et al., 2014). UDL is founded on the notion of the what, how, and why of learning; it has three major concepts that provide students with multiple means of representation, action and expression, and

engagement. UDL's main objective is to ensure multiple ways through which students can attain, express, and apply technological knowledge (Biancarosa & Griffiths, 2012).

As a framework, UDL has integrates brain sciences (cognitive and neuroscience) and research from learning sciences (education, educational psychology) through affective, recognition, and strategic networks (Rose & Meyer, 2002; Nelson & Basham, 2014). UDL is a framework that enables all learners, including students with and without disabilities, to obtain accessibility to materials that match their interests. This is due to the realization and the recognition of inclusiveness as a crucial element that enables learners with different levels and skills to enhance and increase their achievements (Meyer & Rose, 2005). Coyne and Dalton (2005) posit that the application of universal design is important for students in this era, including deaf and hard-of-hearing students (Dolan, Hall, Banerjee, Chun, & Strangman, 2005) or struggling readers in both general and special education (Dalton et al., 2002).

Critical Elements of UDL

UDL has four pillars and critical elements that starts with creating goals, leads to intentional planning for learner variability by using various instructions, employs flexible methods and materials, and ends with timely progress monitoring by evaluating the learning process through multiple ways of assessment (National Center on Universal Design for Learning, 2015; UDL-IRN, 2011). In order to successfully implement UDL, teachers should be aware of these critical elements.

1- Clear Goals

The purpose of any lesson is to reach specific goals, outcomes, and content standards. Teachers set many goals to meet the different needs of their learners, and UDL aims to use multiple options and paths to reach the target goals. When teachers have clear goals, this will

help students to use the most appropriate path to reach these end goals. Thus, to activate UDL, teachers should have various materials and methods to allow students to reach the goals that they have set for them (Coyne, Pisha, Dalton, Zeph, & Smith, 2012).

2- Intentional Planning for Learner Variability

UDL takes into consideration the variability among learners and faces this challenge by intentional proactive planning by providing options, methods, resources, and materials to provide support (UDL-IRN, 2011). Cognitive science and neuroscience explain how individuals process and maintain information, and they also shows how learners are variable (Meyer et al., 2014), which is how UDL can plan an important role by addressing variability among learners.

3- Flexible Methods and Materials

As a flexible framework, UDL provides varied methods and materials to create content that matches students' variability. The variety of materials and methods should be used to engage learners to acquire different information and to enhance their knowledge in many ways (Nelson, 2013). Teachers should be aware of different materials that use technology to facilitate learning for various types of students.

4- Timely Progress Monitoring

As aforementioned, UDL provides choices of flexible methods and materials as well as provides options and opportunities for learners to demonstrate their knowledge. This could be done through a variety of formative and summative assessments or other ways that student can demonstrate their understanding (Nelson & Basham, 2014).

Beside the critical elements, teachers who implement UDL should be aware of the five instructional planning process steps. These five planning process steps are based on the notion of backwards design that starts from the first step. The five steps are establishing clear outcomes,

anticipate learner variability, measurable outcomes and assessment plan, instructional

experience, and reflection and new understanding (Nelson & Basham, 2014; UDL-IRN, 2011).

Finn's (2005) study highlighted that 74 out of 75 participants who are teachers believed that

integrating UDL into instruction would benefit diverse learners in their classroom. Teachers'

knowledge of the UDL principles, critical elements, and instructional planning process will help

to implement UDL.

Role of Technology in the Implementation of UDL

Technology has been used in education to provide tools to facilitate learning. Also,

technology helps students to acquire a deeper understanding by being able to use different

learning resources, materials, devices, techniques and settings (Luppicini, 2005). Because UDL

is a framework that includes various sources, tools, and different types of technology, there is an

obvious relationship between the use of technology and UDL (Basham et al., 2010). In the same

context, this strong relationship between technology and UDL does not mean that UDL is all

about technology; rather, UDL includes purposeful technology that aims to help students (Nelson

& Basham, 2014). Technology helps with the implementation of UDL; for instance, both the

UDL Guidelines and the UDL Critical Elements reference the use of flexible instructional

materials (CAST, 2015; UDL-IRN, 2011). Technology provides for flexibility and supports UDL

through things such as digital instructional materials (Nelson, 2013).

The field of special education has considered the role of technology among the learners

and has come with many services that rely on technology through assistive technology (AT). AT

refers to any item, piece of equipment, product system that is used by individual with disabilities

to increase, maintain, or enhance the functional capabilities (Edyburn, 2004). AT has a primary

role to play in the modern education environment, where it provides help for students who need

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extra attention (Edyburn, 2004; Parette, Peterson-Karlan, Smith, Gray, & Silver-Pacuilla, 2006).

AT aims to improve and maintain the functional capabilities for students with disabilities as it

helps specific student who face difficulty with its technology support from hardware through

software (Maor, Currie, & Drewry, 2011). AT is moving from focusing on specific students to

include all students (Edyburn, 2014), which aligns with the notion of UDL to be more inclusive

and universal (Rose, Hasselbring, Stahl, & Zabala, 2005). UDL and AT have the ability to

empower the education environment and reduce barriers to reach each learner. Importantly, UDL

and AT impact each other (see Fig. 10). Therefore, AT and UDL should align to help various

learners who need extra attention as well as to provide multiple mean of engagement,

representation, and action and expression (Meyer et al., 2014).
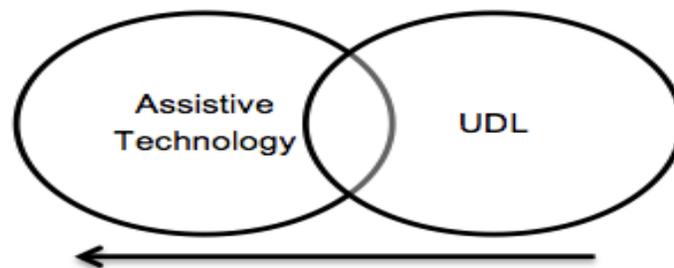
Figure 10. Reduce barriers from Rose et al. (2005)

The outcome of integrating technology and UDL in learning has demonstrated benefits

across learners. It helps to create an atmosphere where learning can include multimedia

techniques, which in turn builds a learning environment that is not only receptive but also

expressive. UDL explores ways that information and knowledge access can be enhanced, ways

through which learning can be strategized, and ways of ensuring engagement among students

(Coyne et al., 2012). The research illustrates that UDL is a successful evidence-based framework

that produce purposeful and proactive designs that support all learners' variability as well as

supporting iterative design as needed to reach positive outcomes (Basham & Marino, 2013). In

addition, UDL uses vary instructional designs, materials, and strategies including technology to create modern learning environments (Basham et al., 2010; Dalton et al., 2002; Dolan, Hall, Banerjee, Chun, & Strangman, 2005; Edyburn, 2010; Hitchcock, 2001; Hitchcock & Stahl, 2003; King-Sears, 2009; Muller & Tschantz, 2003; Rose & Meyer, 2002).

The notion behind UDL is to reach all learners in the classroom with different interests, weaknesses, and strengths to enhance achievement levels. It includes students with and without disabilities and with or without IEPs, all of which can be handled through instructional design and environments that are developed to help all students grow at the same time. An environment that includes visual, audio, sensual, and physical activities along with embedded technology will help create an accessible learning environment for all learners (Basham et al., 2010). Multimedia designs utilized by learners within digital environments help learners go farther and be able to achieve at a higher levels (Mayer, 2009). The implementation of UDL helps to create this type of environment that encourages learners along with providing technology that enhance students' performance (Edyburn, 2004).

Creating a Modern Education Environment

The critical part for successful UDL implementation is having a good understanding of the UDL framework (Edyburn, 2010; Hehir, 2009; Israel et al., 2014). This understanding will take into consideration that UDL is centered on design; this design not limited to the instructional designs, curriculum, and technology but it is also about the learning environment. Users of UDL move through incremental changes step by step to reach the notion of disruptive change that comes with many challenges that teachers should be aware of (Christensen, Horn, & Johnson, 2008). This movement can include basic changes in the classroom, such as using smart boards instead of traditional boards, or using the highest levels of technology, which could

include iPads or smart phones. The transformation from printed papers to digital content is another example that technology brings to the classroom (Gee, 2010; Leu, 2006). Other movements such as flipped classrooms, blended learning, virtual learning, and online learning. Overall, teachers should be aware how to deal with these changes (Staker & Horn, 2012).

UDL is a flexible framework that has the ability to be shaped into any environment including regular classrooms or online environments (Eberle & Childress, 2007), and ranging from K-12 classrooms or higher education settings (HEOA, 2008; Pliner & Johnson, 2004). A good understanding comes through fully grasping UDL's variability (Rose, 2013) to create an environment that meets individual needs through personalization (Smith, 2012). An effective learning environment could be built by knowing the features of personalized instruction where instruction aligns with learning needs and are designed to specific interests of various learners (Bray & McClaskey, 2013). In addition, teachers should be aware of individualization where instruction is designed to meet particular learning needs (Bray & McClaskey, 2013) and differentiation in order to create an effective learning environment designed for the learning preferences of various learners (Tomlinson, 2001; Tomlinson et al., 2003).

UDL in Practice

UDL has been successfully implemented in different curriculum, instructional designs, materials, teachers, and students (Spooner, Baker, Harris, Ahlgrim-Delzell, & Browder, 2007). Courey et al. (2013) show how to improve lesson planning through UDL by studying teachers who took a quick training session; while teachers exhibit understanding of the program, they still need more experience to implement it as a framework in their classrooms. This aligns with the vision of Fixsen et al (2000) who indicate that implementation can occur successfully with a two to four year period, which indicates that UDL is not a simple approach or method to be learned

in quick training sessions. This applies not only for teachers, but also for students as they develop a metacognitive approach for the learning process (Bransford et al., 2000; 2006). Metacognitive approaches through UDL require time to allow students to learn how to understand, self-assess, and have self-discovery of their strengths (Smith, 2012),

UDL can be a powerful framework that assists learners in many subjects and content areas, including science, technology, engineering, and mathematics (STEM) (Anderson & Anderson, 2013; Basham, & Marino, 2013; Courey, LePage, Striker, Roschelle, & Blackorby, 2011). It also can provide a good framework for biology (Kortering, McClannon, & Braziel, 2008), literacy (Coyne, & Dalton, 2005; Coyne et al., 2012), reading comprehension (Brand & Dalton, 2012; Meo, 2008), and assessment (Dalton, & Brand, 2012; Dolan & Hall, 2001). UDL has been beneficial in many areas, including instructional designs that apply UDL (Spooner, Baker, Harris, Ahlgrim-Delzell, & Browder, 2007), teaching enhancement by teachers (Courey et al., 2013), increases in student achievement (CAST, 2015), and paving the road to a more inclusive education (Messinger-Willman, & Marino, 2010).

UDL in Inclusive Education

UDL has strong connections to cognitive theory and has been applied in practices that show successful interventions, which led it to emerge in research as an educational framework that can go beyond classrooms. UDL helps the movement toward inclusive education (Messinger-Willman, & Marino, 2010) and increases opportunities to access general education (Bremer, Clapper, Hitchcock, Hall, & Kachgal, 2002; Hitchcock, Meyer, Rose, & Jackson, 2002; Wehmeyer, 2006). UDL is a framework that incorporates a range of instruction designs, practices, approaches, and assessments while providing equal educational access that is more inclusive in order to meet learning needs (Scott, McGuire, & Shaw, 2003). Besides increasing

the opportunities for inclusive education, UDL aims to reduce barriers that prevent inclusive education from occurring (Messinger-Willman & Marino, 2010). UDL provides a new paradigm of inclusiveness that holds potential for all learners to take advantage of as it expands inclusive practices by applying its principles (Scott, McGuire, & Shaw, 2003).

The term UDL fosters an objective on learning, which includes an inclusive environment that allows all learners to share knowledge and skills without barriers (Rose, Harbour, Johnston, Daley, & Abarbanell, 2006). UDL through its principle of engagement, representation, and action and expression provides the notion of inclusive education that students with disabilities need in order to be included in regular classrooms. UDL promote inclusive educational practices through accessibility and usability of multiple ways of instructional designs, materials, technology, and media to meet numerous needs of learners (Hitchcock & Stahl, 2003). In addition, the role of technology when it is modeled through UDL will shrink the gap between inclusive education and students with disabilities in order to create a modern environment that aligns with UDL.

Common Misconceptions of UDL

UDL has improved both learners' skills and teachers' performances; it has been successfully implemented in many countries. In spite of these positive results, there are still common misconceptions and misunderstanding by teachers, educators, and researchers. Nelson and Basham (2014) illustrated the most common misconceptions on UDL that could lead to mischaracterizations or criticisms (see Table. 2).

Table 2:

Common Misconceptions of UDL (Nelson & Basham, 2014).

Common Misconceptions of UDL	Clarification
UDL and technology	UDL as flexible framework can include technology. In order to use technology, it should be purposeful; otherwise, the technology could be barrier for students (Nelson & Basham, 2014).
UDL only for students with disabilities	Students learn in many ways and unique as a fingerprint (Meyer et al., 2014), which means each student is different than others. UDL meet these learners' variability with or without disabilities.
UDL is an instructional strategy	UDL is not a simple strategy; UDL is framework that includes 3 principles, critical elements, and instructional planning process that should be done through deep understanding (UDL-IRN, 2011).
UDL is the same as differentiation	Differentiation is a critical element, but UD's framework includes differentiation and personalization under it. Thus, UDL has a larger conceptualization theme than just differentiation.
UDL is only for specific subject areas	Many subject areas have use UDL such as STEM, biology, and literacy.
UDL is what a good teacher already does	Being a good teacher will promote the implementation of UDL, but UDL is also about the professional learning, awareness of professional standards and the right stages of implementation.
UDL doesn't have research behind it	UDL is based on more than 1,000 studies from the learning and brain sciences.
UDL works for small groups of students	UDL work for any type of groups and in any classroom size, or any environment such as traditional classroom, online, or blended learning.
UDL is only for certain types of teachers	UDL pays attention to the notion of flexible accessibility and could be used by any type of teachers and classroom, including special education, general education teachers, or elementary, high school, and university level teachers.

Conclusion

The purpose of this study was to implement UDL through the work of teachers of students who are deaf and hard of hearing in the city of Riyadh in Saudi Arabia. This is important because of two factors, the rapid growth segment of special education in the country and the increased funding from the government to improve education for students with disabilities. Therefore, this study aligned with the new project (Tatweer) to increase professional development among teachers by applying evidence-based framework such as UDL to be the first experimental research that applies to education in the country. This chapter has discussed the education system in Saudi Arabia, professional development and education of teachers, and UDL in Education.

CHAPTER III

METHODOLOGY

Research Questions

1. What is the current level of implementation of the three UDL principles in Saudi schools? (Engagement, Representation, and Action/Expression).

2. What are the barriers to implementing UDL in Saudi schools?

3. How does professional development impact teachers' level of understanding regarding implementation of UDL?

4. How does professional development impact teachers' concerns towards implementing UDL?

Research Design

The purpose of this study was to investigate the variables associated with the implementation of UDL in Saudi Arabian schools and identify the barriers that could prevent the implementation of UDL. Therefore, this study used a mixed methods design that use both quantitative and qualitative methods to investigate and answer the research questions. Having different methods present means to investigate and answer the research questions through various approaches available to measure the many domains that research questions ask. More insights will be gained by including both quantitative and qualitative rather than using a single method (Creswell, 2009). By having methods that different concepts and approaches, the databases will be enriched (Johnson & Onwuegbuzie, 2004). The basic concept of using mixed methods is that integration will lead to enhancing and maximizing the strengths of the quantitative and qualitative data (Creswell & Clark, 2011). It allows the researcher to answer the research question in depth through multi-level perspectives and cultural influences that could play an important role (Johnson, Onwuegbuzie, & Turner, 2007).

This study uses levels of collecting date through two stages in order to insure that the data comes from multiple ways to mitigate validity threats and establishing trustworthiness in the findings (Butin, 2010; Creswell, 2013). The two stages will be discussed in details below:

Stage One

The first step of this research effort consisted of developing a survey, adopting another one, and creating a quiz by the researcher. The first version of the surveys and quiz were written in English (see Appendix H and O). Both construct and content validity were done through a pilot study, and the items were reviewed by experts to make sure that the items would measure what they are expected to measure. The purpose of the pilot study is to examine the feasibility of the survey that is intended to be used in a larger-scale study (Leon, Davis, & Kraemer, 2011).

The researcher has translated both surveys into Arabic (see Appendix J and P). After the translation, the researcher set a pilot study by having a small group of K-12 teachers of students who are deaf and hard of hearing that were randomly selected to participate and to take the first version of the survey to check its construct validity. Some items needed clarifications and modifications, and this was accomplished by adding phrases and words. Five faculty members at King Saud University (KSU) participated in the comparison of the translation to ascertain that it matched the meaning in Arabic. All suggestions by focus group members who were either teachers or faculty members at KSU were made (see Appendix K for the Arabic Translated vs. the Arabic Modified Statements). To ensure that the modifications matched the English version, the researcher has completed a back-translation by translating the modified statements in Arabic into English in order to increase the quality of this study (see Appendix L).

After making sure that the survey was checked for construct and content validity, it was sent out to teachers. They were asked to fill out a survey to answer research questions 1 and 2.

The survey was designed to investigate and conduct a broad assessment of the current implementation level of the three UDL principles (engagement, representation, and action and expression) used by teachers of students who are deaf and hard of hearing in schools. Also, the survey was intended to demonstrate the barriers to implementing UDL for deaf and hard of hearing students in Saudi schools.

Stage Two

Teachers have received their training during this stage of this study, and a baseline measurement of the teachers' concerns and understanding of UDL implementation was applied. Teachers filled out a survey before the training session started; the same teachers again filled the same survey after completing the whole session. This survey is different than the previous one that was developed for stage one. This survey is a pre/post survey to measure the teachers' concerns and understanding of UDL. Teachers received extensive training sessions to learn new instructional designs and subsequent application of UDL. Teachers have learned the three principles that are the critical elements of UDL as well as how to apply them in their practices. Teachers who attended the training session received a certificate signed by the dean of the College of Education at King Saud University (see Appendix S).

Teachers also learned how to design and create digital materials through UDL. For example, they taught how to use applications such as *iBook Author* that, through pictures, words, graphics, and 3D modeling, offer students a chance to understand texts that contain complex expressions in diversified ways and assist in students' engagement in class undertakings. This program provides students with a chance to interact with digital content and academic materials at their own convenience (Carnahan, Williamson, Hollingshead, & Israel, 2012). Training sessions allowed teachers to learn how to use Augmented Reality (AR). AR allows students to

interact with 3D information in a natural way in the real environment (Liarokapis, Petridis, Lister, & White, 2002) and provides direct interaction with virtual objects in the real environment (Reitmayr & Schmalstieg, 2001). A variety of website sources and various digital platforms were used during the training session. By the end of the training sessions that lasted five hours, the teachers understood the framework of UDL for the educational setting and how to apply UDL principles of engagement, representation, and action/expression (Rose & Gravel, 2010).

To have a better understanding of the change process resulting from the training session of the implementation of UDL, teachers' concerns were taken into account. According to CBAM, classroom teachers experience concerns during the process of adopting and using new methods, approaches, or frameworks in their teaching. Therefore, this stage relied on the theoretical framework of CBAM by using Stages of Concern Questionnaire (SoCQ) to help identify teachers' concerns regarding the application of UDL. Teachers have been asked to take the SoCQ before and after the training sessions to measure their responses both times in order to see if there are any significant differences in the stages of concern among teachers. The researcher received permission to use the SoCQ from Advancing Research Improving Education (see Appendix M). The researcher modified SoCQ from the original statements to be aligned with this study (see Appendix N for The Original SoCK vs. the Modified Statements of the SoCQ Questionnaire). The researcher translated SoCQ from English (see Appendix O) into Arabic (see Appendix P). For the quiz, the researcher created a quiz that measures teachers' understanding by developing 15 questions. The researcher received two validated surveys from The Center for Applied Special Technology (CAST) that included questions to be used in this study (see Appendix O for English quiz and Appendix P for Arabic quiz; see Fig. 11).
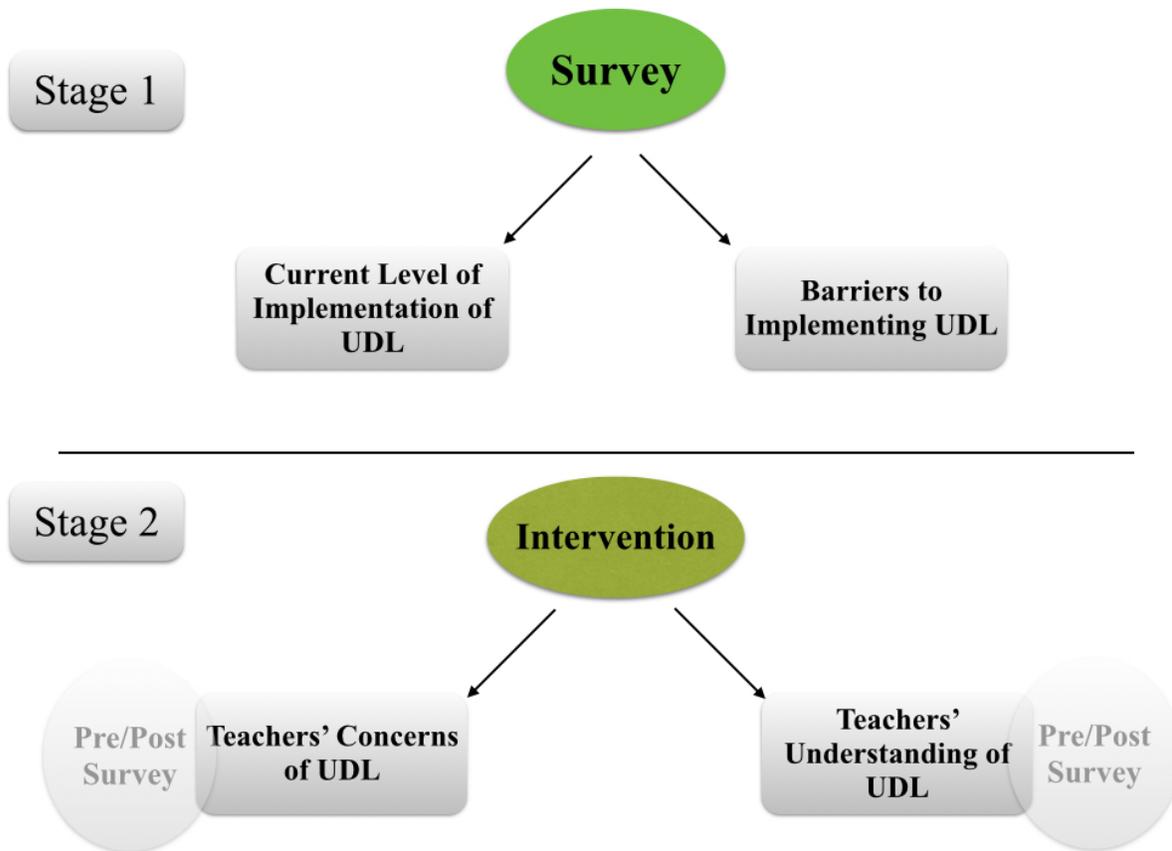
Figure 11. Research Design.

Participants and Setting

This study included male and female teachers of students who are deaf and hard of hearing from different elementary, middle, and high schools. In stage one, teachers filled out either an online or a traditional pencil-and-paper survey. The survey was presented to the teachers online through their supervisors, who in turn sent it to the teachers using Qualtrics Software. Hard copies of the questionnaire were sent to teachers who preferred to fill it out by hand. In stage two, a small number of teachers of students who are deaf and hard of hearing attended a training session. Participants in both stages included male and female teachers of students who are deaf and hard of hearing from 64 schools and institutes in Riyadh City, Saudi Arabia. Table 3 provides the number of deaf and hard of hearing Schools in Riyadh.

Table 3:

Deaf and Hard of Hearing Schools in Riyadh, Saudi Arabia

School Type	School Level	Number of Schools	Schools Type
Male Schools	Elementary School	17	2 Deaf Institutes 2 Deaf Self-contained classrooms 13 HOH* Self-contained classrooms
	Middle School	6	1 Deaf Institute 2 Deaf Self-contained 3 HOH* Self-contained classrooms
	High School	5	1 Deaf Institute 2 Deaf Self-contained classrooms 2 HOH* Self-contained classrooms
Female Schools	Elementary School	20	2 Deaf Institutes 2 Deaf Self-contained classrooms 16 HOH* Self-contained classrooms
	Middle School	9	1 Deaf Institute 2 Deaf Self-contained classrooms 6 HOH* Self-contained classrooms
	High School	7	1 Deaf Institute 2 Deaf Self-contained classrooms 4 HOH* Self-contained classrooms
Total		**64**	

Note. HOD = Hard of Hearing

Power Analysis

Based on the power analysis of this study, which uses *G*Power* software, it is important

to be certain that the sample is a good representative of the population. The analysis required a

cluster size of (*n*=54) teachers to attend the training session with an effect size of .5 (medium

effect size) with power of .95 by conducting a power analysis using difference between two dependent means with .05 as a level of significance. This study had 67 teachers who attended the training sessions that been designed for this study (see Fig 12).
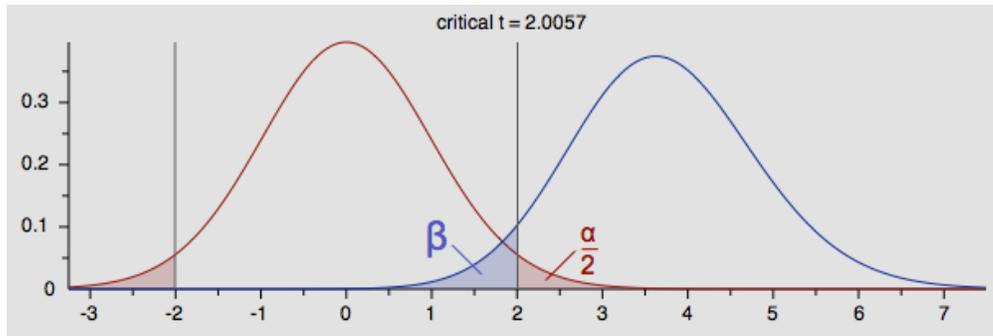
Figure 12. The power analysis based on G*power.

Consideration of Human Subjects' Approval

A request to conduct this research was submitted to The Human Subjects Committee. The Institutional Review Board (IRB) at the University of Kansas reviewed it, and approval was granted to start this study and collect data (see Appendix A).

Research Field Study Approval

For this study, the researcher sent a request to the Ministry of Education in Saudi Arabia to conduct the study. The researcher has sent all the required documents to Saudi Arabian Cultural Mission (SACM) in Washington, D.C. The SACM, after a careful review, sent the documents to the Ministry of Education and King Saud University, and approval was issued to conduct the study (see Appendix B, C, D, E and F).

Data Collection Procedures

This study has included two different questionnaires. The first survey was designed to explain the current levels of implementation of UDL that are used by teachers of students who are deaf and hard of hearing in schools. In addition, the survey explained the barriers to

implementing UDL for deaf and hard of hearing students in Saudi school. The second survey helped to measure teachers' concerns and their understanding regarding UDL.

Instruments

Validity and reliability are two procedures that were utilized for both surveys. According to Frey, "Validity is the extent to which the instrument measures what it is intended to measure" (2006, p. 136). On the other hand, reliability refers to "whether scores for items on an instrument are internally consistent, whether they are stable over time, and whether there is consistency in test administration and scoring" (Creswell, 2009, p. 233).

In order to increase the validity and reliability for both instruments (questionnaires), the following procedures were conducted:

The first survey (UDL):

- Survey items representing features of the UDL tests have adapted from the work of Rose and Meyer (2002), the founding authors of UDL.

- This survey included researchers of the UDL concept who agreed to serve as expert reviewers.

- Survey items were modified and adjusted based on the results of the pilot testing stage of the study prior to use.

- Some vocabulary and terms that could not be translated in the literal sense, but were technically translated and interpreted for meaning Arabic.

- The instrument included a focus group that provided suggestions that have been taken into consideration and applied to the final instrument.

- Each item in this survey has been linked to the literature sources and was measured by a panel of expert professors in special education with expertise in instructional designs and technology (content validity).

- To increase the validity of the instrument, this study relied on Johnstone's (2003) work, "Improving the validity of large-scale tests: Universal design and student performance," to write the items.

- For reliability, Cronbach's Alpha was used in this survey. A reliability coefficient represents a correlation, which measures the intensity and direction of a relationship between the variables.

- The study has used the same subscale found in previous studies that tested UDL: the 5-point traditional Likert scale: Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, and Strongly Agree (Bertram, 2007).

- The following are the survey sections:

    A Consent Form that explains the participants' rights, the purpose of the study, the time that the survey will take, IRB approval and the contact information (see Appendix G English Consent Form and Appendix I Consent Form in Arabic).

    Section 1. Three principles of UDL:

    A. Engagement

    B. Representation

    C. Action/expression

    Section 2. Barriers that could affect implementing UDL.

    Section 3. Demographic information (see Appendix H English Survey and Appendix J Arabic Survey).

The second survey (CBAM):

The Stages of Concern Questionnaire (SoCQ) is a valid scale and an accurate measure of the hypothesized Stages of Concern that been used extensively in many studies (George, Hall, & Stiegelbauer, 2006). The Stages of Concern Questionnaire has strong validity and reliability that make it an excellent questionnaire to use. SoCQ has 35 items that estimate internal consistency (alpha coefficients) for the seven stages ranged from .64 to .83. Moreover, the test-retest correlations ranged from 0.65 to 0.86 (George, Hall, & Stiegelbauer, 2006; Hall, & Hord, 2006).

SoCQ is a questionnaire that includes 35 items divided equally into seven scales, and each scale has five items (see Appendix Q). All 35 items are in a mixed order and are written in one direction, meaning that items with high scores indicate that teachers have intensified concerns towards the UDL. Teachers were asked to mark each item on an eight-point Likert scale based on how true the statement seemed to them at that current time. This scale ranged from 0 through 7, where 0 indicated that "the statement is irrelevant to me," 1 and 2 indicated that "the statement is not true of me now," 3 to 5 indicated that "the statement is somewhat true of me now," and 6 and 7 indicated that "the statement is very true of me now." Having a scale range from 0-7 for each item helps increase opportunities to have variability, which leads to more reliable results (DeVellis, 2012).

- Survey items adapted from the Concerns-Based Adoption Model (CBAM) by Hall and Hord (1987).
- This survey included researchers who agreed to serve as expert reviewers.
- Survey items were modified and adjusted based on the results of the pilot testing stage of the study prior to use.

- Survey items were adopted from a survey that was used before and translated into Arabic that uses CBAM (Alshammari, 2000).

- The instrument included a focus group that provided suggestions that were taken into consideration and applied to the final instrument.

- Each item in this survey was linked to the literature sources and measured by a panel of expert professors (content validity).

- For reliability, Cronbach's Alpha was used in this survey. A reliability coefficient represents a correlation, which measures the intensity and direction of a relationship between the variables.

- The study used a scale from 0-7; for the completely irrelevant items, teachers circled 0 on the scale. If the items strong relevance, teachers circled 7 on the scale.

- Since the Stages of Concern Questionnaire (SoCQ) has a specific scoring device, the researcher requested the scoring device from the developers to use in order to change the score into percentile. The seven stages' raw scores were averaged, and then the raw averages were converted to percentile scores according to the Quick Score Device (see Appendix R). The percentile scores were used to produce seven horizontal bar graphs by showing the Stages of Concern of teachers before and after the training session.

- The following are the survey sections:

  A Consent Form that explains the participants' rights, the purpose of the study, the time that the survey will take, IRB approval, and the contact information (see Appendix O English Consent Form and Appendix P Consent Form).

  Section 1. Teachers' concerns regarding UDL

  Section 2. Teachers' understanding of UDL

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Section 3. Demographic information (see Appendix O English Survey and Appendix P Arabic Survey).

Translation the Survey from English to Arabic

Any survey that will be translated from the original language to another language should be exposed to further analysis and pilot studies to increase the validity and reliability (Griffee, 2001). The survey questionnaire items were translated into Arabic by the researcher for both questionnaires. In terms of validity of the Arabic-translated questionnaire, the procedure of expert review and back translation was conducted to confirm construct, content, and cultural validity arguments. After the translation, both questionnaires were sent to five faculty members at King Saud University and to other PhD students who speak and write in both languages and specialize in Special Education. After conducting construct, content, and cultural validity, the Arabic version of both surveys was given to other specialists in both Arabic and English to translate the questionnaires back into English (see Appendix L). Finally, the two English versions were given to graduate students at the University of Kansas who are native English speakers who examined the questionnaires for any significant differences between the two versions and to confirm the compatibility between them.

For the reliability of the Arabic version, a focus group of 12 teachers acted as a sample that represents the population; they looked at both surveys for 20 minutes each in order to ascertain that the phrases and words were clear and understandable for the teachers. Some items needed additional clarification of words and phrases in order to be understandable for the readers. All modifications suggested by the focus group were made (see Appendix K). The modified Arabic version was piloted with a sample of 25 teachers of students who are deaf and hard of hearing who were similar to the target population in regards to the initial instrument

development. The reason behind doing a pilot study was to measure consistency across items within a single survey before distributes it to the large population. Reliability analyses were conducted to compute internal consistency estimates of reliability (Coefficient Alphas) for both surveys.

Group Design

This study is made up of two stages that include a pilot study by involving a focus group and experts in UDL as well as other research experts in order to evaluate that version of the questionnaire in both English and Arabic. The survey then was distributed to the teachers of students who are deaf and hard of hearing. This study tried to target all teachers of students who are deaf and hard of hearing, both male and female, in Riyadh City by sending the survey to them. A small number of teachers (n=67) participated in a training session, and a pre/post survey was used to measure teachers' concerns and understanding of UDL.

Data Analysis

The research questions of this study were examined and analyzed using various statistical methods depending on the type of data employed. This study used the Statistical Package for Social Science (SPSS) software version 22 to analyze all data. All analyses have been conducted by using p <.05 as a level of statistical significance. Moreover, descriptive statistics have computed in this study for more information that related to research questions.

Research Question 1

The purpose of this question is to investigate the variables associated with the implementation of three UDL principles (engagement, representation, and action/expression) that are used by teachers of students who are deaf and hard of hearing in Saudi Arabian schools. Descriptive statistics such as gender (male or female), teaching (deaf or hard of hearing), setting

(self-contained classroom or deaf institute), and class level (elementary, middle, or high school) are explained. In addition, age, years of teaching experience, level of education (bachelor's degree or graduate), and participants' history of teaching both populations (deaf or hard of hearing) have been clarified. Descriptive statistics provide information about the mean, standard deviation, frequencies, variance, range, and percentage of participants responding for each category.

Research Question 2

The purpose of this question is to investigate the variables associated with the barriers to implementing UDL in Saudi Arabian schools. Descriptive statistics such as gender (male or female), age, teaching (deaf or hard of hearing), setting (self-contained classroom or deaf institute), and class level (elementary, middle, or high school) are explained. In addition, years of teaching experience, level of education (bachelor's degree or graduate), and participants' history of teaching both populations (deaf or hard of hearing) have been clarified. Descriptive statistics provide information about the mean, standard deviation, frequencies, variance, range, and percentage of participants responding for each category.

Research Question 3

A paired samples t- was conducted to examine the mean differences regarding the quiz that was given to the teachers. T-test is one of the most commonly used research test that compares the difference between the means of two independent groups, or the independent-samples t-test (Howell, 2008). A repeated-measures analysis was conducted to compare the effects of the training session before teachers took the training session and after the training session. The quiz has 15 questions that measure the teacher's understanding of UDL before and after the training session.

Research Question 4

A paired samples t-tests was conducted to examine and compare the mean differences regarding each stage of CBAM before and after the training session (Howell, 2008). A repeated-measures analysis was conducted to compare the effects of the training session before teachers took the training session and after the training session. It shows how each stage in CBAM was affected by the training session that the researcher provided. Approval was granted to use Stages of Concern Questionnaire (SoCQ) from Advancing Research Improving Education, the developer of CBAM, in this study (see Appendix M). SoCQ has 35 items that cover seven stages, which are awareness, informational, personal, management, consequence, collaboration, and refocusing (Hall & Hord, 1987). Each stage has five items, and the total scores for each stage range from 0 to 35, after collecting the scores for each stage and then transforming the scores into a percentile based on the SoCQ scoring device (see Appendix R). The Quick Scoring Device is usually used to score the Stages of Concern Questionnaire manually and to form an individual or group profile.

Open-ended Questions

This section consists of four open-ended questions that ask the participants to provide more details that the survey did not cover. The first question asked what other methods teachers use to engage the students. The second question asked what other methods teachers use to represent their materials to the students. The third question asked what other methods teachers use for the students for the action and expression. The fourth question asked what other barriers to implementing UDL are in schools. Open-ended questions were analyzed and coded by using content analysis through the use of a systematic text analysis by having themes and subthemes (Creswell, 2013). Content analysis is a methodological approach that is derived directly from the

text into coding categories (Hsieh & Shannon, 2005) through the process of content analysis, patterns, categories, and themes that will be identified and coded (Mayring, 2000). Trustworthiness indicates the validity in qualitative research (Creswell, 2013). In order to establish trustworthiness for the qualitative questions, a member-checking mechanism has been used (Lincoln & Guba, 1985; Maxwell, 2005).

CHAPTER IV

RESULTS

Introduction

The purpose of this study was to investigate the variables associated with the implementation of UDL in Saudi Arabian schools. As discussed in the previous chapter, data were gathered in two distinct stages. The first stage was primarily focused on the barriers to implementing UDL in Saudi schools and the current level of the three UDL principles' implementation among teachers of students who are deaf and hard of hearing. The second stage was focused on the training sessions' impact on the teachers' understanding of UDL implementation and on their attitudes and concerns toward implementing UDL. Within this chapter, the primary results of the study will be discussed. This chapter will largely be organized according to the study stages (1 & 2) and overall study.

Stage 1: Level of Implementation and Barriers

The first stage of this study focused on broadly identifying current levels of potential UDL implementation as well as barriers to UDL implementation. This section of the chapter will review stage population, as well as the research questions that align with stage one of the study.

Stage 1: Population

As discussed in the previous chapter, the primary population for this stage included teachers of students who are deaf and hard of hearing in Riyadh City (N=269). A total of 301 questionnaires were returned through both online and paper responses, and after careful review, a total of 32 incomplete questionnaires were excluded (see Table 4).

Table 4:

Numbers and Percentage of the Valid and Excluded Cases

Cases	N	Percent
Valid	269	89.4
Excluded	32	10.6
Total	**301**	**100**

The sample included participants (N=269; 141 male, 128 female) from 64 schools and institutes in Riyadh city. The total number of teachers of students who are deaf and hard of hearing in Riyadh is 612, based on the report of the General Secretariat for Special Education for the Department of Deaf and Hard of Hearing (2015). There were both teachers of students who are deaf (N=117) and students who are hard of hearing (N=152) in the sample. Moreover, the participants in this study included teachers from both self-contained classrooms (N=187) and deaf institutes (N=82). The participants in this study included teachers at elementary schools (N=139), middle schools (N=61), and high schools (N=69). Table 5 provides a breakdown of the study participants based on gender, teaching assignment, classroom setting, and class level.

Table 5:

Participants' Demographic

	Frequency	Percent
Gender		
Male	141	52.4
Female	128	47.6
Teaching		
Deaf	117	43.5
Hard of Hearing	152	56.5
Setting		
Self-Contained Classroom	187	69.5
Deaf Institute	82	30.5
Class Level		
Elementary School	139	51.7
Middle School	61	22.6
High School	69	25.7

As shown in Table 6, the participants in this study were teachers of students who are deaf and hard of hearing, with a total of 132 teachers at 49.1%, who had taught both students who are deaf and students who are hard of hearing students. A total of 137 teachers at 50.9% had not taught both students who are deaf and students who are hard of hearing, but they had only taught one group, either students who are deaf or students who are hard of hearing. In addition, a total of 220 teachers have bachelor's degrees, or 81.8%. Only 49 teachers have graduate degrees, at 18.2%.

Table 6:

Participants' Level of Education and Background

	Frequency	**Percent**
Level of Education		
Bachelor's Degree	220	81.8
Graduate	49	18.2
Participants' History of Teaching Both Populations (Deaf and Hard of Hearing)		
Yes	132	49.1
No	137	50.9

As part of this study, it investigated the participants' age and years of teaching experience among the participants. The results showed that the participants' ages ranged from 22 to 52 years old with a mean of 36.28 (SD=6.931). Because of the large variance in participants' ages, ages were recoded into four groups to detect the least common age group and the most common age group. As shown in Table 7, the most common age group was 30-39 with 34.5% of teachers in this group. The least common age group was 50-59 years old with 3.3% of teachers in this group. In addition, the results showed that the participants' years of teaching experience ranged from 1 year to 30 years with a mean of 2.91 (SD=1.381). Because of the large variance in participants' years of teaching experience, this category was recoded into six groups to indicate groupings by

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age. As shown in Table 7, the most common years of teaching experience group were 16-20 with 24.5% of teachers in this group. The least common years of teaching experience group were 26-30 years with 2.2% of teachers in this group.

Table 7:

Participants' Ages and Years of Teaching Experience by Groups

	Frequency	Percent
Age		
29 or Below	52	19.3
30-39	117	43.5
40-49	91	33.8
50-59	9	3.3
Years of Teaching Experience		
1-5	56	20.8
6-10	53	19.7
11-15	59	21.9
16-20	66	24.5
21-25	29	10.8
26-30	6	2.2

Stage 1: Reliability Analysis

The reliability of the survey instrument was evaluated by calculating the internal consistency coefficient (Cronbach's Alpha). The first survey that the researcher developed included four main sections divided into engagement, representation, action, and expression and barriers. The researcher calculated the Cronbach's Alphas separately for each dimension in order to measure the consistency of scores across items. Table 8 shows Cronbach's Alpha coefficient each dimension. The engagement section was $\alpha=.74$, and the representation section was $\alpha=.84$. In addition, the action and expression section was $\alpha=.89$, and the barriers section was $\alpha=.69$. A look at each section shows that the values of the Cronbach's Alpha coefficients were high, which indicates that there is adequate consistency among the questionnaires items for each section.

Table 8:

Current Reliability Coefficients

Scales	Number of Questionnaires Items	Cronbach's Alpha
Engagement	9 Items	α=.74
Representation	9 Items	α=.84
Action and Expression	9 Items	α=.89
Barriers	9 Items	α=.69

For this survey, a five point Likert-type scale was used for the instrument engagement, representation, action, and expression sections, with 1= Never, 2= Not Very Often, 3= Often, 4= Very Often, and 5= Daily. The barriers section, which is the response options for this section, can be described as follows: 1= SD (Strongly Disagree), 2= D (Disagree), 3= N (Neutral), 4= A (Agree), and 5= SA (Strongly Agree).

Research Question one: UDL Principles

Principle of Engagement

To answer research question one, descriptive statistics were conducted to analyze the data by calculating the means of the items and standard deviations in order to report the teachers' responses. Recall, within this survey, the following scale was used: 1= Never, 2= Not Very Often, 3= Often, 4= Very Often, and 5= Daily. For the engagement section, the following results were found: M=2.61, SD= 1.31. As shown in Table 9, the most common educational method was statement 9, "I provide choices for accomplishing course activities in class." (M= 3.38, SD= 1.33). The least used educational method was statement 3, "I offer online assignments" (M= 1.69, SD= 1.08; see Table 9).

Table 9:

Descriptive Statistics for Engagement

Statement	M	SD
1. I use lecture as my primary teaching technique	2.87	1.33
2. I encourage students to work in small groups during class instruction	2.74	1.37
3. I offer online assignments	1.69	1.08
4. I allow students to choose activities that match their interests	2.67	1.33
5. I encourage students to communicate online or face-to-face to discuss course materials	1.98	1.36
6. I try to design class activities that match to student interests.	3.11	1.38
7. I encourage students to study as groups outside of class	2.12	1.27
8. I provide opportunities to build student self-monitoring	2.90	1.32
9. I provide choices for accomplishing course activities in class	3.38	1.33
Average	**2.61**	**1.31**

Principle of Representation

For the second section in this survey, providing multiple means of representation, the

following results were found: M=2.96, SD= 1.42. As shown in Table 10, the most common

method was used statement 2, "I clearly identify the essential concepts in multiple ways, so that

students understand the subject" (M= 3.35, SD= 1.41). The lowest method used was statement 6,

"I use digital or electronic based multimedia books in my teaching" (M= 2.54, SD= 1.39).

Table 10:

Descriptive Statistics for Representation

Statement	M	SD
1. I present information in a variety of ways (verbal, visual, auditory, tactile)	3.31	1.46
2. I clearly identify the essential concepts in multiple ways, so that students understand the subject	3.35	1.41
3. I provide information in alternative formats such as diagrams, charts, graphs or visual concept maps	3.06	1.45
4. I provide a summary of each lesson	3.33	1.49
5. The materials I use are captioned	3.08	1.50
6. I use Digital or Electronic based multimedia books in my teaching	2.54	1.39
7. I offer students access to multimedia resources to support learning	2.79	1.35
8. I encourage students to use online resources and websites to learn class information	2.59	1.45
9. I provide software applications that students can use in their learning	2.59	1.33
Average	**2.96**	**1.42**

Principle of Action and Expression

Across action and expression principle, the following results were found: M=3.32, SD= 1.34. As shown in Table 11, the most common use in action/expression was statement 8, "I provide clear guidelines for how to successfully complete all major course assignments" (M= 3.83, SD= 1.14). The least used in action/expression was statement 1, "I provide multiple types of assignments that include the use of various types of modern media (e.g., written, podcast, presentation, video)" (M= 2.65, SD= 1.41).

Table 11:

Descriptive Statistics for Action/Expression

Statement	M	SD
1. I provide multiple types of assignments that include the use of various types of modern media (e.g., written, podcast, presentation, video)	2.65	1.41
2. I encourage students to self-monitor their own behavior outcomes	3.55	1.29
3. I encourage students to use technology (e.g. laptops, tablets) in class for learning purposes	3.22	1.53
4. I provide activities for students to demonstrate their knowledge in multiple ways (e.g., writing, presenting, drawing, etc.)	3.58	1.19
5. I provide an outline of the steps required for completing the assignments	3.42	1.40
6. I provide models or examples of class projects and assignments	3.07	1.39
7. I allow students to make their own choices in how they complete assignments	3.24	1.39
8. I provide clear guidelines for how to successfully complete all major course assignments	3.83	1.14
9. I clearly identify the scoring methods for all major course assignments before giving the students the assignment	3.32	1.36
Average	**3.32**	**1.34**

Research Question Two: Barriers to Implementation

The second research question discusses the barriers to implementing Universal Design for Learning in Saudi Arabian schools. Participants were asked to complete a survey that rates their degree of agreement by responding to nine items to determine the barriers. Teachers used the following scale to answer this question: 1= SD (Strongly Disagree), 2= D (Disagree), 3= N

(Neutral), 4= A (Agree), and 5= SA (Strongly Agree). Within this survey, a higher score would

denote larger potential barrier to implementing UDL, a lower score would represent less of a

barrier. To answer research question two, descriptive statistics were conducted to analyze the

data by calculating the means of the items and standard deviations in order to report the teachers'

responses. For the barriers section, the following results were found: M=3.01, SD= 1.37. As

shown in Table 12, the most frequent barrier was statement 6, "There's limited access to the

Internet in my school" (M= 3.65, SD= 1.47). The least frequent barrier was statement 3, "I don't

have understanding for how to use technology in my classroom" (M= 2.36, SD= 1.33).

Table 12:

Descriptive Statistics for Barriers in Implementing UDL

Statement	M	SD
1. I don't have understanding of UDL	3.04	1.44
2. I know the basics of UDL but not how to implement it	3.09	1.24
3. I don't have understanding for how to use technology in my classroom	2.36	1.33
4. Lack of overall professional development on new things in education	3.61	1.39
5. There's not enough technology hardware (e.g. laptops, tablets, etc.) in my school	3.40	1.59
6. There's limited access to the Internet in my school	3.65	1.47
7. Technology reduces my contact with students	2.54	1.35
8. My students don't have the necessary technology skills to use it in their own learning	3.19	1.36
9. The use of technology in class is a disruption	2.16	1.11
Average	**3.01**	**1.37**

Stage 2: Professional Development

Within this stage of the study, the researcher provided training sessions that supported professional development for teachers about the implementation of UDL. The participants filled out a pre survey before the training session started and a post survey after the training session ended. The survey includes the following three sections: Section 1, teachers' concern of UDL with a total number of 35 questions; Section 2, teachers' understanding of UDL with a total 15 questions; and Section 3, demographic information.

The researcher held six different training sessions in deaf institutes, elementary schools, middle school, high school, and King Saud University for graduate teachers. Each training session took approximately five hours, and both male and female teachers attended the training sessions and participated in the study. As shown in Table 13 the participants were 81 teachers; 14 were excluded due to incomplete surveys, as were general education teachers as the research was collected only for teachers of students who are deaf and hard of hearing. Therefore, the total participants in the training sessions were N=67.

Table 13:

Numbers and Percentage of Valid and Excluded Cases

Cases	N	Percent
Valid	67	82.7
Excluded	14	17.3
Total	**81**	**100**

Table 14 shows each training session location and the total participants who attended the training session and the valid participants.

Table 14:

Training Session Location and Total Participants

School	Total Participants	Valid
Deaf Institute (Elementary)	17	15
Deaf Institute (Middle School)	7	4
Deaf Institute (High School)	10	7
Hard of Hearing (Elementary)	22	18
Hard of Hearing (Middle & High School)	5	3
King Saud University (Elementary, Middle, and High School)	20	20
Total	**81**	**67**

Stage 2: Population

The actual size of the sample was 67 participants from different K-12 schools and institutes for both male and female students in Riyadh city. The following tables show the participants' numbers based on gender, age, years of experience, type of students that teachers teach, setting, class level, history of teaching both populations of students (deaf and hard of hearing), and teachers' qualifications.

The participants in this group were both male and female teachers of students who are deaf and hard of hearing in Riyadh City, Saudi Arabia. The total number of participants was N=67; there were 53 males which is 79.1% of the sample, and there were 14 females, which is 20.9% of the sample. The researcher used a videoconference to present the training session to the female teachers. In addition, among 67 teachers; there were 31 teachers of students who are deaf at 46.3%, and 36 teachers of students who are hard of hearing at 53.7% of the sample. The participants in this study were both teachers in self-contained classrooms and deaf institutes in Riyadh City. Teachers who teach either students who are deaf or hard of hearing in self-contained classrooms were 41 at 61.2%, and teachers who teach students who are deaf in deaf institutes were 26 at 38.8 %. The participants in this study were teachers in elementary schools,

middle schools, and high schools in Riyadh. The total number of participants was 67: elementary

schools teachers were 50 at 74.6 %; middle schools teachers were 7 at 10.4%; and high school

teachers were 10 14.9% (see Table 15).

Table 15:

Participants' Demographic

	Frequency	Percent
Gender		
Male	53	79.1
Female	14	20.9
Teaching		
Deaf	31	46.3
Hard of Hearing	36	53.7
Setting		
Self-Contained Classroom	41	61.2
Deaf Institute	26	38.8
Class Level		
Elementary School	50	74.6
Middle School	7	10.4
High School	10	14.9

As shown in Table 16, a total of 36 teachers at 53.7% had taught both students who are deaf

and hard of hearing, while a total of 31 teachers at 46.3% had not taught both students who are

deaf and hard of hearing, but instead they had only taught one group, either students who are the

deaf or the hard of hearing. In addition, a total of 49 teachers have bachelor's degrees at 73.1%,

and 18 teachers have graduate degrees at 26.9%.

Table 16:

Participants' Level of Education and Background

	Frequency	Percent
Level of Education		
Bachelor's Degree	49	73.1
Graduate	18	26.9
Participants' History of Teaching Both Deaf and Hard of Hearing		
Yes	36	53.7
No	31	46.3

As part of this study to investigate the variables associated with the implementation of UDL in Saudi Arabian schools, it looked at the participants' age and years of teaching experience among the participants. The results showed that the participants' ages ranged from 24 to 52 years old with a mean of 34.40 and SD=7.38. Because of the large variance in participants' ages, ages were recoded into four groups to detect the least common age group and the most common age group. As shown in Table 17, the most common age group was 30-39 with 52.2% of teachers in this group, and the least common age groups was 50-59 years old with 7.5% of teachers in this group.

In addition, the results showed that the participants' years of teaching experience ranged from 1 year to 27 years with a mean of 11.15 and SD=6.98. Because of the large variance in participants' years of teaching experience, this category was recoded into six groups to narrow down the most common years of teaching experience group and the least common years of teaching experience group. As shown in Table 17, the most common years of teaching experience group was 11-15 with 28.4% of teachers in this group, and the least common years of teaching experience group was 26 or more years with 3% of teachers in this group.

Table 17:

Participants' Ages and Years of Teaching Experience by Groups

	Frequency	Percent
Age		
29 or Below	18	26.9
30-39	35	52.2
40-49	9	13.4
50-59	5	7.5
Years of Teaching Experience		
1-5	15	22.4
6-10	18	26.9
11-15	19	28.4
16-20	7	10.4
21-25	6	9
26-30	2	3

Stage 2: Reliability Analysis

The reliability of the second survey instrument (CBAM) used in this study was evaluated by calculating the internal consistency coefficient (Cronbach's Alpha). The researcher calculated the Cronbach's Alpha scores separately for pre and post surveys in order to measure the consistency of scores across items. As shown in Table 18, the CBAM pre-survey was α=.89 and the post survey was α=.86. The values of the Cronbach's Alpha coefficients were high, which indicates that there is adequate consistency among the questionnaires items for each section. However, some negative items such as item numbers 3, 4, 12, 23, and 30 under the awareness stage were reverse coded.

Table 18:

Current Reliability Coefficients

Scales	Number of Questionnaire Items	Cronbach's Alpha
Pre- survey	35 Items	α=.89
Post- survey	35 Items	α=.86

Research Question Three: Understanding of UDL

A total numbers of 67 teachers took pre and post surveys that measure their understanding of UDL before and after the training session. The quiz includes 15 questions developed for this study. The research question has been analyzed using the Statistical Package for Social Science (SPSS) software version 22. All analyses were conducted by using p <.05 as a level of statistical significance. In addition, the effect size (Cohen's d) will be computed to report if the d is small, moderate or large for the quiz that been taken by teachers by using the following equation:

$$\text{Cohen's d} = \frac{\text{Mean difference}}{\text{Standard deviation}}$$

A paired samples t-tests were conducted to examine the mean differences regarding the quiz that was given to the teachers. As shown in Table 19, there is difference between the scores before and after the training session, which is statistically significant, with t (66) = -47.989, $p < .05$ and large effect size (Cohen's d)= -5.86.

A repeated-measures analysis was conducted to compare the effects of the training session. The mean of the score before the training session was 3.18 with a SD= 1.23, while the mean of the score after the training session was 12.76 with SD= 1.09 (see Table 19).

Table 19:

Repeated Measures Means and Standard Deviations for Question. 3

		Mean	Std. Deviation	Std. Error Mean	t	df	Sig
Pair 1	Before Training	3.1791	1.23000	.15027			
					-47.989	66	.000
	After Training	12.7612	1.08836	.13296			

Note: N=67. Mean Differences=-9.58209 SD=1.63438. Effect size (Cohen's d)= -5.86

This data indicates that teachers who took the five hours training session to receive information about UDL improved their scores. See Figure 13 for a visualization of the score changes before and after the training session.
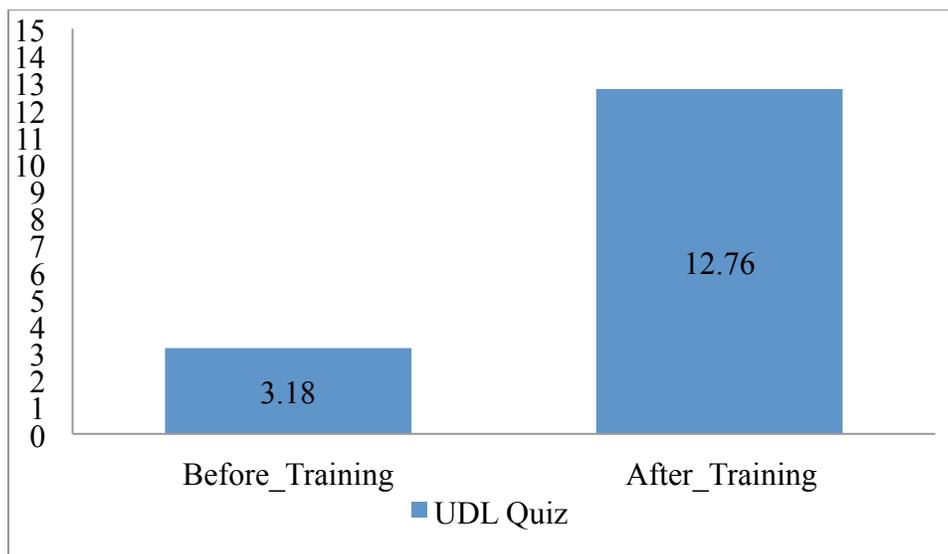
Figure 13. Teachers' scores before and after the training session.

Research Question Four: Trainings Impact on Teachers' Concerns

A total number of 67 teachers participated in the pre and post surveys that measure their concerns and attitudes regarding UDL before and after the training session. The researcher used the Concerns-Based Adoption Model (CBAM) questionnaire after receiving approval from the developers at Advancing Research Improving Education to use the Stages of Concern Questionnaire (SoCQ) for this study; they also approved its translation into Arabic (see Appendix M). SoCQ includes 35 items that cover seven stages, which are awareness, informational, personal, management, consequence, collaboration, and refocusing (Hall & Hord, 1987). Each stage has five items, and the total scores for each stage range from 0 to 35 after collecting the scores for each stage and then transferring the scores into a percentile based on the SoCQ scoring device (see Appendix R). The research question was analyzed by using the Statistical Package for Social Science (SPSS) software version 22. All analyses were conducted by using p <.05 as a level of statistical significance. In addition, the effect size (Cohen's d) will be computed to report how a small, moderate or large effect size for each stage by using the following equation:

$$\text{Cohen's d} = \frac{\text{Mean difference}}{\text{Standard deviation}}$$

A repeated-measures analysis was conducted to compare and examine the mean differences regarding each stage before and after the training session. This study measures each stage of the seven stages separately to see the change and effect of each stage before and after the training session over teachers' concerns. Table 20 shows the mean of each stage before and after the training sessions.

For the awareness, stage 0, the mean before the training session was 84.75 with SD= 18.87, while the mean after the training session was 96.37 with SD= 9.83. For the informational,

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stage 1, the mean before the training session was 85.55 with SD= 17.13, while the mean after the training session was 92.79 with SD= 8.77. For the personal, stage 2, the mean before the training session was 86.04 with SD= 20.36, while the mean after the training session was 91.78 with SD= 9.89. For the management, stage 3, the mean before the training session was 65.57 with SD= 25.56, while the mean after the training session was 72.01 with SD= 26.72. For the consequence, stage 4, the mean before the training session was 54.25 with SD= 27.54, while the mean after the training session was 80.27 with SD= 21.69. For the collaboration, stage 5, the mean before the training session was 67.07 with SD= 29.17, while the mean after the training session was 83.58 with SD= 22.62. For the refocusing, stage 6, the mean before the training session was 56.51 with SD= 27.46, while the mean after the training session was 76.99 with SD= 24.46.

Paired samples t-tests were conducted to examine the mean differences regarding to each stage before and after the training session. As shown in Table 20, there is difference between the scores before and after the training session for the awareness stage, which is statistically significant, with t (66) =-4.55, $p < .05$ and moderate effect size (Cohen's d)= -0.56. For the informational stage, which is statistically significant, with t (66) =-3.08, $p < .05$ and small effect size (Cohen's d)= -0.38. For the personal stage, which is statistically significant, with t (66) =-2.08, $p < .05$ and small effect size (Cohen's d)= -0.26. For the management stage, which is not statistically significant, with t (66) =-1.52, p=.135 and small effect size (Cohen's d)= -0.2. For the consequence stage, which is statistically significant, with t (66) =-8.43, $p < .05$. and large effect size (Cohen's d)= -1.03. For the collaboration stage, which is statistically significant, with t (66) =-4.80, $p < .05$ and moderate effect size (Cohen's d)= -0.59. The last stage, which is refocusing stage, it is statistically significant, with t (66) =-5.55, $p < .05$ and moderate effect size (Cohen's d)= -0.68. (see Table 20).

Table 20:

Repeated Measures Means and Standard Deviations for Question. 4

		Mean	Std. Deviation	Std. Error Mean	t	Sig
Pair 1	Stage 0 Pre	84.75	18.87	2.31		
					-4.55	.000
	Stage 0 Post	96.37	9.83	1.20		
Pair 2	Stage 1 Pre	85.55	17.13	2.09		
					-3.08	.003
	Stage 1 Post	92.79	8.77	1.07		
Pair 3	Stage 2 Pre	86.04	20.36	2.49		
					-2.08	.041
	Stage 2 Post	91.78	9.89	1.21		
Pair 4	Stage 3 Pre	65.57	25.56	3.12		
					-1.52	.135
	Stage 3 Post	72.01	26.75	3.26		
Pair 5	Stage 4 Pre	54.25	27.54	3.36		
					-8.43	.000
	Stage 4 Post	80.27	21.69	2.65		
Pair 6	Stage 5 Pre	67.07	29.17	3.56		
					-4.80	.000
	Stage 5 Post	83.58	22.62	2.76		
Pair 7	Stage 6 Pre	56.51	27.46	3.35		
					-5.55	.000
	Stage 6 Post	76.99	24.46	2.99		

Note: N=67, df=66. Mean differences in Pair 1=-11.63 SD=20.89, Pair 2=-7.24 SD=19.23, Pair 3=-5.73 SD=22.55, Pair 4=-6.45 SD=34.87, Pair 5=-26.02 SD=25.267, Pair 6=-16.51 SD=28.15, Pair 7=-20.48 SD=30.22.

Figure 14 indicates how teachers who took the five hours training session have improved their concerns and attitude regarding UDL.
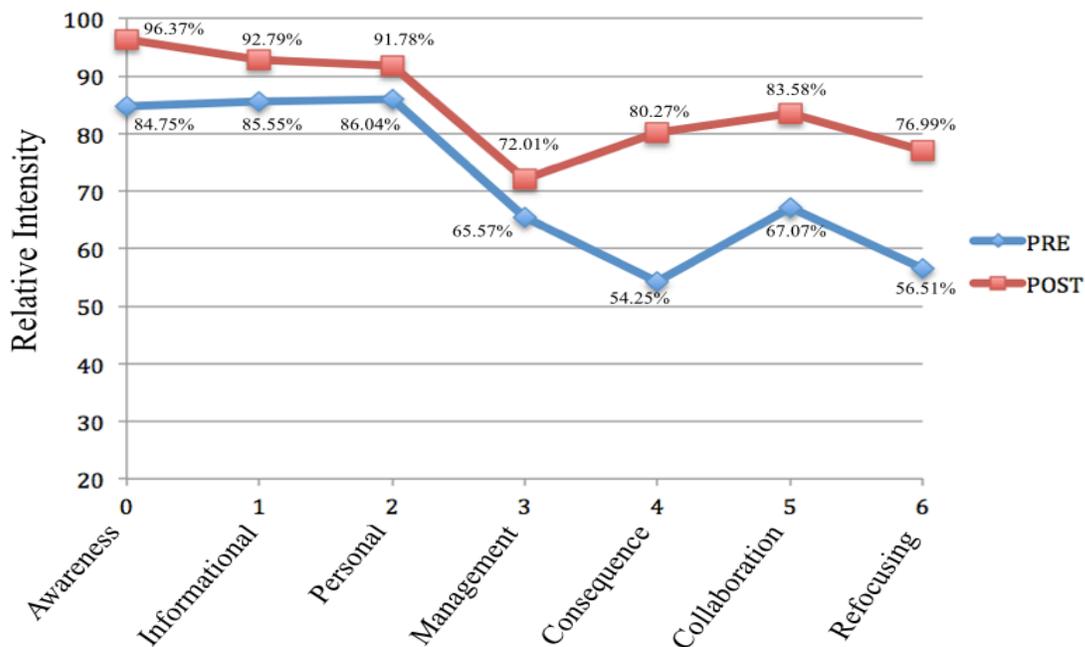
Figure 14. Mean Percentiles of CBAM Results Pre and Post

Qualitative Results from Open-ended Questions

Participants were asked to respond to four open-ended questions at the end of each

section regarding engagement, representation, action/expression, and barriers that had been

presented in the first survey. Among the 269 teachers who participated in the first survey in stage

one, 151 of those teachers responded to additional open-ended questions. These open-ended

questions were created to ask the participants for their comments on additional points that the

survey did not cover. There were four open-ended questions in the first survey in stage 1, and

total response for the first open-ended question was 37.5%, the second question was 36.1%, third

question was 30.1%, and the fourth question was 28.6%. In addition, 118 participants did not

respond to any of these four open-ended questions. Table 21 shows the total number of

participants' responses for each question.

Table 21:

Participants' Responses for Open-ended Questions

Question	Respondents	Percent
Q1. Engagement	101	37.5
Q2. Representation	97	36.1
Q3. Action/Expression	81	30.1
Q4. Barriers	77	28.6
Average		**33.08**

Figure 15 explains the total the percentages of respondents for each open-ended question

and the average respondent for the open-ended questions that been used in the first survey in

stage one.
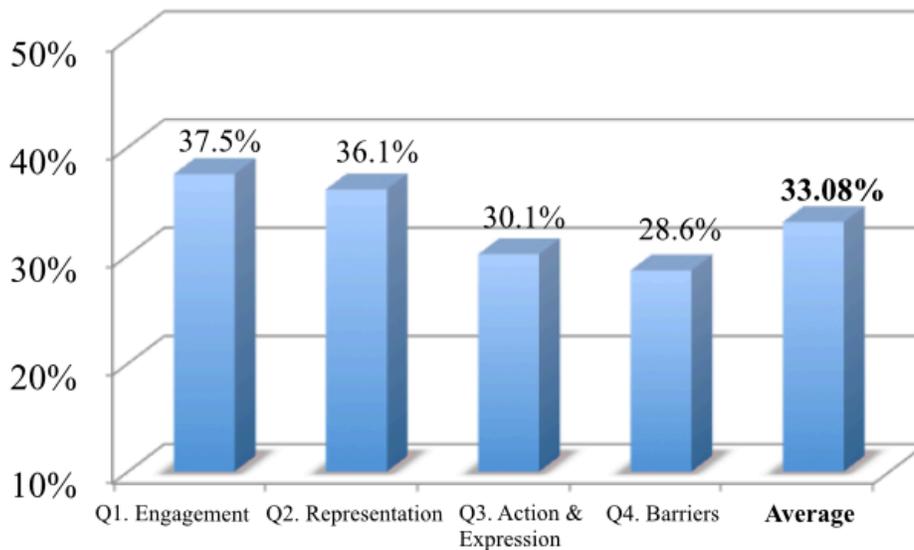
Figure 15. Percentage of responses for open-ended-questions.

In order to establish trustworthiness for the qualitative questions, a member-checking

mechanism has been used (Maxwell, 2012). Members reviewed the answers to confirm themes

and subthemes consistent with the participants' answers. These members are doctoral students

who are experts in special education, and they reviewed all four open-ended questions. They had an agreement that the themes and subthemes look the same in Arabic and English.

Question: How do you Engage Students?

The first open-ended question asks about other methods that teachers use to engage the students that have not been mentioned in the questionnaire. Based on the participants' responses to this question, the researcher divided their answers into 3 major themes and 27 subthemes. The themes are as follows:

I.   Using Technology

II. Reinforcement

III. Other Methods

For the first theme, using technology, the highest frequency response was "using a projector to engage the students" (n=23) at 22.8%. The lowest frequency response was "using smart phones to engage the students" (n=2) at 2%. The second theme, reinforcement, the highest frequency response was collecting points and reinforcement cards to engage the students (n=13) at 12.9%. The lowest frequency response was "reinforcement board and provide entertainment opportunities to engage the student" (n=6) at 5.9%. The last theme under this question is other methods, and its highest frequency response was "using lecture to engage the students" (n=35) at 34.7%. The lowest frequency response was "using external books and magazines that are related to the topic that I will teach to engage the students" (n=5) at 5 % (see Table 22).

Table 22:

Teachers' Responses for Question 1. Engagement

Themes	Subthemes	Frequency	Percent
Using Technology	Using projector	23	22.8
	Watching video	19	18.8
	Using PowerPoint	17	16.8
	Using smart board	14	13.9
	Internet	13	12.9
	Using computers in the schools	8	7.9
	Using tablets/ iPad	5	5.0
	Smart phones	2	2.0
Reinforcement	Collecting points	13	12.9
	Reinforcement cards	13	12.9
	Play games for academic purposes	12	11.9
	Candy	12	11.9
	Going to trips outside the school	12	11.9
	Prizes	11	10.9
	Weekly, monthly competition with prizes	9	8.9
	Gift cards	7	6.9
	Reinforcement board	6	5.9
	Provide entertainment opportunities	6	5.9
Other Methods	Using lecture	35	34.7
	Board	12	11.9
	Let students teach the class	12	11.9
	Role playing	10	9.9
	Concept maps	10	9.9
	Provide materials that engage the students	9	8.9
	Student contract	8	7.9
	Using external books and magazines that related to the topic that I will teach	5	5.0

Question: How do you Provide Multiple Means of Representation?

The second open-ended question asks about other methods that teachers use to represent

the materials to students that have not been mentioned in the questionnaire. Based on the

participants' responses to this question, the researcher has divided their answers into 3 major

themes and 20 subthemes. The themes are as follows:

I.   Using Books

II.   Using Technology

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III. Other Methods

Table 23 shows the highest and lowest frequency and percent for each theme. In the first

theme, using books, the highest frequency response was "use books to represent the materials to

students (n=71) at 70.3%. The lowest frequency response was "use digital books/ e-books to

represent the materials to students" (n=8) at 7.9%. In the second theme, using technology, the

highest frequency response was "watching video to represent the materials to students" (n=34) at

33.7%. The lowest frequency response was "Use software for academic purposes to represent the

materials to students" (n=3) at 3%. In the last theme, other methods, the highest frequency

response was "using lecture to represent the materials to students" (n=37) at 36.6%. The lowest

frequency response was "use school lab to represent the materials to students" (n=2) at 2% (see

Table 23).

Table 23:

Teachers' Responses for Question 2. Representation

Themes	Subthemes	Frequency	Percent
Using Books	Use books	71	70.3
	External books and magazines that related to the topic that I will teach	18	17.8
	Use digital books/ e-books	8	7.9
Using Technology	Watching video	34	33.7
	Using projector	21	20.8
	Using computers in the schools	11	10.9
	Internet	8	7.9
	Using PowerPoint	7	6.9
	Using smart board	5	5.0
	Smart phones	4	4.0
	Using tablets/ iPad	4	4.0
	Use software for academic purposes	3	3.0
Other Methods	Using lecture	37	36.6
	Role playing	27	26.7
	Concept maps	18	17.8
	Provide different materials to represent the topic	6	5.9
	Board	4	4.0
	Let students teach the class	3	3.0
	Use school lab	2	2.0

Question: How do you Provide Multiple Means of Action & Expression?

The third open-ended question asks about other methods that teachers use with the
students for the action and expression principle, which means how teachers provide opportunities
for the students to do their assignments in multiple ways or express their understanding in many
ways rather than one specific way. Based on the participants' responses to this question, the
researcher has divided their answers into 2 major themes and 18 subthemes. The themes are as
follows:

I.   Using Technology

II. Other Methods

Table 24 shows the highest and lowest frequency and percent for each theme. In the first
theme, using technology, the highest frequency response was "using projector that teachers use
for the students for the action and expression" (n=21) at 20.8%. The lowest frequency response
was "Use social networks that teachers use for the students for the action and expression" (n=2)
at 2%. In the second theme, other methods, the highest frequency response was "using board that
teachers use for the students for the action and expression" (n=22) at 21.8%. The lowest
frequency response was "open discussion and group work that teachers' use for the students for
the action and expression" (n=5 each) at 5%.

Table 24:

Teachers' Responses for Question 3. Action/Expression

Themes	Subthemes	Frequency	Percent
Using Technology	Using projector	21	20.8
	Using computers in the schools	13	12.9
	Using PowerPoint	13	12.9
	Using smart board	10	9.9
	Watching video	9	8.9
	Using tablets/ iPad	7	6.9
	Internet	3	3.0
	Smart phones	3	3.0

	Use social networks	2	2.0
Other Methods	Using board	22	21.8
	Role playing	11	10.9
	Concept maps	9	8.9
	Presentations	9	8.9
	Use school lab	7	6.9
	Drew pictures	7	6.9
	I don't have time	6	5.9
	Open discussion	5	5.0
	Group work	5	5.0

Question: What are other barriers to implementing UDL?

The fourth open-ended question asks about other barriers to implementing UDL that have not been mentioned in the questionnaire. Based on the participants' responses to this question, the researcher divided their answers into 3 major themes and 22 subthemes. The themes are as follows:

I. Lack of Professional Development

II. Lack of Technology

III. Other

Table 25 shows the highest and lowest frequency and percent for each theme. In the first theme, lack of professional development, the highest frequency response was "lack of workshops to use technology in education that will be a barrier to implementing UDL" (n=26) at 25.7%. The lowest frequency response was "don't have brochures about UDL (n=5) at 5%. In the second theme, of technology, the highest frequency response was: Don't have equipment in school that will be a barrier to implementing UDL (n=16) with 15.8%. The lowest frequency response was "don't know how to use technology in teaching and students don't know how to use technology at their homes" (n=8 each) at 7.9%. In the third theme, other, the highest frequency response was "don't have training sessions that will be a barrier to implementing UDL" (n=19) at 18.8%. The

lowest frequency response was "don't understand UDL that will be a barrier to implementing

UDL" (n=4) at 4%.

Table 25:

Teachers' Responses for Question 4. Barriers to Implementing UDL

Themes	Subthemes	Frequency	Percent
Professional Development	Lack of workshops to use technology in education	26	25.7
	Lack of training courses about technology in education	23	22.8
	Lack of training sessions related to UDL	14	13.9
	I want to see a demo about UDL	9	8.9
	Don't have brochures about UDL	5	5.0
Technology	Don't have equipment in school	16	15.8
	Low-speed Internet in my school	14	13.9
	Don't have technology in my school	12	11.9
	Internet is not available to all students in my school	10	9.9
	Lack of technical support in my school	9	8.9
	Don't know how to use technology in teaching	8	7.9
	Students don't know how to use technology at their homes	8	7.9
Other	Don't have training sessions	19	18.8
	Never heard about UDL	10	9.9
	Don't have appropriate assessment tools to use	9	8.9
	Don't have family support	7	6.9
	Don't receive support from the Ministry of Education	7	6.9
	Diversity in the class make it hard to apply UDL	6	5.9
	The curriculum don't help to apply UDL	5	5.0
	Don't have co-teaching	5	5.0
	Lack of administrative support	5	5.0
	Don't Understand UDL	4	4.0

Chapter Summary

The purpose of this study was to investigate the variables associated with the

implementation of UDL in Saudi Arabian schools by developing surveys and conducting initial

professional development for teachers in Riyadh, Saudi Arabia. This chapter presents the results

of the statistical analyses of the data collected in the study from 269 teachers through the survey

and 67 teachers through the training sessions. It includes descriptive statistics, a description of population and sampling, reliability analyses, research questions, results, open-ended questions, and a chapter summary. The next chapter will discuss the findings obtained from the research questions results. It will cover the implications, limitations, and recommendations for future studies.

CHAPTER V

DISCUSSION

Purpose of the Study

The aim of this study was to investigate the variables associated with the implementation of UDL in Saudi Arabian schools. This study was conducted in two stages to build a better understanding of UDL implementation. The first stage used a survey to conduct a broad assessment of current levels of the three UDL principles' implementation across teachers of students who are deaf and hard of hearing in Riyadh City. In this stage, data were also gathered on potential barriers to implementation. In the second stage of the study, the researcher conducted an initial professional development for teachers. In this professional development, teachers went through training sessions to enhance their understanding of UDL. Both pre- and post-surveys were given to the teachers who attended the professional development training. The results, as mentioned in chapter 4, have shown significant results in increasing teachers' understanding and positive attitude towards UDL. This chapter will discuss the study's major findings and note its relationship to previous research. This chapter also presents the study's limitations, the implications of its major findings, and suggestions for future research.

Relationship to Previous Research

As was noted in Chapter 2, the education system in Saudi Arabia currently does not integrate many common practices supported in the United States including, but not limited to, co-teaching, response to intervention (RTI), positive behavioral support (PBS), and professional learning standards. Also, since the Ministry of Education runs the teaching system for the entire country, as well as teachers have limited support. Therefore, this study tried to align with the intent of the Ministry of Education under the "King Abdullah Bin Abdul Aziz Public Education

Development Project" (Tatweer, 2015). As a result, teachers who were exposed to this study made a connection between what Tatweer is doing and what this study aims to do; this connection makes the study significant for teachers. Teachers have effectively contributed to this study because they know it aligns with the new direction of the Ministry of Education.

It was essential to build this study's conceptual framework on a strong base rooted into different theories and models in order to create a successful beginning to the implementation of UDL in Saudi Arabian schools (Ravitch & Riggan, 2012; Reigeluth, 1999). This study takes into consideration and cultural perspectives when applying a western framework such as UDL in an eastern culture like Saudi Arabia. It is critical that teachers have an adequate understanding of their discipline through wide knowledge of the conceptual frameworks, historical trajectories, principles, and contemporary structures (Ball, Thames, & Phelps, 2008). Furthermore, it is fundamental to understand the teachers' practices at macro and micro level, which could have an effect on the educational process. This study has been careful in how teachers receive the information and process it in order to make a smooth transformation and change their practices in a way that intersects with social and cultural norms.

UDL in Practice

Literature has shown that UDL is a strong educational framework that helps to makes the transition from inaccessible design to universally accessible design (Basham et al., 2010; Basham et al., 2010; Edyburn, 2010; Rose & Meyer, 2000). UDL is strongly rooted to brain-based research (Rose & Meyer, 2002; Rose, Meyer, & Hitchcock, 2005) and encourages metacognition, which plays a vital role in the education settings (Smith, 2012). UDL helps learners respond to different tasks and missions that happen during the learning process by focusing on how brain deals with multiple tasks (Bransford, Brown, & Cocking, 2000; Bransford

et al., 2006; Driscoll, 2005; Posner & Rothbart, 2007; Raz & Buhle, 2006). Literature also indicates that UDL helps to enhance students' achievements by providing the necessary support and understanding the specific needs of all students. UDL meets the diverse needs of all students, including students with disabilities. The teachers who responded to the surveys and attended the training sessions in this study demonstrated UDL could be effective when they plan their instructional designs.

Prior to the start of this study, there was an initial question whether UDL and the associated professional development could be adopted in fit within the school culture in eastern countries. Specifically, it would be critical for educators to adopt such as framework within their own cultural understanding of school, rather than simply mandate they were made to follow. Currently, the education policy in Saudi Arabia is focusing on implementing theories and practices from developed countries such as the United States. Thus, this study came as response to Saudi Arabia's education initiatives. As a first step toward implementation, this study assessed the level of teachers' understanding and perceptions of UDL as well as how they viewed its potential in Saudi Arabia schools. As was mentioned in Chapter 2, to have successful implementation it is necessary to have a clear model such as a stage of implementations model. This study follows the UDL implementation process to implement UDL successfully (Nelson & Basham, 2014).

UDL Implementation Process

By following the stages of implementations model, this study had a clear plan to successfully implement UDL (Fixsen, Blase, Naoom, & Wallace, 2009). Implementation requires time to occur in any system, and educational systems such as Saudi Arabia that have not been exposed to UDL will need time for implementation. These stages of implementation are

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explore, prepare, integrate, scale, and optimize; each phase includes UDL principles that align with the other stages (CAST, 2015; Nelson & Basham, 2014). Based on the Fixsen model, this study applies these stages that were adapted by CAST. Therefore, this study focuses on the exploration phase when dealing with teachers to measure their concerns and understanding.

Fixsen et al. (2009) stated that implementation that deals with human services is complex, especially when it moves science to service and theory to practice (2009). Therefore, this study carefully considered how to introduce UDL to the community of teachers so that it fit with their present practices in schools. In order to achieve the goal of this study, the researcher provided training sessions for teachers, and following those sessions, noticed how teachers wanted to apply UDL in their classrooms.

The findings of this study indicated that Saudi Arabia is in the very early stages of UDL implementation. Moreover, teachers across the country are generally interested in adopting the UDL framework within their practice, however there are various barriers for the system to overcome to fully implement UDL. Therefore, one of the major recommendations of this study is to embed more research and practices of UDL in teacher education programs and K-12 schools across Saudi Arabia.

Technology Acceptance among Teachers

While UDL is broader than simply technology use, generally the use of technology supports the sustainable implementation of UDL (Nelson & Basham, 2015). Understanding this relationship, this study used the Technology Acceptance Model (TAM; Davis, 1989) to investigate technology practices across the participant population. By using this model, the study was able to identify teacher's attitudes and acceptance toward using technology in their classrooms and what barriers might prevent them from applying technology. This study has

determined teachers' behavioral intention to use technology through TAM fundamental constructs, which are perceived usefulness (PU) and perceived ease of use (PEOU). PU considers whether or not teachers believe the use of technology in their classroom will help them enhance their performance (Davis, 1989). PEOU focuses on how it is easy to use different types of technology in teacher's practices (Davis, 1989). Since this study uses technology as an important factor that aligns with UDL in teacher's practices with their students, TAM helps to understand teacher's behavior towards applying technology through the lens of PU and PEOU (Venkatesh & Davis, 2000).

The study results show how teachers appreciate the value of technology and its usefulness for them and their students. Many teachers mentioned how they use limited technology in their practices and how students benefit from that usage. At the same time, however, the majority of teachers reported that it is not easy to use technology in their teaching. Some teachers have limited skills, while others refer to the school as a primary reason for not using technology due to the lack of technology equipment. Teachers also reported that they need additional professional development courses to use technology effectively; they also reported that their students have either limited skills in using technology or they do not know how to use it. The results are promising in that teachers appreciate the role of technology, but they need help to use it in a sophisticated way. This indicates that future research should focus on PEOU among teachers rather than PU that has been applied by teachers.

Teachers' Concerns through UDL Implementation

Another framework used in this study was the Concerns-Based Adoption Model (CBAM) to measure teachers' concerns before and after the implementation of UDL (Hall & Hord, 1987; Hall & Hord, 2001; Hall, 2013). CBAM has been used widely around the world; in particular,

CBAM has been used in Saudi Arabia over the last 15 years. It matches and aligns with the culture of schools, teachers, and education practices. CBAM, with its seven stages that starts with awareness, informational, personal, management, consequence, collaboration, and reaches the refocusing stages, helps to determine the teacher's concerns (Hall, George, & Rutherford, 1977). Teachers were given the CBAM questionnaire before and after their training session to measure their concerns on the seven stages. The results show that providing training sessions helped transfer teachers to a higher level. As mentioned in Chapter 2, training could transfer teachers' concerns from the self-stage to a higher level, thus reaching the impact stage (Hope, 1997). Therefore, this study is aligned with literature about how training can change teachers' concerns regarding implementing UDL.

As mentioned in Chapter 4, all stages except one of CBAM when compared before and after the training sessions were statistically significant; the exception was stage 3, which is the management stage. The reason that stage 3 is not statistically significant is because the items under this stage deal with how teacher manage the time and responsibilities needed to implement UDL (see Table 26). Teachers need to see UDL in practice to understand how they will manage the time it requires, but the researcher was only able to provide a training session without applying UDL in a real class with students, so a true measure of this stage was not possible. Teachers believe that UDL will take more time, plus it will mean more responsibilities as they organize their teaching around its ideas. Therefore, teachers should implement UDL in order to understand that it does not require more responsibility but instead provides a framework that enhances students' achievements and increases teachers' performance.

Table 26:

Management Stage Items (Stage 3)

Items
I am concerned about not having enough time to organize myself each day.
I am concerned about conflict between my interests and my responsibilities.
I am concerned about my inability to manage the requirements of UDL.
I am concerned about time spent working with nonacademic problems related to UDL.
Coordination of tasks and people is taking too much of my time.

For future research, it would be interesting to use CBAM again, a year after implementation to identify what teachers' concerns are at that point. Thus, researcher has set a five year plan to implement UDL in Saudi Arabian schools. This should provide time to provide professional development for teachers. Future studies will deal with students, policy makers, and educators to generalize the results for other schools in the country. CBAM has provided significant material showing how to deal with teachers; it also has created a list of considerations for implementing UDL more successfully in future studies. Teachers of students who are deaf and hard of hearing, gave clear evidence showing how UDL can be accepted by teachers. Through the different training sessions that were done for this study, teachers indicated that the training sessions were effective in showing them how they can apply UDL in their practices. The results indicate how teachers' concerns improved before and after the training sessions provided by the researcher.

Teachers' Understanding of UDL

An essential element of this study is to support the professional development among the teaching community. This study used different procedures and stages to enhance teachers'

knowledge and practices with new strategies and frameworks that are based on evidence. As mentioned in Chapter 2, the major element to successful reform in education starts with teachers' awareness of change, which is the primary focus in this study (Richardson, 1996). This study looks at the teachers as a fundamental part in the learning process; therefore, teachers should be aware of effective instructional designs that will enhance their students' outcomes and achievements (Hattie, 2003). The major focus in this research was on teachers and how they receive and deal with new information and methods that are to be applied in their practices. Thus, the research design was built to provide UDL to teachers in a manner that allows them to see the benefits and the potential implications for UDL in their practices when they design any class.

This study aims to increase the awareness level among teachers and foster the culture of community learning inside the classroom (Hollins & Guzman, 2005). The researcher provided a set of training sessions for teachers in elementary, middle and high schools by visiting them in their schools. As mentioned in Chapter 3, the researcher provided certificates for attending training session that were signed by the Dean of the Education College at King Saud University to encourage the teachers to attend. The training sessions were held in different locations and lasted up to five hours with direct interaction with the teachers. The majority of teachers had very little information about UDL ahead of time, and this training session helped them to understand it. During the training sessions, teachers were exposed to many strategies, tools, and technology in their area of interest. The training session covered professional development standards to foster collaboration among teachers alongside of learning about UDL in order to reach the desired outcome of this study.

To measure teachers' understanding of UDL, the researcher provided a survey created just for this study, which was given to the teachers before and after the training sessions. Each teacher was given a number that they used on each survey so that the surveys would be matched together for measurement purposes. The results indicate a significant increase in the teachers' understanding of UDL. The survey included 15 questions that measure the teachers' understanding of UDL. The mean of the score before the training session was 3.18 with a SD= 1.23, and after providing the training session, the mean of the score was 12.76 with SD= 1.09. This indicates the training sessions had a significant impact on the teachers.

Teachers' Awareness of the Professional Development Standards

The purpose of learning development is not only to study UDL but also to create a culture with a strong base of collaborative work that will ensure long term change at all levels (Fullan, 1991). Within this view, this study prompts change among teachers by relying on strong standards that can empower change. The Professional Learning Association (2015) has developed seven standards for professional learning, which are learning communities, leadership, resources, data, learning designs, implementation, and outcomes; this was discussed in Chapter two. Teachers received more information during the training session about these standards and how they could be applied in their daily practices.

UDL only happens by having a solid and strong base of professional development criteria that promotes change in teacher practices. For example, one of the major issues regarding professional development for teachers in Saudi Arabian schools is the learning community, as the school system does not provide opportunities for collaboration among teachers and building learning communities that can facilitate that process of changing. Within that same scenario, schools do not provide resources and data that teachers can use to implement their practices.

Without these standards for professional development, UDL will not be implemented successfully in teachers' practices. UDL is a framework that does not happen only in the classroom; it extends further as a daily practice that begins in students' home and moves to the school classroom. Therefore, teachers should improve their knowledge of professional development in order to be able to fully implement UDL.

Professional development starts by having a culture of working as a team to promote relationships among teachers in collaborative and productive environments (Stoll, Bolam, McMahon, Wallace, & Thomas, 2006). Also, building leadership aspects among teachers increases their effectiveness in instructional and organizational levels so that they can be an expert in the class, as does building connections with families and leading teamwork in school (York-Barr & Duke, 2004). Teachers should be able to provide resources that align with the diverse learners in their classes as well as having multiple sources of data to rely on for analysis of their practices, which in turn leads to enhanced students' performances (Lewis, Madison-Harris, Muoneke, & Times, 2010). Moreover, teachers' awareness of theories, research, and best practices will enhance their professional learning (Horowitz et al., 2005). This indicates that teachers should be knowledgeable about the process of implementation at different stages in order to use any strategy or framework successfully in their practices.

Discussion of Major Findings

The major findings of this study was divided into 5 major themes, which are engagement, representation, action and expression, barriers to implementing UDL and professional development.

Engagement

UDL recognizes the role of engagement to motivate and stimulate students to learn through meaningful and creative instruction in order to sustain their level of engagement within teaching content. Therefore, engagement comes as the first principle of UDL in providing more opportunities for learner engagement. Participants in this study reported low levels of engagement (M=2.61, SD= 1.307) among their students in comparison to other principles such as representation and action and expression. Although teachers noted that they try to provide choices for accomplishing course activities during the class, they still do not meet the students' needs. Based on teachers' responses, most of their practices do not have the creativity that UDL states is important. They use traditional methods of providing choices through quizzes, assignments, or formal presentations. The results also showed the lack of technology use with students in order engage them in content.

As an indication that technology has only been minimally implemented into teachers' practices, teachers were highly attentive during the training sessions that covered technology use. The researcher held six different training sessions for teachers of students who are deaf and hard of hearing in Riyadh City that included introduction to UDL and using technology in teaching. Most of the programs, software, and educational platforms used during the training sessions were new to the teachers. They reported that they used what they are familiar with and what was available to them to teach their students. Also, they mentioned the lack of software and programs available in Arabic language and how this prevents their use of the majority of these tools. Because the Ministry of Education is expected to use educational technology in schools in the upcoming years, there is a need to prepare teachers on how to use technology effectively in schools (Ministry of Education, 2015). UDL could provide the foundation for this preparation.

Representation

One of the major themes in this study is how teachers use the traditional books and materials provided from the Ministry of Education. Few teachers have reported that they use any kind of digital or electronic based multimedia books that were designed to teach any subject matter. Teachers reported the highest representation statement on the survey is "clearly identify the essential concepts in multiple ways so that students understand the subject" (M= 3.35, SD= 1.41), but they do not use any form of technology that could facilitate students' understanding. Only eight teachers reported on the open-ended question that they use digital books or e-books with their students. Deaf and hard of hearing students need to interact with digital materials that includes texts, pictures, graphics, 3D, animation, and videos that represent the content in multiple ways (De Jong & Bus, 2004). Modeling UDL through technology will enhance the teacher's' performance and students' achievements (Coyne et al., 2012; Strangman & Dalton, 2005).

Literacy is a major issue for deaf and hard of hearing students that persists throughout their academic life (Luckner, Sebald, Cooney, Young, & Muir, 2005) and this concern was reported many times from the participants. Technology has changed the traditional form of printed literacy into digital formats, which bring new terms in literacy such as digital literacy (Gee, 2010) or new literacy (Leu, 2006). Digital and new literacy allow for new and unique learning opportunities to improve reading and writing among students (Chen, 2010). The Ministry of Education is working to update its curriculum and materials in order to keep up with the accelerating technological developments. The education system in Saudi Arabia tries to enhance the notion of digital citizenship where students have full electronic participation and interact digitally with society (Ribble, Bailey, & Ross, 2004). Reading and writing digital texts

will offer multiple representations that students choose from in order to acquire knowledge by having pictures, 3D, videos, and visual means (Chen, Wu, Ling, Tsai, & Chen, 2009).

Action and Expression

One of the most creative aspects of UDL is allowing the learners to choose the way that they prefer to express their understanding of the content. It also pushes the teachers to be creative in the way that they have their students accomplish tasks. More important, it will allow teachers to understand their students' weaknesses and strengths through the multiple selections that they receive from having options. UDL tends to provide alternative methods to measure students' understanding rather than relying on traditional forms of assessment because it allows learners to show how much they possess intellectually through different means (Courey et al., 2013). Throughout this study, the results have shown teachers' awareness of action and expression were the highest compared to engagement and representation, with M=3.32 and SD=1.339. Teachers reported how significant this principal is to help them meet their various students' various needs.

Although teachers see action and expression as important features to teach their students, the results show concerns have developed due to the lack of various types of modern media. Teachers allow students to do their activities in the traditional options such as written assignments, formal presentations, weekly quizzes, and open discussion. Based on their answers, teachers' use of technology in their practices is limited due to lack of awareness of the technology that can facilitate students' learning. Some teachers in the training session reported they have not received any training sessions that help them apply technology in their practices. The majority of teachers reported their schools are not fully equipped with the Internet, computers, or any technical support. Therefore, further research will be significant if it focuses on how to apply technology in Saudi schools.

Barriers to Implementing UDL

It is important to know UDL has never been presented to teachers in Saudi Arabia and this is the first known study to investigate the use of UDL in teachers' practices. Thus, the most common barrier that teachers face is their lack of understanding of UDL and its principles in practices. Teachers will need more trainings sessions and workshops to be able to foster UDL and employ it effectively as part of their teaching framework. Beside teachers' lack of knowledge regarding UDL, teachers should see UDL in real practice in order to realize that it is not about more responsibilities. Instead, it is a framework that will facilitate teachers by empowering their performance and enhancing students' achievements. In addition, teachers believe that the curriculum is not flexible in a way that would make use of several platforms or programs that are aligned with the curriculum.

The lack of use and understanding of technology was clear from teachers' responses as they reported their use of technology as being at a basic level. Findings for this study indicate that current school environments are a barrier for implementing UDL. Generally the teachers indicated that the school environment do not have the appropriate supports in place to fully support the options needed for UDL implementation. As was mentioned in Chapter 2, Saudi Arabian schools do not employ practices such as co-teaching, RTI, or PBS; therefore, teachers of students who are deaf and hard of hearing need to handle everything by themselves. These teachers believe that if they apply UDL, it will create work that will be more time consuming for them. This study included an intervention that helped to investigate and identify barriers to implementing UDL. There will be follow up studies in the future to deal with these barriers and provide more options to solve them through other interventions.

Professional Development

The teachers report that their main concern is how to meet the Ministry of Education standards; they are also concerned about adopting a framework such as UDL with the use of technology. Therefore, this study introduced UDL to teachers and met their concerns by providing extensive training sessions that took place in their schools. This study was divided into two stages; the first stage was designed to investigate and conduct a broad assessment of the current levels of UDL implementation and the barriers to implementing UDL. Then, a follow-up procedure was applied based on the teachers' expressed needs for a training session. As a result, stage two was designed as a training session based on those needs and concerns.

The intervention in stage two was designed to meet teachers' needs as well as to enact professional development standards suggested by the Professional Learning Association (2015). These standards are learning communities, leadership, resources, data, learning designs, implementation, and outcomes. The researcher introduced these standards to the teachers so that they could become aware of the professional work that is being done in the school community. The teachers expressed concern regarding how to build their practices and increase learning collaboration through exchange experiences with each other. Making a change in teacher's practices should come from creating awareness of new strategies, methods, or frameworks that can be applied in their classroom. This awareness comes from different training sessions, courses, and workshops offered to teachers on a regular basis. In addition, this study aligned with the new concerns of the Ministry of Education to fill the gap between theory and practice. The movement in Saudi Arabia designated by King Salman is intended to integrate both the Ministry of Education and the Ministry of Higher Education into one Ministry.

Teachers expressed concerns about implementing UDL, and that was obvious in the change of their responses before and after the training sessions. CBAM has been used in this study, and the results in Chapter 4 demonstrated significant differences in each stage of CBAM. This study applied different theories and models to understand teachers' attitudes towards implementing any strategies or frameworks in their teaching, and particularly with UDL. Therefore, the next section will discuss the limitations of the study. It will also suggest implications for future research and interventions that will deal with UDL in any new environment. Recommendations and suggestions will be presented for further studies that will be adopted for follow-up studies by this researcher.

Limitation of this Study

This study has limitations that should be considered prior to the design of other studies. First, due to time and funding limitations, this study was conducted only with teachers of students who are deaf and hard of hearing. Thus, the findings from this study might not be generalizable to other special education teachers or to general teachers.

In another limitation, the participants in stage two were chosen based on their willingness to participate and attend the training sessions. Therefore, the sample was not randomly selected in the second stage and this may have influenced the findings. This study was conducted with teachers of students who are deaf and hard of hearing in Riyadh City only. Therefore, findings from this study might not generalizable to other cities in the Kingdom of Saudi Arabia.

Finally, two other limitations relate to moving UDL from a western education system to the Saudi Arabian system. First, the intervention portion of the study had many more male than female participants. In fact, only 14 female participants were among the 67 participants. Moreover, the females had to attend the training session through videoconferencing. Both of

these limitations relate indirectly or directly to Saudi Arabian culture and rules that do not allow men (the researcher) to work directly with females. Second, because of language differences, standard UDL materials (e.g., Principles, Guidelines, and Checkpoints) and the research measurement materials had to go from English to Arabic (and back for this dissertation). Within this process there was some vocabulary and terms that could not be translated in the literal sense, but were technically translated and interpreted for meaning Arabic. It is unknown of any of these limitations may have impacted to the results of this study. Future research should take these limitations into consideration.

Implications for Future Research

The purpose of this study was to investigate the variables associated with the implementation of UDL, including the potential barriers in Saudi Arabian schools with a specific focus on teachers of students who are deaf and hard of hearing. Through both stages that were applied, the study was able to examine several teaching practices that are used in classrooms. In addition, it studied the current level of implementation of the three UDL principles in Saudi Arabian schools used by teachers through their practices; the study also looked at which principle was used more than others. This study discovered barriers to implementing UDL in Saudi Arabian schools for teachers who serve students who are deaf and hard of hearing.

The findings of this study and its implications have provided data and information to understand UDL implementation in Saudi Arabian schools. Furthermore, this study provided training sessions that measure professional development and the impact of this training on UDL. As part of this study, a survey was used to investigate teachers' attitudes and concerns towards implementing UDL. The findings show both positive attitudes and concerns among teachers towards UDL; it will be interesting to see whether these teachers actually start implementing

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UDL in their classrooms. Findings of this study will be useful to the Ministry of Education and their agencies as they plan the implementation of UDL. Overall, the results of this study will help policy makers to have a better vision of the feasibility of UDL implementation in Saudi Arabian schools.

This study was an initial attempt to examine UDL in Saudi Arabian schools and to measure teachers' understanding and concerns of UDL. Based on the results, teachers are in need of more professional development on a regular basis that provides them with different practices and strategies. One of the biggest barriers reported by teachers is the lack of training designed to meet their needs.

From a positive perspective, this study was established in two stages, first to identify training needs prior to planning and providing them with professional development. After understanding the needs, specific professional development plans were designed to meet their needs and introduce the teachers to UDL. Overall, this research helps with the implementation of UDL and aligns with the new vision of the Ministry of Education by integrating technology and enhancing instructional design among teachers. Further studies should involve social validity procedures to address the changes that the education system requires through the cultural shift of education in Saudi Arabia to meet the demands of the social community of teachers by contributing to meet the changes in their practices.

According to this research, teachers' levels of technology use are an issue that the Ministry of Education needs to be aware of so that they can provide solutions to enhance their technology skills. The findings report that teachers do not integrate technology into their practices, which should be considered fundamental in this era. Teachers need to keep current with new instructional designs, modern teaching methods, and ways to merge technology into

their practices. This will be accomplished if teachers are exposed to training sessions and courses about technology. Teachers, particularly special education teachers, are required to keep current with all technology that facilitates their teaching and engages their students. Therefore, the Ministry of Education should provide different kinds of support that are related to teacher's instructional designs, modern teaching methods, technology training sessions, and technical support on a regular basis.

Future research should gather data by including observations that illuminate the change of classroom routines that occurs through the use of UDL. Teachers should be observed in their classrooms as they implement UDL to ascertain that UDL is used correctly; student measurements during UDL implementation should also be included. Further studies can collect data by visiting and observing teachers in their classroom through note taking to measure routine classroom changes of teachers' behaviors. Also, it would be important to measure students' engagement through observation of how UDL helps engage them.

Recommendations and Suggestions for Future Research

Based on the teachers' answers, this study has investigated the variables that could prevent adaptation UDL in Saudi Arabian schools. For the future, there is a need for recommendations to policy makers as well as consideration of further research in order to have a better vision based on the most recent data. Several recommendations are offered by this study:

1. Develop policy to improve teachers professional development by attending training sessions, workshops, and relevant conferences that help to develop their teaching proficiency.

2. Increase the creativity among teachers to motivate students about content and to help them become more engaged in school.

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3. Increase the number of training sessions that deliver new instructional designs and teaching methods to the teachers on a large scale that includes all teachers, both general and special education.

4. Provide free training programs, courses, and workshops on a regular basis on how to use modern technology for teaching.

5. Providing technical support for teachers to be able to use technology correctly; schools should have expert technology teams.

6. Future studies should include other parties, such as students and administrators, to measure UDL in practice.

7. Schools should be equipped with computers, such as laptops, tablets, and other tools to enhance students' achievements.

8. Future studies should be done in different parts of the country and with more teachers.

9. Future studies should focus on larger populations of K-12 teachers, both male and female.

10. Increase the awareness of UDL among all teachers by establishing professional learning communities.

11. Teachers need access to videos, websites, software systems, and different applications that both explain and support the implementation UDL across the different schools and subject areas.

12. Additional funding and research in the area of UDL is needed to expand upon these findings.

Summary

The purpose of this study was to investigate the variables associated with the implementation of UDL and identify the barriers that could prevent implementing UDL. Therefore, this study was divided into two major stages. The first stage was to investigate the current level of implementation of the three UDL principles and the barriers to implementing UDL among teachers of students who are deaf and hard of hearing in Riyadh City (N=269). The second stage was a follow-up procedure after learning the teachers' needs through a specially designed intervention that provided training sessions for 67 teachers. The results of the intervention indicated significant differences among teachers before and after taking the training sessions associated with their understanding and level of concern.

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APPENDICES

Appendix A: Human Subjects Committee Approval

APPROVAL OF PROTOCOL

January 22, 2015

Majed Alsalem
m234a127@ku.edu

Dear Majed Alsalem:

On 1/22/2015, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Supporting Professional Development among Deaf and Hard of Hearing Teachers through the Implementation of Universal Design for Learning in Saudi Arabia
Investigator:	Majed Alsalem
IRB ID:	STUDY00002011
Funding:	None
Grant ID:	None
Documents Reviewed:	• Survey B.docx, • Recruitment Flyer.pdf, • Survey A.docx, • consent form, • Initial Submission Form, • Survey A.docx, • Survey B.docx,

The IRB approved the submission from 1/22/2015 to 1/21/2016.

1. Before 1/21/2016 submit a Continuing Review request and required attachments to request continuing approval or closure.
2. Any significant change to the protocol requires a modification approval prior to altering the project.
3. Notify HSCL about any new investigators not named in original application. Note that new investigators must take the online tutorial at https://rgs.drupal.ku.edu/human_subjects_compliance_training.
4. Any injury to a subject because of the research procedure must be reported immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity.

If continuing review approval is not granted before the expiration date of 1/21/2016 approval of this protocol expires on that date.

Please note university data security and handling requirements for your project:
https://documents.ku.edu/policies/IT/DataClassificationandHandlingProceduresGuide.htm

You must use the final, watermarked version of the consent form, available under the "Documents" tab in eCompliance.

Sincerely,

Stephanie Dyson Elms, MPA
IRB Administrator, KU Lawrence Campus

Human Subjects Committee Lawrence
Youngberg Hall | 2385 Irving Hill Road | Lawrence, KS 66045-7568 | (785) 864-7429 | www.research.ku.edu

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Appendix B: Letter of Definition from Saudi Arabian Cultural Mission

Kingdom of Saudi Arabia
Ministry of Higher Education
Cultural Mission To The U.S.A.

بسم الله الرحمن الرحيم

المملكة العربية السعودية
وزارة التعليم العالي
الملحقية الثقافية بالولايات المتحدة الأمريكية

وزارة التعليم العالي
Ministry of Higher Education

Academic Affairs

Official Letter

The Saudi Arabian Cultural Mission at the United States of America certifies that the student MAJED ABDULRAHMAN A ALSALEM civil id ▓▓▓▓▓▓▓▓▓▓▓▓▓▓ is a scholarship student whom is sponsored by the Ministry of Higher Education for a(n) (Doctorate - PHD) degree since 11/08/2011, the student named above is still on the scholarship until 10/08/2015.

This letter was given to the student to present to (- Whom It May Concern) for certification purposes without any obligation and/or liability on our office.

Assistant Cultural Attaché
for Academic Affairs

Mohammed Alomar, PhD

8500 Hilltop Road • Fairfax, Virginia 22031 • (703) 573-7226 • (703) 573-2244 • Fax: (703) 573-2595
Web Site: www.sacm.org • E-Mail: sacmusa@sacm.org

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Appendix C: Requesting a Permission Regarding Conducting Research Study

بسم الله الرحمن الرحيم

سعادة رئيس قسم التربية الخاصة

السلام عليكم و رحمة الله و بركاته،،،

أفيدكم أنني أحد المبتعثين لدراسة الدكتوراه في قسم التربية الخاصة بجامعة كانساس و أرغب في استكمال متطلبات رسالة الدكتوراة بعنوان (تعزيز الاداء المهني لمعلمي الصم وضعاف السمع من خلال تطبيق التصميم التعليمي الشامل في المملكة العربية السعودية) خلال رحلتي العلمية التي أقوم بها حالياً داخل المملكة ، حيث من متطلبات الرسالة:

١- جمع بيانات من معلمي و معلمات الصم وضعاف السمع في مدينة الرياض من خلال الاستبانة المرفقة التي تهدف لتحديد الوضع والمستوى الحالي للتصميم التعليمي الشامل والحواجز التي تقف ضد تطبيقه في قاعة الدرس من وجهة نظر معلمي ومعلمات الصم وضعاف السمع في مدارس مدينة الرياض.

٢- القيام بورشة عمل للمعلمين لتزويدهم بأفضل الممارسات والاستراتيجيات العلمية داخل قاعة الدرس، ومن ثم الوقوف على مدى درجة تقبل التصميم التعليمي الشامل لدى معلمي الصم وضعاف السمع بعد تقديم دورة تدريبة مكثفة.

ارجوا منكم قبول طلبي و التوجيه بإجراء اللازم شاكراً و مقدراً تعاونكم،،،،

ماجد عبدالرحمن عبدالعزيز السالم
m234a127@ku.edu
majalsalem@ksu.edu.sa
0506297577

Appendix D: Approval Letter from the Chairperson of Special Education at King Saud University

Kingdom of Saudi Arabia
Ministry of Higher Education
King Saud University
Code 034
College of Education

بسم الله الرحمن الرحيم

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الملك سعود
رمزها ٠٣٤
كلية التربية

No: ٢/٨/٣٦٨٠٩ الرقم: التاريخ: ٥٥/١/١ ..   Date:١٩٢٦/١١/

إلى من يهمه الأمر

السلام عليكم ورحمة الله وبركاته ... وبعد:

بناءً على طلب طالب الدكتوراه / ماجد بن عبدالرحمن السالم ، والمبتعث بجامعة كانسس بإجراء رسالة الدكتوراه في المملكة العربية السعودية ، حيث تتضمن دراسته تحكيم الاستبانة من قبل بعض أعضاء هيئة التدريس بقسم التربية الخاصة بجامعة الملك سعود ، فإنه لا مانع لدينا من حضور المبتعث/ ماجد السالم ، وعمل دراسته الميدانية في الفترة من ١٥ ديسمبر ٢٠١٤م الموافق ١٤٣٦/٢/٢٣هـ وحتى تاريخ ١٥ مارس ٢٠١٥م الموافق ١٤٣٦/٥/٢٤هـ.

وتقبلوا خالص التحية والتقدير،،،،

رئيس قسم التربية الخاصة

د. تركي بن عبدالله القريني

Appendix E: A Letter from the Dean of College of Education to The Ministry of Education Regarding Conducting Research Study

Kingdom of Saudi Arabia
Ministry of Higher Education

King Saud University

Code 034

College of Education

Dean's Office

Date: ١٤٣٧/٢/١٦

No.: ٦٤٩٦

المملكة العربية السعودية
وزارة التعليم العالي

جامعة الملك سعود

رمزها ٠٣٤

كلية التربية

مكتب العميد

الرقم: ٦٤٩٦   التاريخ: ١٤٣٧/٢/١٦

سعادة مدير عام إدارة التربية والتعليم بمنطقة الرياض   المحترم

السلام عليكم ورحمة الله وبركاته ... وبعد:

نفيد سعادتكم بأن المحاضر بقسم التربية الخاصة/ ماجد بن عبدالرحمن السالم ، يقوم بإجراء دراسة علمية بعنوان: "تعزيز الأداء المهني لمعلمي الصم وضعاف السمع من خلال تطبيق التصميم التعليمي الشامل في المملكة العربية السعودية"، لاستطلاع آراء معلمي الصم وضعاف السمع في معاهد وبرامج الصم وضعاف السمع في جميع مراحل المدارس الحكومية بمدينة الرياض.

عليه، أرجو من سعادتكم التكرم بتسهيل مهمته ، والسماح له بتطبيق الأداة على عينة الدراسة.

وتقبلوا خالص التحية والتقدير،،،،

عميد كلية التربية

٢/١٦

د. طارق بن صالح الريس

Appendix F: Approval Letter from the Ministry of Education to Distribute Surveys and Conduct Research Study

الرقم : ٣٣٣٤٤٢٦٦٣		المملكة العربية السعودية
التاريخ : ١٤٣٦/٣/١٧م		وزارة التربية والتعليم
المرفقات :		٢٨٠

الإدارة العامة للتربية والتعليم بمنطقة الرياض

إدارة التخطيط والتطوير

وزارة التربية والتعليم
Ministry of Education

تسهيل مهمة باحث

الاسم		السجل المدني
ماجد بن عبدالرحمن عبدالعزيز السالم		١٠٨٢٤٥٥٥٧٥
العام الدراسي	الدرجة العلمية	الكلية	الجامعة
١٤٣٥/١٤٣٦هـ	دكتوراه	التربية	الملك سعود

عنوان الدراسة : تعزيز الأداء المهني لمعلمي الصم وضعاف السمع من خلال تطبيق التصميم التعليمي الشامل في المملكة العربية السعودية.

عينة الدراسة : معلمي ومعلمات الصم وضعاف السمع.

المكرم مدير مدرسة ....   وفقه الله

السلام عليكم ورحمة الله وبركاته ، وبعد :

بناء على تعميم معالي الوزير رقم ٥٥/٦١٠ وتاريخ ١٤١٦/٩/١٧ هـ بشأن تفويض الإدارات العامة للتربية والتعليم بإصدار خطابات السماح للباحثين بإجراء البحوث والدراسات ، وحيث تقدم إلينا الباحث (الموضحة بياناته أعلاه) بطلب إجراء دراسته، ونظراً لاكتمال الأوراق المطلوبة نأمل تسهيل مهمته مع بداية الفصل الدراسي الثاني للعام ١٤٣٥/١٤٣٦ هـ.

مع ملاحظة أن الباحث يتحمل كامل المسؤولية المتعلقة بمختلف جوانب البحث ، ولا يعني سماح الإدارة العامة للتربية والتعليم موافقتها بالضرورة على مشكلة البحث أو على الطرق والأساليب المستخدمة في دراستها ومعالجتها.

شاكرين لكم وتقبلوا تحياتي..

مدير إدارة التخطيط والتطوير

سعود بن راشد ال عبداللطيف

صورة لجميع مكاتب التربية والتعليم

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Appendix G: Consent Form in English

CONSENT STATEMENT

Supporting Professional Development among Deaf and Hard of Hearing Teachers
through the Implementation of Universal Design for Learning in Saudi Arabia

The IRB approved the submission from 1/22/2015 to 1/21/2016 IRB ID: STUDY00002011 Investigator: Majed Alsalem

Dear Teachers,

The Department of Special Education at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You should be aware that even if you agree to participate, you are free to withdraw at any time without penalty.

The purpose of this survey is to identify the current status of Universal Design for Learning and the barriers of its implementation in Saudi Arabian schools for deaf and hard of hearing students in K-12. We hope the results of this survey will enhance the development of better understanding of UDL in Saudi Arabian schools. Overall, UDL supports the inclusion of all students, including those with and without identified disabilities. Your participation is completely voluntary. It should take you about 10-15 minutes to complete the survey. This survey is completely confidential.

If you would like additional information concerning this study or your participation, please feel free to contact the principal investigator or the faculty Supervisor. Thank you for your precious time that you spent to complete this survey and we appreciate your participation in this study.

We thank you in advance!

Sincerely,

Majed Alsalem   James Bsham, Ph.D.
Principal Investigator   Faculty Supervisor
Special Education   Special Education
College of Education   College of Education
University of Kansas   University of Kansas
M234a127@ku.edu   jbasham@ku.edu
majalsalem@ksu.edu.sa

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Appendix H: (UDL) English Survey

Supporting Professional Development among Deaf and Hard of Hearing Teachers through the Implementation of Universal Design for Learning in Saudi Arabia

Section 1: The current level of implementation of UDL.

For this section of the survey use the following scale:

For each statement, please place a check mark (√) according to the following rating scale:

1= Never, 2= Not Very Often, 3= Often, 4= Very Often, and 5= Daily.

Directions: In thinking about your own teaching please identify how often you do the following.

	Engagement	1	2	3	4	5
1	I use lecture as my primary teaching technique.					
2	I encourage students to work in small groups during class instruction.					
3	I offer online assignments.					
4	I encourage students to study as groups outside of class.					
5	I encourage students to communicate online or face-to-face peers to discuss course materials.					
6	I try to design class activities that match to student interests.					
7	I allow students to choose activities that match their interests.					
8	I provide opportunities to build student self-monitoring.					
9	I provide choices for accomplishing course activities in class.					

If you use different methods to engage your students please indicate below

…………………………………………………………………………………………………

………….…………………………………………………………………………………

………………………..……………………………………………………………………

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	Representation	1	2	3	4	5
1	I present information in a variety of ways (verbal, visual, auditory, tactile).					
2	I clearly identify the essential concepts in multiple ways so that students understand.					
3	I provide information in alternative formats such as diagrams, charts, graphs or visual concept maps.					
4	I provide a summary of the lesson.					
5	The materials I use are captioned.					
6	I use Digital or Electronic based multimedia books in my teaching.					
7	I offer students access to multimedia resources to support learning.					
8	I encourage students to use online resources and websites to learn class information.					
9	I provide software applications that students can use in their learning.					

If you use different methods to represent your materials please indicate below

……………………………………………………………………………………………

……………………………………………………………………………………………

………………….…………………………………………………………………………

	Action and Expression	1	2	3	4	5
1	I provide multiple types of assignments that include the use of various types of modern media (e.g., written, podcast, presentation, video).					
2	I encourage students to self-monitor their own behavior and learning outcomes.					
3	I encourage students to use technology (e.g. laptops, tablets) in class for learning purposes.					
4	I provide activities for students to demonstrate their knowledge in multiple ways (e.g., writing, presenting, drawing, etc.).					
5	I provide an outline of the steps required for completing the assignments.					
6	I provide models or examples of class projects and assignments.					
7	I allow students to make their own choices in how they complete assignments.					
8	I provide clear guidelines for how to successfully complete all major course assignments.					
9	I clearly identify the scoring methods for all major course assignments before giving the students the assignment.					

If you use different methods of action and expression please indicate below

…………………………………………………………………………………………………

………….……………………………………………………………………………………

………………..……………………………………………………………………………

Section 2: Barriers to implementing UDL in classroom.

For this section of the survey use the following scale:
For each statement, please place a check mark (√) that indicates the extent to which you agree or disagree with the statement using the following rating scale:

SD= Strongly Disagree, D= Disagree, N= Neutral, A= Agree, and SA= Strongly Agree

	Barriers	SD	D	N	A	SA
1	I don't have understanding of UDL.					
2	I know the basics of UDL but not how to implement it.					
3	I don't have understanding for how to use technology in my classroom.					
4	Lack of overall professional development on new things in education.					
5	There's not enough technology hardware (e.g. laptops, tablets, etc.) in my school.					
6	There's limited access to the Internet in my school					
7	Technology reduces my contact with students					
8	My students don't have the necessary technology skills to use it in their own learning					
9	The use of technology in class is a disruption					

If there are any other barriers that you can think of please indicate below
……………………………………………………………………………………………………
……………………………………………………………………………………………………
………………………..………………………………………………………………………

Section C: Demographic information

- Gender
  - o   Male
  - o   Female

- Age

  _____

- What type of student they are teaching

  - o   Deaf
  - o   Hard of hearing

- In your history of teaching have you taught both populations of students?
  - o Yes
  - o No

- Setting
  - o   Regular schools
  - o   Deaf institution

- Class level that you teach
  - o Elementary School
  - o Middle School
  - o High School

- Years of experience

_____

- How many years have you been using computers (or tablets) to support your students learning?

_____

- How many years have you been using the Internet to support your students learning?

  _____

- Highest level of education you have completed:
  - o Bachelor's degree
  - o Graduate

- Do you have enough computers to effectively use technology in your teaching?

  - o Yes
  - o No

Appendix I: Consent Form in Arabic

بسم الله الرحمن الرحيم

الموافقة على الإشتراك في الدراسة

سعادة الاستاذ/ة ....سلمه الله

السلام عليكم ورحمة الله وبركاته.... وبعد

تهدف هذه الدراسة الى فحص واقع التطور المهني لمدرسي الصم وضعاف السمع من خلال تطبيقات التصميم الشامل للتعلم من خلال تحديد الوضع والمستوى الحالي للتصميم الشامل للتعلم والحواجز التي تقف ضد تطبيقه في الصفوف الدراسية من وجهة نظر معلمي ومعلمات الصم وضعاف السمع في مدارس مدينة الرياض. حيث يُعرف التصميم الشامل للتعلم بأنه إطار تعليمي يستند على ثلاث مبادئ رئيسية وهي:

(١) تقديم المحتوى التعليمي بأكثر من طريقة وأسلوب

(٢) إعطاء وسائل مختلفة للطلاب لكي يعبروا عن فهمهم من خلال عدة طرق

(٣) توفير وسائل مختلفة للطلاب للمشاركة والتفاعل من خلال الأنشطة الصفية التي توفرها داخل قاعة الدرس وخارجها من خلال استخدام التقنية .

لذا امل التكرم بتعبئة هذا الاستبيان بشكل دقيق بما يساعد الباحث لفهم أفضل حول الوضع الحالي لأساليب التدريس المستخدمة لتدريس الصم وضعاف السمع. علماً بأن جميع المعلومات سوف يتم التعامل معها بسرية تامة ولن تستخدم إلا لأغراض البحث العلمي .شاكرين لكم وقتكم الثمين للمشاركة في هذا الاستبيان .

المشرف على البحث : د. جايمس باشام
قسم التربية الخاصة
جامعة كانسس
jbasham@ku.edu

الباحث : ماجد عبدالرحمن السالم
قسم التربية الخاصة
جامعة كانسس
m234a127@ku.edu
majalsalem@ksu.edu.sa

Appendix J: (UDL) Arabic Survey

الرجاء وضع علامة (√) أمام العبارات التالية التي تناسبك خلال تدريسك وذلك باستخدام المقياس التالي:

١=مطلقا ٢= أحيانا ٣= في كثير من الأوقات ٤=في معظم الأوقات ٥= بشكل يومي

يرجى تحديد مدى استخدامك للأساليب التالية اثناء عملية التدريس:

المشاركة والتفاعل

	٥	٤	٣	٢	١	العـــبــارة	
						أستخدم التلقين المباشر كطريقة أساسية في التدريس	١
						أشجع الطلاب على العمل في مجموعات صغيرة خلال الدرس	٢
						أزود الطلاب بواجبات عن طريق الإنترنت	٣
						أسمح للطلاب باختيار الأنشطة التي تتناسب اهتماماتهم داخل الفصل	٤
						أشجع الطلاب على التواصل عبر الإنترنت أو وجهاً لوجه لمناقشة المواد الدراسية	٥
						أحاول أن أصمم النشاطات الصفية التي تتطابق مع اهتمامات الطلاب	٦
						أشجع الطلاب على الدراسة (المذاكرة) في مجموعات خارج الفصل	٧
						أقوم بتوفير فرص للطلاب لتنمية المراقبة الذاتية لديهم	٨
						أقوم بتقديم خيارات متنوعة لإنجاز الأنشطة داخل الفصل	٩

إذا كنت تستخدم وسائل مختلفة للطلاب لتشجيعهم على المشاركة والتفاعل من خلال الأنشطة الصفية التي توفرها داخل قاعة الدرس، الرجاء ذكرها هنا:

....

....

....

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التقديم والعرض

	العــبارة	١	٢	٣	٤	٥
١	أقدم المعلومات للطلاب من خلال مجموعة متنوعة من الطرق (اللفظية والبصرية والسمعية واللمسية)					
٢	أحدد بوضوح المفاهيم الأساسية بطرائق متعددة لتساعد الطلاب على فهم الموضوع					
٣	أقدم المعلومات للطلاب في أشكال مختلفة كالرسوم البيانية والصور التوضيحية أو خرائط المفاهيم البصرية					
٤	أقوم بتزويد الطلاب بملخص لكل درس					
٥	تحتوي المواد المرئية التي أقدمها على عبارات مكتوبة					
٦	أستخدم الكتب الرقمية و الإلكترونية في التدريس					
٧	أقوم بتوفير مصادر تعليمية مختلفة للطلاب لدعم التعلم					
٨	أشجع الطلاب على أستخدام مصادر من الإنترنت بما يدعم تعليمهم					
٩	أقوم بتزويد الطلاب ببرامج وتطبيقات يمكن استخدامها في تعليمهم					

إذا كنت تستخدم وسائل مختلفة لتقديم المادة العلمية والمحتوى لطلابك، الرجاء ذكرها هنا

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الفهم والتعبير

	٥	٤	٣	٢	١	العــــبارة	
						أقوم بتزويد الطلاب بأنواع مختلفة من الواجبات التي تتضمن الوسائل التعليمية الحديثة كالعروض التقديمية ومقاطع الفيديو.	١
						أشجع الطلاب على المراقبة الذاتية لسلوكياتهم أو تصرفاتهم داخل قاعة الدرس.	٢
						أشجع الطلاب على استخدام التقنية الحديثة (على سبيل المثال اللاب توب، الكمبيوتر) داخل الفصل لغرض التعلم.	٣
						أقوم بتزويد الطلاب بأنواع مختلفة من الأنشطة لإظهار معرفتهم من خلال طرائق متعددة (مثل : الكتابة ،العرض و التقديم، الرسم الخ...)	٤
						أقوم بتزويد الطلاب بإجراءات ارشادية لإكمال الواجبات المنزلية	٥
						أقوم بتزويد الطلاب بنماذج أو أمثلة للمشاريع الصفية والواجبات	٦
						أسمح للطلاب لاختيار طريقتهم المناسبة المفضلة في إكمال الواجبات	٧
						أقوم بتزويد الطلاب بتوجيهات واضحة لكيفية إكمال جميع المهام المعطاة لهم بنجاح	٨
						أحدد بوضوح نظام الدرجات لجميع المهام والواجبات قبل إعطائها للطلاب	٩

إذا كنت تستخدم طرقا مختلفة لطلابك لكي يعبروا عن فهمهم ، الرجاء ذكرها هنا

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القسم الثاني: معوقات تطبيق التصميم الشامل للتعلم في الصفوف الدراسية

الرجاء تحديد درجة موافقتك أو عدم موافقتك على العبارات التالية وذلك باستخدام المقياس التالي:

1 = غيرموافق بشدة ، 2=غير موافق ، 3= محايد ، 4= موافق ، 5= موافق بشدة

العوائق والحواجز

٥	٤	٣	٢	١	العـــبارة	
					ليس لدي فهم عن التصميم الشامل للتعلم	١
					لدي معرفة بأساسيات التصميم الشامل للتعلم لكن ليس لدي المام كاف بكيفية تنفيذه	٢
					ليس لدي معرفة بكيفية استخدام التقنية في الصفوف الدراسية	٣
					لايوجد دورات تدريبية كافية تختص بتقديم المعلومات الحديثة في مجال التعليم	٤
					لايوجد أجهزة كمبيوتر في مدرستي.	٥
					هناك وصول محدود للأنترنت في مدرستي	٦
					استخدام التقنية يقلل من عملية التواصل مع الطلاب	٧
					يفتقر الطلاب الذين اعمل معهم الى مهارات التقنية اللازمة لاستخدامها في تعلمهم	٨
					اعتقد أن استخدام التقنية في الصف الدراسي تؤدي الى ارباك العملية التعليمية	٩

إذا كان هناك حواجز وعواقب أخرى، الرجاء ذكرها هنا

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القسم الأخير : المعلومات الشخصية

الجنس:
☐ ذكر
☐ أنثى

العمر: _____

عدد سنوات التدريس: _____

هل أنت مدرس:
☐ صم
☐ ضعاف سمع

خلال تاريخك التدريسي هل قمت بتدريس كلتا الفئتين الصم وضعاف السمع:
☐ نعم
☐ لا

نوع الفصل الذي تقوم بتدريسه:
☐ فصل مدمج في مدرسة
☐ معهد للصم

مدرستك الحالية:
☐ ابتدائي
☐ متوسط
☐ ثانوي

المؤهلات العلمية:
☐ بكالوريوس
☐ دراسات عليا

كم عدد السنوات التي استخدمت فيها الحاسب لغرض التعليم: _____

كم عدد السنوات التي استخدمت فيها الإنترنت لغرض التعليم: _____

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**Appendix K: The Arabic-Translated vs. the Arabic Modified Statements on UDL
Questionnaire**

The Arabic-Translated vs. the Arabic Modified Statements on UDL Questionnaire

العبارات المترجمة إلى العربية ما بعد التعديل والتنقيح	العبارات المترجمة إلى العربية	
		المشاركة والتفاعل
أستخدم التلقين المباشر كطريقة أساسية في التدريس	أستخدم التلقين المباشركطريقة أساسية في التدريس	١
أشجع الطلاب على العمل في مجموعات صغيرة خلال الدرس	أشجع الطلاب على العمل في مجموعات صغيرة خلال الدرس	٢
أزود الطلاب بواجبات عن طريق الإنترنت	أزود الطلاب بواجبات عن طريق الانترنت	٣
أسمح للطلاب باختيارالأنشطة التي تتناسب اهتماماتهم داخل الفصل	أسمح للطلاب لاختيار الأنشطة التي تتناسب اهتماماتهم داخل الفصل	٤
أشجع الطلاب على التواصل عبر الإنترنت أو وجهاً لوجه لمناقشة المواد الدراسية	أشجع الطلاب على التواصل عبر الإنترنت أو وجها لوجه لمناقشة المواد الدراسية	٥
أحاول أن أصمم النشاطات الصفية التي تتطابق مع اهتمامات الطلاب	أحاول أن أصمم النشاطات الصفية التي تتطابق مع اهتمامات الطلاب	٦
أشجع الطلاب على الدراسة (المذاكرة) في مجموعات خارج الفصل	أشجع الطلاب على دراسة في مجموعات خارج الفصل	٧
أقوم بتوفير فرص للطلاب لتنمية المراقبة الذاتية لديهم	أقوم بتوفير فرص للطلاب لبناء المراقبة الذاتية	٨
أقوم بتقديم خيارات متنوعة لإنجاز الأنشطة داخل الفصل	أقوم بتوفير خيارات متنوعة لانجاز الأنشطة داخل الفصل	٩
		التقديم والعرض
أقدم المعلومات للطلاب من خلال مجموعة متنوعة من الطرق (اللفظية والبصرية والسمعية واللمسية)	أقدم المعلومات للطلاب خلال مجموعة متنوعة من الطرق (اللفظية والبصرية والسمعية واللمسية)	١
أحدد بوضوح المفاهيم الأساسية بطرائق متعددة لتساعد الطلاب على فهم الموضوع	أحدد بوضوح المفاهيم والأفكار الأساسية لأي درس من خلال عدة طرق لتساعد الطلاب على فهم الدرس	٢
أقدم المعلومات للطلاب في أشكال مختلفة كالرسوم البيانية والصور التوضيحية أو خرائط المفاهيم البصرية	أقدم المعلومات للطلاب في أشكال مختلفة كالرسوم البيانية وصور أو خرائط المفاهيم البصرية	٣
أقوم بتزويد الطلاب بملخص لكل درس	أقدم ملخص لكل درس	٤
تحتوي المواد المرئية التي أقدمها على عبارات مكتوبة	جميع المواد المرئية التي اقدمها تحتوي على عبارات مكتوبة	٥
أستخدم الكتب الرقمية و الإلكترونية في التدريس	أستخدم الكتب الرقمية و الإلكترونية في التدريس	٦
أقوم بتوفير مصادرتعليمية مختلفة للطلاب لدعم التعلم	أقوم بتوفير مصادر تعليمية مختلفة للطلاب لدعم عملية التعليم للطلاب	٧
أشجع الطلاب على أستخدام مصادر من الإنترنت بما يدعم تعليمهم	أشجع الطلاب على أستخدام مصادرومواقع من الانترنت لدعم عملية التعليم	٨

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٩	أقوم بتزويد الطلاب ببرامج وتطبيقات التي يمكن استخدامها في تعلمهم	أقوم بتزويد الطلاب ببرامج وتطبيقات يمكن استخدامها في تعليمهم
الفهم والتعبير		
١	أقوم بتزويد الطلاب بأنواع مختلفة من الواجبات التي تشمل استخدام أنواع متعددة من الخيارات (على سبيل المثال ، الواجبات المكتوبة ، تسجيل فيديو،العرض و التقديم)	أقوم بتزويد الطلاب بأنواع مختلفة من الواجبات التي تتضمن الوسائل التعليمية الحديثة كالعروض التقديمية ومقاطع الفيديو.
٢	أشجع الطلاب على المراقبة الذاتية لسلوكياتهم وتصرفاتهم داخل قاعة الدرس	أشجع الطلاب على المراقبة الذاتية لسلوكياتهم أو تصرفاتهم داخل قاعة الدرس.
٣	أشجع الطلاب على استخدام التكلونوجيا (على سبيل المثال اللاب توب، الكمبيوتر) داخل الفصل لغرض التعليم	أشجع الطلاب على استخدام التقنية الحديثة (على سبيل المثال اللاب توب، الكمبيوتر) داخل الفصل لغرض التعلم.
٤	أقوم بتزويد الطلاب بأنواع مختلفة من الأنشطة لإظهار معرفتهم بطرق متعددة (على سبيل المثال،الكتابة ،العرض و التقديم، الرسم الخ...)	أقوم بتزويد الطلاب بأنواع مختلفة من الأنشطة لإظهار معرفتهم من خلال طرائق متعددة (مثل : الكتابة ،العرض و التقديم، الرسم الخ...)
٥	أقوم بتزويد مخطط واضح للخطوات المطلوبة لاستكمال اي واجب	أقوم بتزويد الطلاب باجراءات ارشادية لإكمال الواجبات المنزلية
٦	أقوم بتزويد نماذج أو أمثلة للمشاريع الصفية والواجبات	أقوم بتزويد الطلاب بنماذج أو أمثلة للمشاريع الصفية والواجبات
٧	أسمح للطلاب لاختيار طريقتهم المناسبة المفضلة في اكمال الواجبات	أسمح للطلاب لاختيار طريقتهم المناسبة المفضلة في إكمال الواجبات
٨	أقوم بتزويد توجيهات واضحة لكيفية إكمال جميع المهام المعطاه للطلاب بنجاح	أقوم بتزويد الطلاب بتوجيهيات واضحة لكيفية إكمال جميع المهام المعطاة لهم بنجاح
٩	أحدد بوضوح نظام الدرجات لجميع المهام والواجبات قبل اعطائها للطلاب	أحدد بوضوح نظام الدرجات لجميع المهام والواجبات قبل إعطائها للطلاب
العوائق والحواجز		
١	ليس لدي فهم عن التصميم التعليمي الشامل	ليس لدي فهم عن التصميم الشامل للتعلم
٢	لدي معرفة بأساسيات التصميم التعليمي الشامل لكن لست على دراية بكيفية التنفيذ	لدي معرفة بأساسيات التصميم الشامل للتعلم لكن ليس لدي المام كاف بكيفية تنفيذه
٣	ليس لدي دراية كافية باستخدام التكلونوجيا داخل قاعة الدرس	ليس لدي معرفة بكيفية استخدام التقنية في الصفوف الدراسية
٤	لايوجد دورات تدريبية كافية تختص بتقديم المعلومات الحديثة في مجال التعليم	لايوجد دورات تدريبية كافية تختص بتقديم المعلومات الحديثة في مجال التعليم
٥	لايوجد أجهزة كمبيوتر في مدرستي	لايوجد أجهزة كمبيوتر في مدرستي.
٦	هناك وصول محدود للأنترنت في مدرستي	هناك وصول محدود للأنترنت في مدرستي
٧	أستخدام التكنولوجيا يقلل التواصل مع الطلاب	استخدام التقنية يقل من عملية التواصل مع الطلاب
٨	طلابي لا يملكون مهارات التكنولوجيا اللازمة لاستخدامها في العملية التعليمية	يفتقر الطلاب الذين اعمل معهم الى مهارات التقنية اللازمة لاستخدامها في تعلمهم
٩	استخدام التكنولوجيا في الصف تسبب تشويش وارباك	اعتقد أن استخدام التقنية في الصف الدراسي تؤدي الى ارباك العملية التعليمية

Appendix L: The Back-Translated (UDL Questionnaire)

	Back-Translated Statements	Arabic-Translated Statements
	Engagement	المشاركة والتفاعل
1	I use lecture as my primary teaching technique	أستخدم التلقين المباشر كطريقة أساسية في التدريس
2	I encourage students to work in small groups during class instruction	أشجع الطلاب على العمل في مجموعات صغيرة خلال الدرس
3	I offer online assignments.	أزود الطلاب بواجبات عن طريق الإنترنت
4	I allow students to choose activities that match their interests.	أسمح للطلاب باختيار الأنشطة التي تتناسب اهتماماتهم داخل الفصل
5	I encourage students to communicate online or face-to-face to discuss course materials.	أشجع الطلاب على التواصل عبر الإنترنت أو وجهاً لوجه لمناقشة المواد الدراسية
6	I try to design class activities that match to student interests.	أحاول أن أصمم النشاطات الصفية التي تتطابق مع اهتمامات الطلاب
7	I encourage students to study as groups outside of class.	أشجع الطلاب على الدراسة في مجموعات خارج الفصل
8	I provide opportunities to build student self-monitoring.	أقوم بإتاحة فرص للطلاب لبناء المراقبة الذاتية
9	I provide choices for accomplishing course activities in class.	أقوم بتقديم خيارات متنوعة لإنجاز الأنشطة داخل الفصل
	Representation	التقديم والعرض
1	I present information in a variety of ways (verbal, visual, auditory, tactile).	أقدم المعلومات للطلاب خلال مجموعة متنوعة من الطرق (اللفظية والبصرية والسمعية واللمسية)
2	I clearly identify the essential concepts in multiple ways, so that students understand the subject	أحدد بوضوح المفاهيم والأفكار الأساسية لأي درس من خلال عدة طرائق لتساعد الطلاب على فهم الدرس
3	I provide information in alternative formats such as diagrams, charts, graphs or visual concept maps.	أقدم المعلومات للطلاب في أشكال مختلفة كالرسوم البيانية أو الصور أو خرائط المفاهيم البصرية

4	I provide a summary of each lesson.	أقوم بتزويد الطلاب بملخص لكل درس
5	The materials I use are captioned.	تتضمن المواد المرئية التي أقدمها للطلاب على عبارات توضيحية مكتوبة
6	I use Digital or Electronic based multimedia books in my teaching	أستخدم الكتب الرقمية و الإلكترونية في التدريس
7	I offer students access to multimedia resources to support learning.	أقوم بتوفير مصادرتعليمية مختلفة للطلاب لدعم عملية تعليمهم
8	I encourage students to use online resources and websites to learn class information.	أشجع الطلاب على أستخدام مصادرومواقع من الإنترنت بما يدعم تعليمهم
9	I provide software applications that students can use in their learning.	أقوم بتزويد الطلاب ببرامج وتطبيقات يمكن استخدامها في تعليمهم
	Action and Expression	الفهم والتعبير
1	I provide multiple types of assignments that include the use of various types of modern media (e.g., written, podcast, presentation, video).	أقوم بتزويد الطلاب بأنواع مختلفة من الواجبات التي تتضمن الوسائل التعليمية الحديثة كالعروض التقديمية ومقاطع الفيديو.
2	I encourage students to self-monitor their own behavior outcomes.	أشجع الطلاب على المراقبة الذاتية لسلوكياتهم أو تصرفاتهم داخل قاعة الدرس.
3	I encourage students to use technology (e.g. laptops, tablets) in class for learning purposes.	أشجع الطلاب على استخدام التقنية الحديثة (على سبيل المثال اللاب توب، الكمبيوتر) داخل الفصل لدعم العملية التعليمية .
4	I provide activities for students to demonstrate their knowledge in multiple ways (e.g., writing, presenting, drawing, etc.).	أقوم بتزويد الطلاب بأنواع مختلفة من الأنشطة لإظهار معرفتهم من خلال طرائق متعددة (على سبيل المثال،الكتابة ،العرض و التقديم، الرسم الخ...)
5	I provide an outline of the steps required for completing the assignments.	أقوم بتزويد الطلاب باجراءات ارشادية لإكمال الواجبات المنزلية
6	I provide models or examples of class projects and assignments.	أقوم بتزويد الطلاب بنماذج أو أمثلة للمشاريع الصفية والواجبات

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7	I allow students to make their own choices in how they complete assignments.	أسمح للطلاب لاختيار طريقتهم المناسبة المفضلة في إكمال الواجبات
8	I provide clear guidelines for how to successfully complete all major course assignments.	أقوم بتزويد الطلاب بتوجيهات واضحة لكيفية إكمال جميع المهام المعطاة لهم بنجاح
9	I clearly identify the scoring methods for all major course assignments before giving the students the assignment.	أحدد بوضوح نظام الدرجات لجميع المهام والواجبات قبل إعطائها للطلاب
	Barriers	العوائق والحواجز
1	I don't have understanding of UDL.	ليس لدي فهم عن التصميم الشامل للتعلم
2	I know the basics of UDL but not how to implement it.	لدي معرفة بأساسيات التصميم الشامل للتعلم لكن ليس لدي المام كاف بكيفية تنفيذه
3	I don't have understanding for how to use technology in my classroom.	ليس لدي المام كاف باستخدام التقنية في الصفوف الدراسية
4	Lack of overall professional development on new things in education.	لايوجد دورات تدريبية كافية تختص بتقديم المعلومات الحديثة في مجال التعليم
5	There's not enough technology hardware (e.g. laptops, tablets, etc.) in my school.	لايوجد أجهزة كمبيوتر في مدرستي.
6	There's limited access to the Internet in my school.	هناك وصول محدود للأنترنت في مدرستي
7	Technology reduces my contact with students.	اعتقد ان استخدام التقنية يقلل من عملية التواصل مع الطلاب
8	My students don't have the necessary technology skills to use it in their own learning	يفتقر الطلاب الذين اعمل معهم الى مهارات التقنية اللازمة لاستخدامها في العملية التعليمية
9	The use of technology in class is a disruption	اعتقد أن استخدام التقنية في الصف الدراسي تؤدي الى ارباك العملية التعليمية

Appendix M: Permission to Use Stages of Concern Questionnaire (SoCQ)

ADVANCING RESEARCH

SEDL

IMPROVING EDUCATION

To: Majed Alsalem (Licensee)
     550 Stoneridge, Apt. E105
     Lawrence, KS 66049

From: Nancy Reynolds
      Information Associate
      SEDL, an affiliate of the American Institutes for Research
      Information Resource Center—Copyright Permissions
      4700 Mueller Blvd.
      Austin, TX 78723

Subject: License Agreement to reproduce and distribute SEDL materials

Date: January 22, 2015

Thank you for your interest in using the **Stages of Concern Questionnaire** (SoCQ 075) published by SEDL and written by Archie A. George, Gene E. Hall, and Suzanne M. Stiegelbauer in 2006 as Appendix A, pages 79-82 in *Measuring Implementation in Schools: The Stages of Concern Questionnaire*, in electronic format as SEDL's *Stages of Concern Questionnaire (SoCQ) Online* accessible on the SEDL website from http://www.sedl.org/pubs/catalog/items/cbam21.html and published on pages 48-49 in the SEDL publication *Taking Charge of Change*, revised ed., published in 2006, 2nd printing, 2008, revised PDF version uploaded on Lulu.com, 2014, that was written by Shirley M. Hord, William L. Rutherford, Leslie Huling, and Gene E. Hall.

The SoCQ 075 will be referred to as the "work" in this License Agreement. SEDL is pleased to grant permission to the Licensee, a graduate student at the Department of Special Education at the University of Kansas in Lawrence, KS, to use the work to assess deaf and hard of hearing teachers' concerns about new teaching framework called Universal Design for Learning (UDL) and for research for a dissertation titled *Supporting Professional Development Among Deaf and Hard of Hearing Teachers Through the Implementation of Universal Design for Learning in Saudi Arabia*. The following are the terms, conditions, and limitations governing this limited permission to reproduce the work:

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Thank you, again, for your interest in using the *Stages of Concern Questionnaire (SoCQ 075)*. If you have any questions about this License Agreement, please contact me at 800-476-6861, ext. 6548 or 512-391-6548, or by e-mail at nancy.reynolds@sedl.org.

Sincerely,

*Nancy Reynolds*
Nancy Reynolds for SEDL
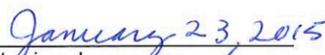
January 23, 2015
Date signed

Agreed and accepted:

Signature: _____
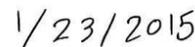
1/23/2015
Date signed

Printed Name: _Majed Alsalem_

Appendix N: The Original SoCQ vs. the Modified Statements of the SoCQ Questionnaire

	Original Statements	**Statements After Modification**
1	I am concerned about students' attitudes toward the innovation.	I am concerned about students' attitudes toward UDL.
2	I now know of some other approaches that might work better.	I now know of some other approaches that might work better.
3	I don't even know what this innovation is.	I don't even know what the UDL is.
4	I am concerned about not having enough time to organize myself each day.	I am concerned about not having enough time to organize myself each day.
5	I would like to help other teachers in their adaptation this innovation.	I would like to help other teachers in their adaptation of UDL.
6	I have a very limited knowledge about this innovation.	I have a very limited knowledge about UDL.
7	I would like to know the effect of reorganization on my professional status.	I would like to know the effect of reorganization on my professional status.
8	I am concerned about conflict between my interests and my responsibilities.	I am concerned about conflict between my interests and my responsibilities.
9	I am concerned about revising my use of this innovation.	I am concerned about revising my use of UDL.
10	I would like to develop working relationships with both our teachers and outside teachers using this innovation.	I would like to develop working relationships with both our teachers and outside teachers using UDL.
11	I am concerned about how this innovation affects students.	I am concerned about how UDL affects students.
12	I am not concerned about this innovation.	I am not concerned about UDL.
13	I would like to know who will make the decisions in the new system.	I would like to know who will make the decisions in the new system.
14	I would like to discuss the possibility of using this innovation.	I would like to discuss the possibility of using UDL.
15	I would like to know what resources are available if we decide to adopt this innovation.	I would like to know what resources are available if we decide to adopt UDL.
16	I am concerned about my inability to manage the requirements of this innovation.	I am concerned about my inability to manage the requirements of UDL.
17	I would like to know how my teaching or administration is supposed to change.	I would like to know how my teaching or administration is supposed to change.
18	I would like to familiarize other schools or persons with the progress of this new framework.	I would like to familiarize other schools or persons with the progress of this new framework.
19	I am concerned about evaluating my impact on students.	I am concerned about evaluating my impact on students.
20	I would like to revise this innovation instructional approach.	I would like to revise UDL instructional approach.
21	I am completely occupied with other things.	I am completely occupied with other things.
22	I would like to modify our use of this innovation based on the experiences of our students.	I would like to modify our use of UDL based on the experiences of our students.

	Original Statements	Statements After Modification
23	Although I don't know about this innovation, I am concerned about things in this area.	Although I don't know about UDL, I am concerned about things in this area.
24	I would like to excite my students about their part in this approach.	I would like to excite my students about their part in this approach.
25	I am concerned about time spent working with nonacademic problems related to this innovation.	I am concerned about time spent working with nonacademic problems related to UDL.
26	I would like to know what the use of this innovation will require in the immediate future.	I would like to know what the use of the UDL will require in the immediate future.
27	I would like to coordinate my effort with others to maximize the effects of this innovation.	I would like to coordinate my effort with others to maximize the effects of UDL.
28	I would like to have more information on time and energy commitments required by this innovation.	I would like to have more information on time and energy commitments required by UDL.
29	I would like to know what other teachers are doing in this area.	I would like to know what other teachers are doing in this area.
30	At this time, I am not interested in learning about this innovation.	At this time, I am not interested in learning about UDL.
31	I would like to determine how to supplement, enhance, or replace this innovation	I would like to determine how to supplement, enhance, or replace UDL
32	I would like to use feedback from students to change the program.	I would like to use feedback from students to change the program.
33	I would like to know how my role will change when I am using this innovation	I would like to know how my role will change when I am using UDL
34	Coordination of tasks and people is taking too much of my time	Coordination of tasks and people is taking too much of my time
35	I would like to know how this this innovation is better than what we have now	I would like to know how this UDL is better than what we have now

Appendix O: The Stages of Concern Questionnaire and UDL Quiz (English Version)

Supporting Professional Development among Deaf and Hard of Hearing Teachers through the
Implementation of Universal Design for Learning in Saudi Arabia

| The IRB approved the submission from 1/22/2015 to 1/21/2016 |
| IRB ID: STUDY00002011 |
| Investigator: Majed Alsalem |

Dear Teachers,

The Department of Special Education at the University of Kansas supports the practice of protection for
human subjects participating in research. The following information is provided for you to decide whether
you wish to participate in the present study. You should be aware that even if you agree to participate,
you are free to withdraw at any time without penalty.

Purpose: The purpose of this survey is to determine the concerns deaf and hard of hearing
teachers have in adopting Universal Design for Learning (UDL) in their teaching. Moreover, this
survey determines teachers' understanding of UDL before and after the training session.

Your participation is completely voluntary. It should take you about 10-20 minutes to complete
the survey. This survey is completely confidential.

We thank you in advance!

Section A:
To answer this section, you should chose from 0-7, some items appear to be little relevance or
irrelevant to you. For the completely irrelevant items, please circle (0) on the scale. If the items
strong relevance, please circle (7) on the scale.

For example:

This statement is very true of me at this time	0 1 2 3 4 5 6 7
This statement is somewhat true of me now	0 1 2 3 4 5 6 7
This statement is not true of me now	0 1 2 3 4 5 6 7
This statement is irrelevant to me	0 1 2 3 4 5 6 7

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	Stages of Concern (CBAM)	0	1	2	3	4	5	6	7
1	I am concerned about students' attitudes toward UDL.								
2	I now know of some other approaches that might work better.								
3	I don't even know what the UDL is.								
4	I am concerned about not having enough time to organize myself each day.								
5	I would like to help other teachers in their adaptation of UDL.								
6	I have a very limited knowledge about UDL.								
7	I would like to know the effect of reorganization on my professional status.								
8	I am concerned about conflict between my interests and my responsibilities.								
9	I am concerned about revising my use of UDL.								
10	I would like to develop working relationships with both our teachers and outside teachers using UDL.								
11	I am concerned about how UDL affects students.								
12	I am not concerned about UDL.								
13	I would like to know who will make the decisions in the new system.								
14	I would like to discuss the possibility of using UDL.								
15	I would like to know what resources are available if we decide to adopt UDL.								
16	I am concerned about my inability to manage the requirements of UDL.								
17	I would like to know how my teaching or administration is supposed to change.								
18	I would like to familiarize other schools or persons with the progress of this new framework.								
19	I am concerned about evaluating my impact on students.								
20	I would like to revise UDL instructional approach.								
21	I am completely occupied with other things.								
22	I would like to modify our use of UDL based on the experiences of our students.								
23	Although I don't know about UDL, I am concerned about things in this area.								
24	I would like to excite my students about their part in this approach.								
25	I am concerned about time spent working with nonacademic problems related to UDL.								
26	I would like to know what the use of the UDL will require in the immediate future.								
27	I would like to coordinate my effort with others to maximize the effects of UDL.								
28	I would like to have more information on time and energy commitments required by UDL.								

29	I would like to know what other teachers are doing in this area.								
30	At this time, I am not interested in learning about UDL.								
31	I would like to determine how to supplement, enhance, or replace UDL								
32	I would like to use feedback from students to change the program.								
33	I would like to know how my role will change when I am using UDL								
34	Coordination of tasks and people is taking too much of my time								
35	I would like to know how this UDL is better than what we have now								

Section B: Understanding UDL

To answer this section you should choose from 1-5 based on what you think is the right answer.

1. Universal Design for Learning (UDL) has:
- o 1 principle
- o 2 principles
- o 3 principles
- o 4 principles
- o 5 major principles

2. The critical elements of UDL:
- o Clear Goals and Timely Progress Monitoring
- o Clear Goals, Flexible Methods & Materials and Timely Progress Monitoring
- o Clear Goals, Intentional Planning for Learner Variability, Flexible Methods & Materials and Timely Progress Monitoring
- o Clear Goals
- o Timely Progress Monitoring

3. Instructional Planning Process of UDL goes through:
- o Establish clear outcomes and anticipate learner variability
- o Establish clear outcomes, anticipate learner variability, and measurable outcomes and assessment plan
- o Establish clear outcomes, anticipate learner variability, measurable outcomes and assessment plan, and instructional experience
- o Establish clear outcomes, anticipate learner variability, measurable outcomes and assessment plan, instructional experience, and reflection and new understandings.
- o Establish clear outcomes

4. Recognition Networks is:
- o The "why" of learning
- o The "how" of learning
- o The "what" of learning
- o All
- o None of these

5. Affective Networks is:
- o The "what" of learning
- o The "how" of learning
- o The "why" of learning
- o All
- o None of these

6. Strategic Networks
- o The " how " of learning
- o The " why " of learning
- o The "what" of learning
- o All
- o None of these

7. Universal Design for Learning (UDL) is:
- o An approach to teaching
- o A framework used to teach students with/without disabilities
- o A single strategy used to teach students
- o A set of strategies used for students with disabilities
- o A software application for teaching

8. UDL works better for
- o Special education teachers only
- o General education teachers only
- o Both special and general teachers
- o Only for deaf and hard of hearing teachers
- o None of these

9. Learner "variability" refers to:
- o The range of emotions that each learner has toward school and learning
- o The different ethnic and cultural backgrounds of learners
- o The range of knowledge, skills, and strategies each learner brings to the learning environment
- o All of the above
- o I don't know.

10. Learning goals refer to:
- o How we want students to show what they know
- o What a teacher wants to change about his or her teaching
- o Meet the Ministry of Education Standards or other standards
- o What students should know or be able to do by the end of a learning event such as a lesson or unit
- o I don't know

11. When using the UDL framework, context is important because:
- o The design of the environment and the supports and scaffolds available in the curriculum and instruction impacts a learner's ability to understand, show knowledge, and engage with a learning task
- o A teacher can impact how a student feels about the information or skills being taught
- o Supports and scaffolds can allow a student to demonstrate a skill that he or she would not have been able to demonstrate on his or her own
- o All of the above
- o I don't know

12. A learning "context" includes:
- o The environment
- o The curricular materials
- o Any supports and scaffold in the environment, the curricular materials, or the instruction
- o All of the above
- o I don't know

13. Affect:
- o Distracts from the cognitive tasks demanded by school
- o Means enjoying learning
- o Includes values, feelings, and emotions; it allows for learning to occur
- o Can always be seen on the faces of students in a teacher's classroom
- o I don't know

14. The recognition network of the brain:
- o Allows us to identify information and categorize what we experience
- o Allows us to see, hear, and feel
- o Allows us to experience emotions
- o Allows us to make a plan for learning
- o I don't know

15. My undressing of UDL in general is:
- About design in the classroom environment
- About design in the teaching materials
- About design that deals with student variability
- All of the above
- I don't know

<u>**Section C: Demographic information**</u>
- Gender
  - Male
  - Female

- Age _____

- What type of student they are teaching
  - Deaf
  - Hard of hearing

- In your history of teaching have you taught both populations of students?
  - Yes
  - No
- Setting
  - Regular schools
  - Deaf institution
- Class level that you teach
  - Elementary School
  - Middle School
  - High School
- Years of experience_____
- Highest level of education you have completed:
  - Bachelor's degree
  - Graduate
- How many years have you been using computers (or tablets) to support your students learning? _____

- How many years have you been using the Internet to support your students learning? _____

- Do you have enough computers to effectively use technology in your teaching?

  - Yes
  - No

Appendix P: The Stages of Concern Questionnaire and UDL Quiz (Arabic Version)

بسم الله الرحمن الرحيم
الموافقة على الإشتراك في الدراسة

عزيزي معلم الصم وضعاف السمع، السلام عليكم ورحمة الله وبركاته.... وبعد

أشكرك مقدماً على حسن تعاونك في إتمام هذه الدراسة والتي تهدف لدعم التطور المهني لمدرسي الصم وضعاف السمع من خلال تطبيقات التصميم الشامل للتعلم (Universal Design for Learning) حيث يُعرف التصميم الشامل للتعلم بأنه إطار تعليمي يستند على ثلاث مبادئ رئيسية وهي (١) تقديم المحتوى التعليمي بأكثر من طريقة وأسلوب (٢) إعطاء وسائل مختلفة للطلاب لكي يعبروا عن فهمهم من خلال عدة طرق (٣) توفير وسائل مختلفة للطلاب للمشاركة والتفاعل من خلال الأنشطة الصيفية التي توفرها داخل قاعة الدرس وخارجها من خلال استخدام التكلونوجيا.

الغرض من هذه الاستبانة هو تحديد درجة تقبل التصميم الشامل للتعلم لدى معلمي الصم وضعاف السمع بعد تقديم دورة تدريبية مكثفة. وعلاوة على ذلك، يتضمن هذا الاستبيان أسئلة تقيس فهم ومعرفة التصميم الشامل للتعلم من قبل المعلمين قبل وبعد انتهاء الدورة التدريبية.

عزيزي المعلم، أشكرك جزيل الشكر على إعطائي هذا الجزء من وقتك الثمين للمشاركة في هذا الإستبيان ويسعدني الإجابة على أي سؤال يتعلق بالدراسة أو المشاركة فيها وذلك عبر وسائل الاتصال الموضحة في الأسفل.

الباحث : ماجد عبدالرحمن السالم
m234a127@ku.edu
majalsalem@ksu.edu.sa

القسم الأول:
للإجابة على هذا القسم، ينبغي اختيار رقم من (٠) إلى (٧) حسب شعورك، حيث يمثل (٠)عدم اهتمام كلي أو معرفة بالسؤال المطروح والرقم (٧)يمثل معرفة تامة. بينما تشكل الأرقام مابينهما نسبة معرفتك وشعورك تجاه الموضوع. تذكر أن تكون اختياراتك تعبَر عن وضعك الحالي

على سبيل المثال:

هذه العبارة صحيحة جدا لي في الوقت الحاضر	٧ ٦ ٥ ٤ ٣ ٢ ١ ٠	
هذه العبارة تنطبق علي بعض الشي	٧ ٦ ٥ ٤ ٣ ٢ ١ ٠	
هذا العبارة لا تنطبق علي في الوقت الحاضر	٧ ٦ ٥ ٤ ٣ ٢ ١ ٠	
هذا العبارة لا تعني لي شيئاً	٧ ٦ ٥ ٤ ٣ ٢ ١ ٠	

تنطبق علي تماماً الآن		تنطبق علي بعض الشي			لا تنطبق علي في الوقت الحاضر		لا تنطبق علي مطالقا
٧		٦	٥	٤	١ ٣		٠

٧	٦	٥	٤	٣	٢	١	٠	العـــبارة	
								أنا مهتم بمعرفة شعور الطلاب تجاه التصميم الشامل للتعلم	١
								أعرف حالياً أساليب أخرى قد تعمل بشكل أفضل من التصميم الشامل للتعلم	٢
								ليس لدي معرفة بالتصميم الشامل للتعلم	٣
								أنا قلق لعدم وجود وقت كاف لتنظيم نفسي كل يوم	٤
								أرغب في مساعدة المعلمين الآخرين في تطبيق التصميم الشامل للتعلم	٥
								لدي معرفة محدودة جداً حول التصميم الشامل للتعلم	٦
								أرغب بمعرفة أثر تطبيق التصميم الشامل للتعلم على وضعي المهني	٧
								أنا قلق بخصوص التعارض بين اهتماماتي ومسؤولياتي عندما أطبق التصميم الشامل للتعلم	٨
								أنا مهتم بتعديل تطبيقي للتصميم الشامل للتعلم	٩
								أرغب في إقامة علاقات عمل مع طاقم التعليم الخاص بنا ومعلمين من خارج المدرسة يستخدمون التصميم الشامل للتعلم	١٠
								أنا مهتم لمعرفة التصميم الشامل للتعلمعلى الطلاب	١١
								أنا غير مهتم بتطبيق التصميم الشامل للتعلم في الوقت الحالي	١٢
								أرغب في معرفة من سيضع القرارات بخصوص تطبيق التصميم الشامل للتعلم	١٣
								أرغب في المناقشة حول كيفية تطبيق التصميم الشامل للتعلم	١٤
								أرغب في معرفة مصادر التعلم المتوفرة في حال تطبيق التصميم الشامل للتعلم	١٥
								أنا قلق لعدم قدرتي على إدارة كل ما يتطلبه تطبيق التصميم الشامل للتعلم	١٦
								أرغب في معرفة كيف سيتغير تدريسي أو إدارتي في حال تطبيق التصميم الشامل للتعلم	١٧
								أرغب في تزويد مدارس أخرى أو معلمين أخرين بمعلومات حول عملية سير هذا التوجه الجديد	١٨
								أنا مهتم في تقييم تأثيري على الطلبة عندما أطبق التصميم الشامل للتعلم	١٩
								أرغب في تعديل أسلوب تطبيق التصميم الشامل للتعلم	٢٠
								أنا مشغول كلياً بأشياء أخرى	٢١
								أرغب في تعديل تطبيقي للتصميم الشامل للتعلم بناءً على خبرات طلابنا	٢٢
								لعدم معرفتي بالتصميم الشامل للتعلم ، فأني قلق حول عدم إلمامي التام ببعض المتطلبات المستقبلية في هذا المجال	٢٣
								أرغب في استثارة طلابي وبث حماسهم حول دورهم عند تطبيق التصميم الشامل للتعلم	٢٤

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						أنا قلق بالنسبة للوقت المبذول في العمل مع المشكلات غير التعليمية المتعلقة بتطبيق التصميم الشامل للتعلم	٢٥
						أرغب في معرفة ما سيتطلبه تطبيق التصميم الشامل للتعلم في المستقبل القريب	٢٦
						أرغب في تنسيق جهودي مع الآخرين للحصول على أقصى الفوائد من خلال تطبيق التصميم الشامل للتعلم	٢٧
						أرغب في الحصول على معلومات أكثر حول الوقت والجهد المطلوب لتطبيق التصميم الشامل للتعلم	٢٨
						أرغب في معرفة ما يفعله المعلمون الآخرون في تطبيقهم للتصميم الشامل للتعلم	٢٩
						حالياً أنا غير مهتم بمعرفة معلومات أكثر حول التصميم الشامل للتعلم	٣٠
						أرغب في تحديد كيفية إتمام أو تعزيز تطبيق التصميم الشامل للتعلم أو كيفية استبداله بشيء آخر أفضل	٣١
						أرغب في استخدام التغذية الراجعة من قبل الطلاب لعمل تغييرات على التصميم الشامل للتعلم	٣٢
						أرغب في معرفة كيف سيتغير دوري عندما أستخدم التصميم الشامل للتعلم	٣٣
						تنسيق المهام والأشخاص يأخذ الكثير من وقتي عندما أطبق التصميم الشامل للتعلم	٣٤
						أرغب في معرفة كيف يكون تطبيق التصميم الشامل للتعلم أفضل مما لدينا حالياً	٣٥

القسم الثاني: فهم ومعرفة التصميم الشامل للتعلم
للإجابة على هذا القسم يجب أن تختار على ما تعتقد أنه الإجابة الصحيحة.

١. يشتمل التصميم الشامل للتعلم UDL (Universal Design for Learning) على:
☐ مبدأ واحد
☐ مبدئين
☐ ٣ مبادئ
☐ ٤ مبادئ
☐ ٥ مبادئ

٢. تشتمل العناصر الرئيسية للتصميم الشامل للتعلم على:
☐ أهداف واضحة و رصد التقدم المستمر
☐ أهداف واضحة واستخدام مواد وطرق مرنة و رصد التقدم المستمر
☐ أهداف واضحة و معرفة المتغيرات المؤثرة على عملية التعلم واستخدام مواد وطرق مرنة و رصد التقدم المستمر
☐ تصميم أهداف واضحة جدا
☐ رصد تقدم الطلاب بشكل مستمر ودائم

٣. تتضمن عملية التخطيط للدرس من خلال استخدام التصميم الشامل للتعلم على:
☐ تحديد نتائج واضحة والتنبؤ بالمتغيرات المؤثرة على عملية التعلم

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تحديد نتائج واضحة والتنبؤ بالمتغيرات المؤثرة على عملية التعلم ووضع أهداف ونتائج قابلة للقياس والتقييم

تحديد نتائج واضحة والتنبؤ بالمتغيرات المؤثرة على عملية التعلم ووضع أهداف ونتائج قابلة للقياس والتقييم وربط التدريس بخبرات الطلاب وإنشاء بيئة تفاعلية بين الطلاب

تحديد نتائج واضحة والتنبؤ بالمتغيرات المؤثرة على عملية التعلم ووضع أهداف ونتائج قابلة للقياس والتقييم وربط التدريس بخبرات الطلاب

تحديد نتائج واضحة هو جوهر التخطيط الفعال للتصميم الشامل للتعلم

٤. شبكة التعرف (Recognition Networks) الموجدة بالدماغ تهتم ب:

هدف التعلم

كيفية التعلم

ماهية التعلم

جميع ماذكر

لاتوجد إجابة مما ذكر

٥. شبكة الاهتمام وترتيب الأولويات (Affective Networks) الموجدة بالدماغ تهتم ب:

كيفية التعلم

ماهية التعلم

هدف التعلم

جميع ماذكر

لاتوجد إجابة مما ذكر

٦. شبكة الاستراتجيات والمهارات (Strategic Networks) الموجدة بالدماغ تهتم ب:

هدف التعلم

ماهية التعلم

كيفية التعلم

جميع ماذكر

لاتوجد إجابة مما ذكر

٧. التصميم الشامل للتعلم عبارة عن:

طريقة تدريس

استراتيجية مفردة تستخدم لتعليم وتدريس الطلاب

إطار تعليمي يستخدم لجميع الطلاب بما فيهم الطلاب ذوي الإعاقة

مجموعة من الاستراتجيات لتعليم وتدريس الطلاب ذوي الإعاقة

مجموعة من التطبيقات والبرمجيات لتعليم وتدريس الطلاب

٨. التصميم الشامل للتعلم يعمل بشكل أفضل من خلال:

معلمي التربية الخاصة فقط

معلمي التعليم العام فقط

معلمي التربية الخاصة والتعليم العام

معلمي الصم وضعاف السمع

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□ لا أعلم

٩. يشار إلى مصطلح المتغيرات:
□ مجموعة من المشاعر لكل متعلم تجاه المدرسة والتعلم
□ خلفيات وخبرات المتعلم
□ مجموعة من المعارف والمهارات و الاستراتيجيات لدى كل متعلم بشكل فردي
□ كل ما سبق
□ فقرة ٢و٣

١٠. يشار إلى أهداف التعلم:
□ إظهار المعرفة من قبل الطلاب بأي طريقة
□ اختيار أفضل الطرق المناسبة للتدريس من قبل المعلم
□ قدرة الطلاب ومهارتهم في إظهار معرفتهم بشكل مستمر ودائم
□ تطبيق متطلبات وزارة التربية والتعليم
□ لا أعلم

١١. عند استخدام التصميم الشامل للتعلم ، يجب مراعاة:
□ دور المعلم على أنه العنصر الأساسي المؤثر على الطلاب
□ الطالب كمحور الأهتمام الأول
□ تصميم البيئة الفصلية، معرفة المتغيرات التعليمية داخل قاعة الدرس، استخدام طرائق تدريس فعالة و إيجاد فرص تفاعلية للطلاب
□ كل ما سبق
□ لا أعلم

١٢. يقصد بالسياق التعليمي الفعال من خلال التصميم الشامل للتعلم :
□ إنشاء بيئة تفاعلية
□ إعداد مواد تعليمية فعالة
□ إنشاء بيئة تفاعلية ومواد تعليمية متعددة وطرائق تدريس متجددة
□ فقرة ١ و ٢
□ لا أعلم

١٣. يقصد بالتأثير الفعال:
□ العمليات الإدراكية والمعرفية التي يستخدمها الطالب جراء وجود مثير
□ التعلم بطريقة ممتعة ومشوقة
□ مجموعة من العمليات العلمية المتسلسلة التي تؤثر ايجابياً لإحداث عملية التعلم
□ يظهر بشكل واضح وجلي في تعبيرات وسلوكيات الطلاب
□ لا أعلم

١٤. شبكة التعرف (Recognition Networks) الموجدة بالدماغ تسمح لنا:
□ بتحديد وتصنيف المعلومات

☐تحديد المشاعر والسلوكيات

☐أن نرى، نسمع، ومعرفة الاحرف ومدلول الكلمات

☐بتنظيم وتخطيط المعلومات المستقبَلة

☐ لا أعلم

١٥. معرفتي الحالية بالتصميم الشامل للتعلم هي:

☐تصميم البيئة الصفية

☐تصميم المواد التعليمية

☐تصميم يتناسب ويلائم خصائص طلابي

☐كل ما سبق

☐ لا أعلم

القسم الأخير: المعلومات الشخصية

الجنس:

☐ ذكر ☐ أنثى

العمر: ـــــــ

عدد سنوات التدريس: ـــــــ

هل أنت مدرس:

☐ صم ☐ ضعاف سمع

خلال تاريخك التدريسي هل قمت بتدريس كلتا الفئتين الصم وضعاف السمع:

☐نعم ☐ لا

نوع الفصل الذي تقوم بتدريسه:

☐فصل مدمج في مدرسة ☐معهد للصم

مدرستك الحالية:

☐ابتدائية ☐متوسطة ☐ثانوية

المؤهلات العلمية:

☐بكالوريوس ☐دراسات عليا

كم عدد السنوات التي استخدمت فيها الحاسب لغرض التعليم: ـــــــ

كم عدد السنوات التي استخدمت فيها الإنترنت لغرض التعليم: ـــــــ

هل يوجد أجهزة كمبيوتركافية لاستخدامها بشكل فعال في مدرستك:

☐نعم ☐ لا

Appendix Q: Statements on the Stages of Concern Questionnaire Arranged According to Stage

<div align="center">

CBAM Stages

(Hall, George, and Rutherford, 1986, p. 25)

</div>

Item number	Statement

<div align="center">

<u>Stage 0 Awareness Concern</u>

</div>

3.   I don't even know what UDL is.

12.   I am not concerned about UDL.

21.   I am completely occupied with other things.

23.   Although I don't know about UDL, I am concerned about things in the area.

30.   At this time, I am not interested in learning about UDL.

<div align="center">

<u>Stage 1 Informational Concern</u>

</div>

6.   I have a very limited knowledge about UDL.

14.   I would like to discuss the possibility of using UDL.

15.   I would like to know what resources are available if we decide to adopt UDL.

26.   I would like to know what the use of UDL will require in the immediate future.

35.   I would like to know how UDL is better than what we have now.

<div align="center">

<u>Stage 2 Personal Concern</u>

</div>

7.   I would like to know the effect of reorganization on my professional status.

13.   I would like to know who will make the decisions in the new system.

17.   I would like to know how my teaching or administration is supposed to change.

28.   I would like to have more information on time and energy commitments required by UDL.

33.   I would like to know how my role will change when I am using UDL.

<div align="center">

<u>Stage 3 Management Concern</u>

</div>

4.   I am concerned about not having enough time to organize myself each day.

8.   I am concerned about conflict between my interests and my responsibilities.

<div align="center">

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</div>

16.   I am concerned about my inability to manage the requirements of UDL.

25.   I am concerned about time spent working with nonacademic problems related to this innovation.

34.   Coordination of tasks and people is taking too much of my time.

Stage 4 Consequence Concern

1.   I am concerned about students' attitudes toward UDL.

11.   I am concerned about how UDL affects students.

19.   I am concerned about evaluating my impact on students.

24.   I would like to excite my students about their part in this approach.

32.   I would like to use feedback from students to change the program

Stage 5 Collaboration Concern

5.   I would like to help other teachers in their adaptation of UDL.

10.   I would like to develop working relationships with both our teachers and outside teachers using UDL.

18.   I would like to familiarize other schools or persons with the progress of this new framework.

27.   I would like to coordinate my effort with others to maximize the effects of UDL.

29.   I would like to know what other teachers are doing in this area.

Stage 6 Refocusing Concern

2.   I now know of some other approaches that might work better.

9.   I am concerned about revising my use of UDL.

20.   I would like to revise UDL instructional approach.

22.   I would like to modify our use of UDL based on the experiences of our students.

31.   I would like to determine how to supplement, enhance, or replace UDL

Appendix R: The Stages of Concern Quick Scoring Device

SOCQ QUICK SCORING DEVICE

DIRECTIONS FOR USING THE SOCQ QUICK SCORING DEVICE

The Stages of Concern Questionnaire (SoCQ) contains 35 items. The scoring of the SoCQ requires a series of operations that result in an SoCQ profile. The following steps should be carried out on the Quick Scoring Device:

Step 1   In the box labeled A, fill in the identifying information taken from the cover sheet of the SoC Questionnaire.

Step 2   Copy the numerical values of the circled responses to statements 1 through 35 in the numbered blanks in the Table labeled B. Note that the numbered blanks in Table B are *not* in consecutive order.

Step 3   Box C contains the Raw Scale Total for each stage (0–6) For each of the seven columns (0–6) in Table B, add the numbers within each column, and enter the sum for each column (0–6) in the appropriate blank in Box C. Each of these seven Raw Score Totals is a number between 0 and 35.

Step 4   Table D contains the percentile scores for each Stage of Concern. Find the Raw Scale Score Total for Stage 0 from Box C; locate this number in the left-hand column in Table D, then look in the Stage 0 column to the right in Table D and circle that percentile ranking. Do the same for Stages 1 through 6, only match the left-hand column raw score with the corresponding stage.

Step 5   Transcribe the circled percentile scores for each stage (0–6) from Table D to Box E. Box E now contains seven numbers between 0 and 99.

Step 6   Box F contains the SoC graph. From Box E, take the percentile score for Stage 0 and mark that point with a dot on the Stage 0 vertical line on the SoC graph. Do the same for Stages 1 through 6. Connect the points to form the SoC profile.

For interpretation of the SoC profile, refer to Hall, George, and Rutherford (1979).

SoCQ Quick Scoring Device

A

Date: _____

Site: _____ SS#: _____

Innovation: _____

B

			Stage			
0	1	2	3	4	5	6
3__	6__	7__	4__	1__	5__	2__
12__	14__	13__	8__	11__	10__	9__
21__	15__	17__	16__	19__	18__	20__
23__	26__	28__	25__	24__	27__	22__
30__	35__	33__	34__	32__	29__	31__

Raw Score Totals **C** __ __ __ __ __ __ __

Percentile Scores **E** __ __ __ __ __ __ __

D

Five Item Raw Scale Score Total	0	1	2	3	4	5	6
0	10	5	5	2	1	1	1
1	23	12	12	5	1	2	2
2	29	16	14	7	1	3	3
3	37	19	17	9	2	3	5
4	46	23	21	11	2	4	6
5	53	27	25	15	3	5	9
6	60	30	28	18	3	7	11
7	66	34	31	23	4	9	14
8	72	37	35	27	5	10	17
9	77	40	39	30	5	12	20
10	81	43	41	34	7	14	22
11	84	45	45	39	8	16	26
12	86	48	48	43	9	19	30
13	89	51	52	47	11	22	34
14	91	54	55	52	13	25	38
15	93	57	57	56	16	28	42
16	94	60	59	60	19	31	47
17	95	63	63	65	21	36	52
18	96	66	67	69	24	40	57
19	97	69	70	73	27	44	60
20	98	72	72	77	30	48	65
21	98	75	76	80	33	52	69
22	99	80	78	83	38	55	73
23	99	84	80	85	43	59	77
24	99	88	83	88	48	64	81
25	99	90	85	90	54	68	84
26	99	91	87	92	59	72	87
27	99	93	89	94	63	76	90
28	99	95	91	95	66	80	92
29	99	96	92	97	71	84	94
30	99	97	94	97	76	88	96
31	99	98	95	98	82	91	97
32	99	99	96	98	86	93	98
33	99	99	96	99	90	95	99
34	99	99	97	99	92	97	99
35	99	99	99	99	96	98	99

Concerns-Based Systems International

The SOCQ Quick Scoring Device was developed by Eddie W. Parker and Teresa H. Griffin.

F

Graph with y-axis "Relative Intensity" (0 to 100) and x-axis "SoC Stages" (0 to 6), with columns labeled: AWARENESS, INFORMATION, PERSONAL, MANAGEMENT, CONSEQUENCE, COLLABORATION, REFOCUSING.

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Appendix S: Certificate for Attending Training Session

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شهادة حضور دورة

التصميم الشامل للتعليم

تشهد كلية التربية جامعة الملك سعود

قد حضر دورة (**التصميم الشامل للتعليم**) التدريبية

وذلك بتاريخ ١٤٣٦/٤/٢٢هـ   الموافق   ٢٠١٥/٢/١١هـ

كما تتقدم الكلية لسعادته بوافر الشكر والامتنان للمشاركة الفعالة أثناء الدورة

المدرب	عميد كلية التربية
أ . ماجد بن عبدالرحمن السالم	د . طارق بن صالح الريس

Design by Al-ahmad