Universal Design for Learning (UDL) Across Cultures: The Application of UDL in Kuwaiti Inclusive Classrooms

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Abstract
The purpose of this qualitative study was to investigate the role of Universal Design for Learning (UDL) in inclusive settings in which students with and without disabilities learn and gain knowledge. Five teachers from Kuwait participated in the study. Twenty-five consecutive observations were conducted to derive the primary data for this study. Interviews with the teachers were also used to support/add to the study’s results. Findings indicate that UDL is effective in engaging all students, including those with disabilities. The results also found that although teachers may have basic knowledge of UDL, they need more training and practice to successfully address the needs of all students, including students with disabilities.

Keywords
universal design for learning, engagement, accessibility, learning, inclusion, students with disabilities

Introduction
Universal Design for Learning’s (UDL) concept first originated in the field of architecture in which buildings were universally designed (e.g., providing ramps, elevators, or automatic doors) to be accessible by people with disabilities. Later, it was found that universal design was applicable to a variety of individuals, such as expectant women, mothers with baby strollers, and older adults with canes, in reality for all people (Scott et al., 2003). The concept of universal design can also be applied to learning as “Universal design for learning (UDL) encompasses an effective approach to classroom procedures, ensuring that instruction is designed to be accessible to all potential learners” (Johnson-Harris & Mundschenk, 2014, p. 168), including those with disabilities and who are at risk of school failure. UDL is a framework that provides alternatives to make the general education core curriculum and instruction accessible and applicable to students with different backgrounds, learning preferences, and abilities in a wide variety of learning contexts (Chita-Tegmark et al., 2012; Mackey, 2019; Rao, 2015). It is used to provide multiple opportunities for exposure to learning for all students, including those with special needs (Center for Applied Special Education [CAST], 2020). David Rose, Anne Meyer, and their colleagues at CAST were the first to present the concept of UDL in the educational arena (Edyburn, 2005).

The UDL framework is dependent on three main principles that provide multiple opportunities for engagement, representation, and action/expression. These principles are based on the three primary brain networks (IRIS Center, 2020). According to CAST (2020), multiple means of engagement is the first UDL principle that is based on the brain’s affective network. According to this principle, students should be offered several options to help them engage in the learning environment (CAST, 2020). Through this principle, learners will be motivated, stimulating their interests to engage in learning. The recognition network supports the UDL’s second principle by “providing multiple representations of learning content to students” (CAST, 2020, p. 1). The teacher presents the learning materials to the students using several strategic and instructional techniques until all students comprehend the meaning of the materials. To help learners be more resourceful and knowledgeable, information and learning contents will be presented in multiple ways/methods. The third principle of UDL involves the strategic network of the brain. According to this principle, students should have multiple opportunities to express their learned knowledge. Students should be able to select from multiple options, such as reports, projects, hands-on activities, and technological tools to express what they have learned. Learners will be strategically goal-directed by differentiating the ways they can express what they have learned (CAST, 2020).

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Through these principles, the fundamental purpose of UDL is achieved—to design a flexible learning environment in which all students can gain knowledge and cultivate their learning skills. Equality in access to learning contexts is attained with the help of UDL (IRIS Center, 2020), which serves all students. The framework is not a one-size-fits-all learners’ approach, but rather an approach that provides multiple means of exposure to curriculum components, such as goals, instruction, learning content, and assessment. In UDL, students have several ways to access and achieve their learning goals and many opportunities to learn new knowledge. Students have the right to choose the appropriate way to showcase their learning and they are assessed through multiple methods until the teacher obtains evidence of their learning (King-Sears, 2014). Teachers scaffold learning by breaking all barriers, accommodating and modifying the curriculum to support the learning of students with and without disabilities (Nicholl et al., 2013).

**Kuwaiti Educational Culture and UDL**

UDL represents an attempt to fulfill the mandates of both the No Child Left Behind Act of 2001 and the Individuals with Disabilities Education Act of 2004 (Bryant et al., 2020). These two U.S. laws were highly influential in the development of special education services for students with disabilities in Kuwait. Many countries use these laws as models to improve the educational environment and provide multiple opportunities for learning for all students with and without disabilities (Pierangelo & Giuliani, 2012). Nationally, the Kuwaiti educational system is taking a huge step forward to include students with disabilities in the general education environment, fulfilling the need of the mandate of the *Kuwaiti Law 8/2010* (2010) that states as follows:

The Kuwaiti government is mandated to provide the educational services and facilities for individuals with disabilities in equity with the others without disabilities fulfilling the individuals with disabilities’ special needs in communication, language and training, along with the adequate preparation of educational staff of teachers, professionals, leaders and paraprofessionals with high-levels of quality and professionality to better educate students with special needs. (*Law No. 8, 2010, Article 9*)

The Kuwaiti policies address this mandate by including students from a limited number of disability categories (i.e., students with learning disabilities [LD], hearing impairments, low vision, high functioning autism and/or Asperger’s syndrome, and mild intellectual disabilities including Down syndrome). Accordingly, it is noted that the concepts of inclusion and teaching students with disabilities in least restrictive environments are currently being transferred across cultures (from the experiences of teaching students with disabilities in the United States and United Kingdom) to Kuwait. After the issuance of *Law 8/2010*, the Public Authority of the Disabled (PATD) was established. Since 2010, the PATD has been working to serve and fulfill the needs of students with disabilities, including rehabilitation and educational services. Most updated data of the PATD revealed that 4,058 individuals with visual impairments, 13,568 individuals with orthopedic impairments, 14,147 individuals with intellectual disabilities and autism spectrum disorders, 4,264 individuals with hearing impairments, and 5,735 individuals with LD are being served by the authority (PATD, 2016). The services provided by the authority involve transferring students to appropriate schools based on their needs, paying for the tuitions (of studying in private schools), and providing parents/legal guardians with most updated information about schools and centers that assist their children with special needs to pursue their learning.

On the contrary, when it comes to the implementation of UDL, it is noted that the mandate of the *Kuwaiti Law 8/2010* (2010) encompasses all the education practices and trends involving inclusion of students with disabilities and addressing their educational needs. It does not specify the use of specific educational, evidence-based practices. Thus, the implementation of UDL is basically a personal effort by special education teachers to address students with and without disabilities needs to meet the *Kuwaiti Law 8/2010* mandate. Two establishments prepare our teachers in Kuwait: Kuwait University (KU) College of Education, offering general education programs, and College of Education at The Public Authority for Applied Education and Training (TPAAET), offering general education programs and one special education program (for all school levels from kindergarten to Grade 12). In the College of Education, KU, preservice teachers have one required course, Teaching Students with Special Needs, in which they have an introduction to special education, including concepts of inclusion and teaching students with and without disabilities in inclusive classrooms.

Many teachers who obtained their bachelor’s degrees in general education (from College of Education, KU) or in special education (from College of Education, TPAAET) received their theoretical knowledge about UDL during their teacher preparation programs. Yet they were not officially trained on the application of UDL during their study and/or teaching practicum (student teaching). Many teachers would learn about UDL during their undergraduate program and would implement UDL because they believed in its benefits to improve outcomes of their students with and without disabilities in inclusive educational settings.

**Relationship Between UDL, Social Inclusion, and Special Education Needs**

**Theory and Practice**

The engagement of all students with different capabilities, abilities, and with or without disabilities is the main goal of UDL. In essence, UDL is designed to “provide equitable
opportunities to reach high standards across variable students” (Mackey, 2019, p. 81). UDL theory emphasizes the notion that teachers should provide multiple means of engagement, multiple means of representation, and multiple means of actions for all students including those with disabilities (CAST, 2020). The principles of UDL are highly effective in engaging all students with and without disabilities in all aspects of the learning process. According to Lowrey et al. (2017), UDL is motivational and enhances the social inclusion of all students, especially those with disabilities. Mackey (2019) indicated that when UDL is applied, it underlies the “class climate, the types of interactions between and amongst teachers and students, the classroom setup and physical space, the instructional strategies utilized, the resources available, the feedback provided and the frequency and type of evaluation” (p. 81). These aspects are highly essential for better engagement and inclusion of students with disabilities. Students with disabilities will have opportunities to access learning in multiple ways, have a better understanding of it, and accordingly can share their perspectives, ideas, and concepts with all their peers.

Lowrey et al. (2017) noted when teachers apply UDL, they consider the learner’s variability, fulfilling their needs of learning. The UDL framework enables teachers to identify obstacles that students encounter in various learning environments, thereby finding better options to eliminate and/or remove such obstacles (Rao & Torres, 2017). This would help in accelerating the options of students with disabilities to find learning easier and more engaging, encouraging them to interact with teachers and peers in the learning context. It would also improve their social inclusion along with learning.

Research Purpose and Questions

The purpose of this study was to explore the practical implementation of UDL in inclusive learning contexts. This study examined the role of UDL in providing multiple opportunities to access learning contexts for all students, including those with disabilities from the perspectives of their teachers and actual practices in classroom. This qualitative study was an attempt to illustrate the comprehensive picture of UDL practices in inclusive Kuwaiti classrooms. This qualitative study tried to demonstrate how people (participants) perform, think, or act when using UDL in their classrooms. All of these aspects would promote learning from people rather than studying them (Spradley, 1980). Accordingly, cultural knowledge about and behavior related to UDL were explored in this research. An investigation of a case in a certain domain and exploring the variables that interact within the natural environment, rather than manipulating those variables to observe their influences, is the major theme that researchers look for in their qualitative researches (LeCompte, 1993). Thus, the researcher attempted to demonstrate the role of UDL (the case) and how the factors and or/variables, namely, teacher’s gender, students’ educational level (preschool, elementary, middle, or high school), type of inclusive classroom student’s disability, and number of years teaching experience/employment were interacting with it (UDL) to observe their influences in inclusive settings. The concept of hypothesis is absent from this study because in qualitative studies open-ended questions are used. Quantitative researches, on the contrary, are framed in terms of closed-ended questions (hypotheses; Creswell, 2009). The research questions in this study were as follows:

Research Question 1 (RQ1): What is the role of UDL interacting with the above-mentioned factors/variables on the academic performances and learning accomplishments of students with and without disabilities in inclusive classrooms?

Research Question 2 (RQ2): How is UDL implemented by participants (with all the above-mentioned factors) in inclusive classrooms?

The Review on UDL

UDL Seen From Special and General Education Students’ and Teachers’ Perspectives

Several research studies have investigated UDL from two perspectives: those of teachers and students. Johnson-Harris and Mundschenk (2014) explored the effectiveness of UDL on the learning engagement of students with behavioral disorders (BD) and their typically developing peers in an inclusive classroom. In this study, students with BD were motivated to engage in learning by receiving multiple incentives, such as reinforcements of positive behaviors through reward or praise. These incentives, in addition to teachers varying their instructional strategies, increased class participation among all students, including those with BD. The study concluded that, through UDL, teachers could maximize learning among students with and without BD.

Siu and Lam (2012) discussed the importance of using technology to engage the learning of students with visual impairments in inclusive classrooms. Computer-assisted learning (CAL) was provided through an alternative input device such as a Braille keyboard. Through this device and training, students with visual impairments were no longer segregated and learning became more user-friendly and easily accessible. In a study by Coyne et al. (2013), electronic books and letter and word recognition software were used to scaffold word learning and letter performance among students with intellectual disabilities. The role of technology was overt in increasing learned words and letters by students, including individuals with intellectual disabilities. UDL is an innovative framework for developing learning among students with high-incidence disabilities such as LD, BD, and other health impairments (OHIs). A study by Kortering et al. (2008) found that students with LD, BD, and OHI demonstrated high levels
of satisfaction with the various techniques used to deliver biology and algebra learning content in addition to the options the students were provided to express their knowledge. Such techniques play a key role in improving learning in these subject areas among students with LD (Kortering et al., 2008). A study by McGuire-Schwartz and Arndt (2007) investigated the impact of UDL on students with LD and their typically developing peers in an inclusive learning setting. Results indicated that UDL improved students’ learning engagement. In addition, UDL helped in meeting the diverse needs of students and made education more effective and inclusive for students (McGuire-Schwartz & Arndt, 2007).

UDL has also been investigated from the teacher’s perspective. Spooner et al. (2007) discussed the notion that training preservice teachers on how to design a universally accessible learning environment for a diverse group of students could greatly assist in improving students’ future learning outcomes. Students with disabilities would therefore have equal access to learning opportunities and opportunities to express their learning (Spooner et al., 2007). Zhang (2005) highlighted the essential role of UDL in improving teachers’ instructional strategies and assessment tools. By implementing UDL, teachers gain a clear perspective regarding their instructional techniques and their effectiveness in delivering content and engaging students in learning. Moreover, UDL helps teachers obtain feedback on the adequacy and efficacy of their assessment tools based on their students’ assessment results, thereby aiding teachers in developing their instructional practices for students with and without disabilities (Zhang, 2005).

Prior research has demonstrated the role of UDL in improving both students’ and teachers’ practices in education. As mentioned above, students benefit from UDL as it provides them with multiple options and opportunities to access, express, and engage in learning (McGuire & Scott, 2006). Students with and without disabilities can identify the best way to learn when UDL is implemented in the classroom. In addition, teachers have access to data about their instructional techniques and assessment tools (LaRocco & Willken, 2013), which are derived from students’ performance. These data offer teachers considerable information about how to improve their instructional behaviors and techniques. UDL could also be a resource for evaluating teachers’ instructional practices (Embry et al., 2005).

Nevertheless, multiple gaps are found in the literature on UDL. One gap is the lack of comparisons regarding the level of knowledge teachers have about UDL and the extent to which teachers apply that knowledge in practice. Another salient gap is that few studies have been conducted on the application of UDL in different grade levels (K–12). The most notable areas of research on UDL have been in higher education. Accordingly, this study represents an attempt to fill these gaps and increase the body of research on UDL in the field.

Method

This research utilized a qualitative research study incorporating interviews of five teachers and multiple observations of their classroom practices. These teachers were purposefully selected based on their qualifications as they had deep, comprehensive experience in teaching students with disabilities in inclusive settings. According to Glesne (2011), when the selection of a study’s participants is purposeful, it enriches the study and provides deep information and knowledge about the study’s case(s).

In addition, this research represents what Glesne (2011) called “backyard research” (p. 41). Although the researcher did not work at any of the five schools, the researcher had an established rapport with the school staff. As Glesne (2011) stated, in “backyard” studies, “the groundwork for rapport is already established” (p. 41). The assistant principals at the five schools accepted the researcher, facilitated the process of observing the classes, and made needed changes to the schedule to enable the researcher to interview and observe the teachers.

A semi-structured interview protocol was created to explore the extent of their knowledge about UDL. Teachers were interviewed regarding the main principles of UDL, its uses, and beneficial aspects in inclusive classes and their knowledge of evidence-based practices related to UDL (e.g., Tell me how you implement UDL in your classroom, what evidence practices related to UDL do you implement?). If not discussed, participants were prompted to describe how multiple opportunities for engagement, action, expression, and representation were implemented. The researcher also asked teachers to share their thoughts regarding the selection and implementation of UDL. Participants were asked to share their cultural knowledge and behavioral performance regarding the implementation of UDL while teaching students with and without disabilities in inclusive classrooms. Consent from the schools and teachers to participate in the study was obtained prior to any actions on the part of the researcher. Each teacher was interviewed 3 times, with each interview lasting from 30 min to a maximum of 45 min.

Following the final interview, the researcher observed each participating teacher to assess the role of UDL in inclusive classes and how UDL was implemented in these settings, how teachers helped students with and without disabilities in inclusive classes, and how they employed their knowledge of UDL while teaching. Each classroom was observed 5 times. This research was an attempt to demonstrate the actual, practical implementation of UDL by teachers in inclusive settings.

Participants and Site Selection

Five teachers participated in this qualitative study. The teachers were purposefully selected from public and private schools in Kuwait. While all participants taught inclusive
classrooms, two teachers held general education certification, two held certifications in special education, and one a master’s in curriculum and instruction. Participants differed in terms of years of experience (range = 5–17 years), certification area, grade taught (K–11), gender (three females and two males), and prior experience with technology. All classrooms had approximately 24 general education students and one to four students with a disability. All but one classroom had a paraeducator. Table 1 displays demographic and descriptive data of the participants and the classroom demographics.

At the time of the observation, the first two participants (kindergarten teachers) were teaching the skill of “camping in the desert,” one requirement of the kindergarten curriculum in Kuwait. The classroom teachers delivered all of the instructions. Each observation session in the kindergarten classes was a maximum of 30 min (during the allocated time for classes/periods). The third participant was an Arabic language teacher who taught Grade 4. Each observation session took 40 min, during the allocated time for classes/periods at elementary schools. Participant 4 was a biology teacher, teaching in a private school. His students with attention-deficit/hyperactivity disorder (ADHD) used Livescribe “smart pens,” as an assistive technology (AT) tool, and the students could use these pens to record audio lectures/information while writing notes in biology classes. Each observation session in high school took 40 to 45 min. Participant 5 was a doctoral student in a special education program, specializing in the use of technology and teaching students with disabilities. He taught history in a private school. This teacher had four students with hearing impairments who needed an FM system (a type of AT that amplifies sound to help individuals hear).

**Researcher’s Role**

The researcher was known to the participants and school teams from prior research interactions. She reintroduced herself as an educator interested in inclusion and evidence-based practices to promote the success of inclusion. This seemed to motivate staff, facilitate her access, and maintain rapport. The previous acquaintance with these schools could be interpreted as subjectivity; however, the researcher’s role was to employ this subjectivity as a factor to enhance the study.

Unlike quantitative or experimental inquiries in which researchers seek the functional relationship between cause and effect or between an intervention and a behavior, qualitative researchers depend on observations, recordings, interpretations, and descriptions of the studied phenomena. Accordingly, the researcher’s self or persona should be heard and viewed in qualitative inquiry (Eisner, 1991). The researcher’s background, history, and knowledge are used to interpret and analyze data to derive thematic results about the studied case. Thus, subjectivity is part of the researcher’s persona. Qualitative researchers cannot separate their experiences, historical backgrounds, perspectives, or even emotions from research (Glesne, 2011). All these aspects are the researcher’s present personality in a qualitative inquiry (Eisner, 1991). Moreover, Peshkin (1988) perceived subjectivity as the researcher’s personal lens through which data could be interpreted and results could be derived.

Subjectivity is formed through a researcher’s experience and is embedded in her experiences in a specific field. Thus, many researchers use their experiences and subjectivity in nearly all stages of their research (Barone, 1997). Accordingly, subjectivity should be acknowledged in this research inquiry because it is part of the researcher’s identity. The participants’ experiences and information improved the researcher’s interpretations of UDL and its practical implementation in the classroom. The researcher has been studying and teaching UDL concepts and themes since she started her doctoral program in 2013. She tried to create positive connotations of her subjectivity and experience in this study and guard against bias. Glesne (2011) explained that monitoring subjectivity would help in achieving a more trustworthy study that is protected against bias. One way the researcher controlled her subjectivity was by removing the lens of being acquainted with the teachers, especially as she learned more about them while interviewing them. Thereafter, the researcher tried to be critical throughout her observations by attempting to observe the comprehensive picture of the practical implementation of UDL by the participants. She also referred back to the ideal practices of UDL that she usually encounters in the definitions of UDL and compared those with her observations and the participants’ responses in the interviews. These comparisons assisted in gaining an understanding of what was being said regarding UDL and how it was implemented by the educators in inclusive contexts. The researcher’s role involved some brief interviews with the participants after each observation session to expand on her thoughts, inferences, and reflections and to connect the theoretical experience of UDL to the inferences gained from the interviews and the subsequent observations. The brief interviews clarified some ambiguous ideas and points about the lessons that were taught.

The researcher’s role was also to engage in passive participation while observing the participants. Spradley (1980) stated that passive participation occurs when a researcher does not interact with or contribute to the scene of observation. This type of observation was chosen because the observation sites (the five schools) did not grant permission for the researcher to participate. The participants were fully responsible for the instructional process.

**Data Collection**

The researcher collected data gleaned from participant interviews and classroom observations. A total of three interviews were conducted with each participant. The researcher observed each classroom a total of 5 times.
| Participant | Gender | Grade-level participant taught | Years of experience in inclusive classes | Academic degree | Number of students in class | Number of students with disabilities | Students’ age | Use of assistive technology | Staff (teacher and paraeducator) to pupil ratio |
|-------------|--------|--------------------------------|------------------------------------------|-----------------|-----------------------------|-------------------------------------|---------------|-------------------------------|-----------------------------------------------|
| 1           | Female | Kindergarten                   | 5                                        | Bachelor’s early childhood education     | 25              | Three with Down syndrome    | 4 to 5 years | —                            | 2:25                                          |
| 2           | Female | Kindergarten                   | 5                                        | Bachelor’s early childhood education     | 25              | Three with Down syndrome    | 4 to 5 years | —                            | 2:25                                          |
| 3           | Female | Grade 4 Arabic language class  | 10                                       | Master’s curriculum instruction          | 22              | One with dyslexia           | 9 to 10 years | —                            | No paraeducator, 1:22                         |
| 4           | Male   | Grade 10 biology               | 10                                       | Master’s special education               | 23              | Two with ADHD               | 15 to 16 years | Livescribe Smart pens        | 2:23                                          |
| 5           | Male   | Grade 11 history               | 17                                       | Master’s special education               | 25              | Four with hearing impairment | 16 to 17 years | FM system                    | 2:25                                          |

Note. ADHD = attention-deficit/hyperactivity disorder.
The interviews were designed to address three main themes/domains: the what, why, and how of UDL. Subsequently, additional appointments were arranged with the teachers (participants) to conduct five observations in each teacher’s class to observe their implementation of UDL and obtain as much data as possible for the study. As mentioned above, the observations were conducted in multiple subject areas, including social studies (history), science (biology), language arts (Arabic), and life skills (camping in the desert). Consideration was given to the participants’ preferences and suggestions for attending their classes. For example, one participant (Participant 5) was teaching two history classes. He suggested observing a particular high school class as another researcher was collecting data for a second class he was teaching. The researcher did not contradict the participant’s choice; rather, the researcher agreed with the participant’s suggestion because she was interested in learning from him rather than forcing her opinions. The researcher wanted to gain a sense of being a learner in the empirical field. Glesne (2011) highlighted the importance of having a sense of learning from the very beginning of a research project as that sense can assist the researcher in reflecting on the investigation and can affect the accuracy of the interpretation of results (Glesne, 2011).

Before the data collection, certain logistics were prepared. The participants’ consent was obtained and the researcher assured the participants that their real identities would be kept anonymous and confidential. The interview protocol (questions) was prepared. Three interviews lasting 30 min each were conducted individually with participants. Open-ended questions were asked. As pointed out by Seidman (2013), the interview protocol did not include leading questions to avoid influencing the direction of the interview and the participant’s responses. Seidman (2013) indicated that interviews should involve major themes/aspects: first, the participant’s experience and history, second, the “details of that experience” (p. 21), and third, the participant’s reflection on the meanings of their experiences. Each of the three interviews focused on one of these aspects. Because the researcher’s role was to focus on learning and not on discussing UDL, the researcher listened to the participants instead of offering opinions or perceptions.

During the interviews, the researcher recorded the interviewees’ responses using the Notability application on her iPad to aid in the process of transcribing the audio recordings. After 48 to 50 hr of verbatim transcription, the data analysis process began. It involved coding the most frequently repeated themes or concepts expressed by the participants. According to Rubin and Rubin (1994), analysis is basically a way of organizing the main ideas derived from data. As indicated by Rubin and Rubin (1994), the researcher combined related and similar information. The most frequently repeated concept relating to UDL was accessibility. UDL is based on the idea of providing all students, including those with disabilities, access to curriculum and instruction in general education classrooms (Raimondi, 2005).

After conducting the interviews, the researcher prepared a field log as Glesne (2011) indicated that a field notebook is the main note recording tool in a qualitative study. In her notebook, the researcher recorded her descriptions of the classroom and the teacher’s educational practices. Multiple notes were recorded, including descriptive, analytic, and research data. The researcher took notes that included descriptions and detailed recordings of each teacher’s UDL practices in the classroom. She also took analytic notes that included comments, questions, inferences, or reflections regarding what she observed. Generating notes was essential to deriving themes and concepts while composing the major results of this study. Spradley (1980) explained the process of data analysis as looking for patterns in what participants do and say. To describe cultural knowledge or behavior (in this study, the culture of UDL), patterns in the data should be explored. Thus, the researcher’s work involved finding patterns in the participants’ UDL practices. Referring back to the literature, the researcher deduced that the main concept of UDL was the accessibility of curriculum components: goals, instruction, learning content, and assessment. All students with and without special needs should have access to all these components to facilitate learning (King-Sears, 2014). The observational data were analyzed using Spradley’s domain analysis with some adaptations.

**Results**

**UDL Principle 1: Engagement and Application**

Data from both the participant interviews and observations assisted in deeper understanding of the use of UDL in inclusive Kuwaiti classrooms. According to Creswell (1998), using several data sources will increase the trustworthiness of a study. With regard to the first research question, the three main principles of UDL were observed in all classes at different grade levels. Interview data indicated that teachers had studied UDL in their teacher preparation programs in one or two courses, which discussed the concept of how UDL addresses the needs of diverse students and how to better educate them with the use of UDL. All of these ideas and concepts were theoretical information and did not emphasize the application of UDL by their teaching practicum supervisors before entering the classroom. For example, one kindergarten teacher (Participant 1) mentioned that her higher education program did not sufficiently prepare preservice teachers and/or school personnel regarding the basic concepts of UDL. She stated,

They (teacher preparation programs) do not prepare teachers, because I think nobody outside special education discusses UDL. I knew UDL because of an intro course to special education that I took during my bachelor’s degree preparation. I do not think that general education preparation programs discuss what universal design for learning is. Unfortunately, in general programs, they are not concerned about those barriers because
they do not cover the inclusion part of it, although we are experiencing it (inclusion) when we teach in schools.

She received superficial knowledge about the concepts of UDL. Yet the participant had an insatiable desire to improve her teaching and exploring how she could effectively implement UDL. During the lesson of “camping in the desert,” she provided a real small tent, surrounding it with sand, little plants, and replicas of sheep, goats, and other items related to camping while discussing the notion of a desert with the children. For engagement, she asked her students to role-play that their friends were going on a camping trip and they needed to pack items for the trip. While the children were thinking of what items they needed, she asked them to sort pictures of camping tools needed for the trip. Participant 1 partnered each student with Down syndrome with a peer without a disability to perform the role-playing scenario. She offered help and assistance when needed.

Participant 2 demonstrated the same perspective regarding UDL. She added that UDL is really an essential practice that future teachers should be trained on during their undergraduate programs. She shared her concern that no one taught her how to infuse the elements of UDL throughout her classroom learning environment. She said,

I consider myself as a self-taught educator. I haven’t encountered any professor during my undergraduate study that asked us to apply UDL during our micro teaching lessons. Many professors in the general education courses did not know what UDL was, and how would they improve our implementation of UDL!

Participant 2 also worked hard to engage her students in lessons to grasp the meaning of camping (both teachers covered the same kindergarten curriculum), what activities they could do, and how to protect our environment. After displaying pictures of camping, she introduced the idea that people should keep the Kuwaiti desert clean. She asked the children to go to the classroom corners where she prepared pictures, real objects, and words about camping, asking students to engage in each activity and work together arranging those items to demonstrate the concept of camping. Students with Down syndrome in both classes were helped by teachers to engage in their group work with their typically developing peers for more social and academic engagement and to learn from their peer models.

In this regard, Participant 5 added that he studied about UDL during his graduate programs of special education. Participant 5 indicated as follows:

I was lucky that I pursued my graduate study in Special Education. I learned in depth how UDL elements are implemented in theory and practice. During my master’s program, I conducted research projects about UDL including observing UDL in real inclusive settings along with applying UDL in our co-teaching mini lessons presentations in class. In these activities, I could get the grasp of UDL.

His knowledge of UDL was obvious during the observation sessions in his classes. Participant 5 incorporated his students’ interests by engaging them in different activities according to preferences. For example, during the unit of ancient civilizations, he asked students to choose whether to complete maps about these civilizations, to locate agricultural/industrial activities on the map, create a concept map about such activities, or write a mini essay about them. All his students with and without disabilities, along with those who were at risk of school failure, were engaged during class activities. Participant 5 sustained students’ efforts and persistence of challenge by engaging them in collaborative work. According to Brand et al. (2012), a key component of UDL’s principle of engagement is evident when students continue accepting the challenge and work hard to engage in learning. This was clearly noted in Participant 5’s class. His students were engaged in jigsaw activities about World Wars I and II. Students exchanged knowledge and concepts in their groups, and provided guidance and feedback to others when answering the discussion questions. This allowed more collaboration among them. It was noted that Participant 5 clearly communicated his expectations and goals for each collaborative activity. According to Mackey (2019), when the teacher identifies goals and expectations for his students, he produces maximum authenticity and personal connections to the learning content, thereby engaging his students with and without disabilities and minimizing the number of threats and distractions (i.e., difficulties) that students might face.

Participant 3 provided a fourth example of how teachers could engage their students with and without disabilities. At the time of the study, she was teaching a student with dyslexia. She was sorting students in groups, with high and low achievers in each group, so students could learn from each other. In their reading activity, students had to read the letters of the new words and, on a worksheet, they were to circle the letters that made the sounds of these words. For her student with dyslexia, she used multisensory instructional techniques to assist him with the task. According to Schlesinger and Gray (2017), multisensory instruction is an approach that uses systematic phonics instruction and lesson activities that incorporate the simultaneous engagement of at least two sensory modalities (visual, auditory, or kinesthetic/tactile). Because children with dyslexia usually encounter difficulties and obstacles in learning how to decode, this would impact their ability to read and spell words (Ehri, 2014). Multisensory teaching techniques stimulate students with dyslexia to learn the sounds and letters, and engage them in the process of learning, using their senses. Participant 3 used sandpaper letters and shared reading, that is, two multisensory techniques. During the group activity, students worked on the worksheets. First, Participant 3 sat next to the student with dyslexia and she engaged him in a shared reading activity. The student followed along as she read aloud. He interacted with the text (with the teacher’s assistance) by underlining the sounds (letters) that formed the words. After reading each
word, she asked him to draw a picture of these words (e.g., mansion, garden) in the marginal space on the article. Afterward, the teacher gave the student a small board that contained the words from the activity cut out of sandpaper. This multisensory technique helped the student to trace each letter with his fingers while saying the sound of the letter. He could feel the shape of the letters as he read/wrote. This technique can help students with dyslexia retain a tactile memory of letter and sounds.

A fifth example of engagement was noted in Participant 4’s biology class. The teacher asked his students to complete a three-section assignment about evolution. Students had to write about changes to the environment, theory of evolution, and its support and evidence, along with the mechanisms by which the evolution occurs. The assignment required students to draw/provide pictures, sketches, or concept maps to provide evidence of their understanding of the topic, evolution. The teacher read through the instructional guide and explained what was required for each section, his expectations, and the grading system for this assignment. Afterward, he demonstrated models and examples of prior students’ work. He also posted these examples on Google Drive, so students could refer to them as needed. These actions provided students with a clear idea about the assignment and expectations. Participant 4 exhibited a deep understanding of UDL and how to effectively apply it with a high level of quality in a classroom setting. This expertise most likely originated from his training as a special educator. His commitment to UDL was obvious as, in addition to rethinking instruction, he provided special needs students with AT to promote further access to the curriculum. At the beginning of the school year, he taught his students with disabilities how to use the Livescribe pen to record and play the classroom notes. Students were allowed to take the smartpens home every day. This allowed students to review audio at home, thus reinforcing learning and allowing further work on projects. Students were allowed to keep the AT until the end of the school year.

**UDL Principle 2: Representation**

According to Brand et al. (2012), to effectively address diverse students’ needs and enhance their academic performance, teachers must apply the second principle of UDL. This requires the representation of information using a wide range of formats. All participants used UDL as a tool to promote the accessibility of the entire learning environment for all students, including those with disabilities. The use of multiple access and/or representation information was observed in all of the classrooms. For example, Participant 3 (the elementary teacher) provided students access to multiple materials through the use of teaching tools and materials such as white boards and pictures. The learning content was presented in multiple ways. She used multisensory instructional techniques not only to engage her student with dyslexia but also to provide access for all of her students. For example, students were asked to write a sentence containing the new vocabulary word(s). For each group, she provided the word(s) on cards, so students could glue the card in the proper place in the sentence. Magnetic letters were also provided so students could form words and sentences using the new vocabulary words.

During the unit/experience of “camping in the desert,” Participant 1 gave her students multiple opportunities to access information by representing it in multiple ways—pictures, audio, video, and models. For example, when presenting desert animals, she talked about their attributes and used pictures or small figurines to represent various aspects (e.g., hides/skins, how they survived in the desert, and foods they ate). Thereafter, using the same pictures, she played a recording of their sounds in the wild. Afterward, she played an educational short clip about camels in the desert. Participant 2, conducting the same unit, discussed the material used for creating the tent. She explained to the children that most of the tents in Kuwait are made with goat hair. She showed them a picture of a traditional goat hair tent. Interestingly, it was a tactile picture of a tent that was made with real goat hair. All of the students (including her students with Down syndrome) had an opportunity to touch the picture and get a feel of the material. Students, in this case, learned information about tents in Kuwait, associating goat hair with the creation of tents. These procedures embody the UDL guideline of multiple representation of the same content.

Participant 4 discussed the notion of oceanic changes to the environment. He used charts to explain the concept and then played a documentary clip on oceanic changes. The video clip was narrated in English; the teacher used a YouTube option (auto-translate) to provide a closed caption of Arabic for the students. Students with disabilities were provided with individual tablets and ear pods, so they could stay focused on the video. This personalized the learning and provided another example of UDL.

In history classes, Participant 5 represented the learning content in multiple and different methods. For example, when discussing the topic of ancient civilization, he copied salient information to a PowerPoint and displayed it on a PowerPoint presentation. He also displayed pictures about the ancient civilization (Babylonia and Babel civilization). Explaining in detail about the jobs of ancient Babylonians, he showed the students a sculpture representing the work of craftsmen at that time. This archeological piece was passed from one group to the other, giving students the opportunity to touch and see it closely.

**Representing knowledge and technology.** The use of technology, such as smart boards, teaching materials, and graphics helped students engage in the learning process. All participants indicated that the main theme of UDL is to ensure the accessibility of the curricula and instructional strategies, thus enabling all students to learn and build knowledge. For...
example, Participant 4 indicated that UDL is an appropriate methodology for providing multiple opportunities to access curricula and instruction when he stated,

Universal design for learning typically means allowing students access to materials. Again, I think UDL provides multiple opportunities to access content.

As discussed, the main principles of UDL were evident during the observation classes. Exposing students to learning content through multiple means and providing opportunities for students to engage in and express their learning gave all students, including those with disabilities, access and flexibility to achieve their learning goals. When a teacher tried to convey specific content or implement a learning activity, they used several ways to deliver the knowledge until the students understood the information. Thus, it was clearly notable that, through UDL, the teachers created an accessible learning environment to help students construct knowledge and acquire learning experiences.

In addition to varying their instructional techniques, the five teachers integrated the use of new technological tools, devices, and services to ensure the accessibility of learning for all students. According to the participants, teachers use new technology programs or services to assist students to collaboratively learn and access models to promote student understanding of themes and materials. These tools might be beneficial not only for students with disabilities who need specific types of assistance, but also for their typically developing peers. For example, Participant 5 mentioned the importance of collaboration through technology among students when learning a content under the UDL framework when he stated,

We have the Cloud now where I can put all my Google Docs and share them with all my students. They can all collaborate on that document, in one spot. That collaboration is not impossible, technology made a huge difference.

The participants highlighted that knowledge of UDL is essential and indicated that in addition to teachers, other stakeholders (e.g., parents, school personnel, and faculty members) must comprehend the meaning and purpose of UDL to successfully implement it. Stakeholders must have adequate knowledge of and preparation for UDL to successfully implement the framework in educational settings. According to Participant 2, she felt that

Anyone who has access to a student’s learning must know the basic principles of UDL. This knowledge is used to practically help those learners achieve their learning goals and fulfil their academic needs. Whether that student had a disability or not, the stakeholders who are associated with students’ learning must understand the basics of UDL.

**UDL Principle 3: Action and Expression**

It was evident that in all 25 observations, all five participants provided students with options to express their understanding of the given skill or concept. In addition, they supported their students and provided them with guidance and assistance. For example, Participant 3, explained the strategic method of how to discuss sandstorms (a common occurrence in Kuwait’s desert environment) and how we could protect ourselves in different ways. She taught the students a think-aloud protocol and asked them to find ways of protecting themselves in these storms. Using the same protocol, she gave students options to narrate their solutions in written paragraphs, pictures, and words/sentences or in comic strips (sentences in speech bubbles of certain characters) using Comic Strip Creator app. For this app, she sat with the group who wanted to work with comics and taught them how to insert their sentences for each character to create their comic about the topic being discussed.

Another example of how participants gave their students with and without disabilities options to express their learning was Participant 4. After discussing the unit of botany and plant cells structure, the teacher asked the students to use their laptops and/or tablets to enter the Padlet he prepared for them to jot down their ideas representing their understanding of the plant cell structure. Padlet is a digital media corkboard that can work on any browser online and/or through an app on tablets such as iPads. Students with ADHD had an opportunity to post their ideas and the main concepts about plant cell structure at their own pace, without being distracted in the regular classroom participation. The next day, Participant 4 asked students to bring leaves to class. Using the laboratory tools, they were able to dissect the leaves and explain each part of the leaf to a classmate. This modeled a peer-mediated instruction strategy. Each student instructed his classmate, and then they role-played as the teacher and tutee. The teacher circulated around the room for any further help or assistance. Students with ADHD were put into pairs with peers without disabilities, so they could benefit from peer instruction of the lesson.

Results demonstrate that participants understood the basic theoretical concepts and themes of UDL. In terms of the second research question, which focused on the actual implementation of UDL in inclusive classrooms, observations revealed that the participants had a strong grasp of UDL “as theoretical knowledge” and could implement the framework and principles of UDL to effectively provide instruction for students with and without disabilities. UDL had a prominent role in these inclusive classrooms. In all instances, participants varied the delivery of learning content and use of multiple instructional strategies, such as peer-mediated instruction, modeling, prompting, hands-on activities, think-aloud protocols, and technology. This finding relates to one of the main underpinnings of UDL, the accessibility of learning contexts for all students including those with disabilities.
The participants used a variety of teaching techniques, including oral readings, presentations, visual demonstrations, drawings, and videos to present lesson content. In reference to varying teaching methods, Participant 5 stated as follows:

It (UDL) focuses on my planning a lot, I don’t know, I might read something out loud, it may look to anybody walking in that I was reading something from out of a book. But the reality is, I’m reading because I have students in my room with hearing impairments, and they may need an FM system, so they can hear when their peers read, for example.

As discussed earlier, UDL was observed during classroom instruction. Participants relied on several techniques, such as asking questions, white boards, think and pair-share, and Socratic discussions (for high schoolers) to formatively assess their students. Notably, participants gave their students with and without disabilities the needed accessibility to the general education curriculum and learning environment. At its core, UDL involves providing alternatives to make curriculum accessible and applicable to students with different backgrounds, abilities, strengths and limitations (CAST, 2020). The participants provided different options for assessment, which is an important component of UDL. This result corresponded with the claim by Participant 3 regarding assessment tools. She mentioned the use of a variety of assessment tools to provide students with multiple opportunities to express their learning and explained as follows:

When it comes to assessments, I definitely make sure that I follow very strictly the principle of accessibility, that is, I provide options for students to present what they learned in multiple ways.

This result indicates that although UDL is studied in special education programs as an effective, evidence-based practice, many general education teachers utilized it to motivate their students with and without disabilities for increased learning outcomes. Participants focused on ensuring the accessibility of components of the curriculum. Participants connected learning content to their students’ lives. Students were able to discuss their thoughts, work together, and share ideas to express learning. It was noticed that UDL guidelines of multiple means of engagement, representation, action, and expression were all permeated in participants’ classes. This maximized the instructional impact on the affective, recognition, and strategic networks (CAST, 2020; Meyer et al., 2014). With the use of UDL, the needs of all their students, including those with disabilities and those at risk of school failure, were effectively addressed.

Discussion
Providing diverse students (including those with disabilities) the needed supports and scaffolds is grounded in the UDL framework. This corresponds to the thoughts of Welch (1995) who identified UDL as a practice that embraces the view that diversity is the norm within students no matter what their cultures, origins, ethnicities, abilities, and/or learning levels. Accordingly, as indicated by Lowrey, et al. (2017), we (educators) should provide diverse students multiple accesses to the general education environment and curriculum. The results of this study indicate that UDL’s application in classrooms assisted in the reduction of barriers and challenges that students with disabilities might encounter while learning. It was noted that UDL provided flexibility to access knowledge by providing appropriate accommodations and needed scaffolds. In addition, as previously discussed by both Siu and Lam (2012), through UDL, teachers could manage the learning environment and increase universal access to the general education goals, content, instruction, and assessment.

Findings demonstrate that the use of technology was highly supportive in all classroom environments. Likewise, as earlier mentioned by Coyne et al. (2013), technology enhanced UDL application, improving the learning environment for all students including those with disabilities. The technology (i.e., AT of Livescribe pens, FM, and iPads) used in the context of the study, was complex and multidimensional, permeating all aspects of learning. It helped make the classroom environments more inclusive. This corresponds with Flagg-Williams and Bokhorst-Heng’s (2016) findings that the use of technology, while applying UDL, provides more flexibility and accommodations that positively affects the learning settings.

Results also indicate that students had multiple options and ways to access content and demonstrate knowledge. UDL’s main principles were clearly noted. This result corresponds with CAST’s (2020) notion that providing these options (accessing knowledge) helps students be more confident, thereby increasing their self-efficacy and motivation to engage in learning contexts.

As mentioned above, the mandate of Kuwaiti law to provide all the needed facilities to effectively include students with disabilities in the general education environment did not specify the application of UDL. Yet, the results of this study indicate that teachers used UDL because they studied about its benefits during their teacher preparation and/or graduate programs. They believed in the power of UDL to motivate and engage all students, especially those with disabilities, to maximize learning and outcomes. This result corresponds with Nicholl et al.’s (2013) notion that UDL provides needed accesses to all students, regardless of their abilities, capabilities, and/or interests, to help them accelerate their learning performances.

Conclusion
When researching the application of UDL in Kuwaiti inclusive classrooms, multiple thoughts emerge. Through the context of the study, UDL was explored, showing its positive
effects on students' engagement and expression of their learning. Generally, it is educationally essential to help all diverse students, including those with disabilities and at risk of school failure, become confident and successful learners whose accomplishments are apparently noted in classroom settings. This could happen when, through research, evidence-based educational practices such as UDL are accurately and effectively applied (IRIS Center, 2020). While there are 41,772 individuals, including students, with disabilities being served by the PATD (2016) in Kuwait, 19 general education teacher training programs (for all subject areas, and grade levels: kindergarten, elementary, middle, and high school levels) at KU, 15 general education programs (for all subject areas and grade levels), and one special education program at the College of Education at TPAAET, it was exciting to see UDL implemented successfully in five inclusive classes from both public and private schools. This result holds a promise for the rest of the nation. In addition, although Kuwait is in infancy stages for providing services to students with disabilities, it is rapidly adopting/learning from other special education partners to increase the application of successful practices such as UDL.

Limitations and Recommendations
The current study demonstrated the role of UDL in Kuwaiti inclusive classrooms. It highlights the beneficial aspects of UDL in terms of engaging students with and without disabilities in learning. Providing multiple opportunities for students to access the core curriculum in a general education setting is the main purpose of UDL (Edyburn, 2005).

Although this study demonstrated the effective role of UDL, it had limitations. The first limitation was that the observations were conducted in five classrooms spanning education from early childhood to secondary level. At the secondary level, observations were limited to specific content areas such as social studies, life skills, and science. It is highly recommended that future research increases the number of participants and focuses on a specific level (e.g., only childhood level) or targeted content areas (e.g., science, mathematics) to gain a deeper understanding of the implementation of UDL from multiple perspectives. Observations were not conducted for all classrooms in the selected grade levels at each school. For example, there were five history classes of Grade 11, and four biology classes of Grade 10. Only classes of Participants 4 and 5 were observed, whereas there were other teachers who were teaching the same subject areas to the same grade levels and yet were not observed. Even with regard to Participants 4 and 5, only one group of students for each of them was observed. This happened because of conflicts with schedules or commitments. As mentioned earlier, the researcher did not attempt to negotiate with or persuade the participant(s) to grant further access to other classrooms because she wanted to create a safe atmosphere. According to Glesne (2011), it is important for researchers to help participants feel that the researcher is coming to observe and not to spy. Based on this perspective, the participants' preferences and suggestion(s) regarding the classroom observations were accepted. The observations and interviews were conducted in certain classes with specific disability categories (e.g., Down syndrome, ADHD, dyslexia, and hearing impairment). While only a few disability categories are served in Kuwaiti inclusive classrooms, it is recommended that further research explore other disability categories whenever possible.

Overall, UDL is an appropriate methodology that can be used to address the learning needs of all students. As more students with disabilities are placed in inclusive classes, Kuwaiti researchers should explore the impact of UDL as it is an effective framework that can improve the learning performance of all students, including those with disabilities. Adopting effective instructional frameworks such as UDL would increase students’ learning and motivate them to confidently engage in the educational context. Results demonstrated that UDL is highly useful and it could be applicable across international settings, if it was well understood, and applied by professionals. The theme of UDL is universal. It is not associated with a specific culture, but rather it is attached to the learning needs of students’ with and without disabilities. UDL has the potential to ensure students’ success regardless of their disability, ability, capability, cultural diversity, or ethnicity.

Future research on the implementation of UDL in practice is recommended. The concept of UDL and how it aligns with other contemporary and traditional frameworks should be investigated. Research explorations, especially in Kuwait, should investigate the challenges involved in providing an inclusive classroom environment from a teaching perspective, with concentration on the theoretical/conceptual framework. Much of the relevant literature focuses on defining UDL and its principles theoretically. Future research is needed to highlight the practical application of UDL in inclusive settings to ensure student success in all learning fields, particularly high stakes examinations (Kortering et al., 2008). In addition, future research is recommended to explore the reasons why the UDL concept is not addressed in Kuwaiti general education preparation programs. Although UDL is designed for students with and without disabilities, many general education preparation programs in Kuwait do not discuss UDL; it is discussed primarily in special education programs. Many single-subject or experimental studies have investigated the impact of UDL, but there is a lack of qualitative and quantitative research on UDL in both the U.S. and international arena. Thus, future research is recommended to examine UDL from different angles and dimensions. UDL should be perceived as an essential component in the classroom and not just as an aspiration among educators.
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