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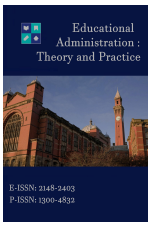

Teachers' Perception Towards Implementation of Principles of Universal Design for Learning (UDL) in Teaching Students with Learning Difficulties

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Abstract

This study aims to assess teachers' implementation of the principles of Universal Design for Learning (UDL) when teaching students with learning difficulties and the barriers they face in its implementation. The descriptive survey approach to describe participants' experiences using the UDL framework, a survey was conducted on 78 study participants, all teachers with learning difficulties. The questionnaire was created with 36 questions on UDL concepts using the four domains of 1) engagement, 2) representation, 3) action and expression, and 4) barriers to applying UDL. The study's findings supported that UDL implementation levels were generally high. The results also indicate that the most central principle of UDL was the representation domain, ranking first, while the action, expression, and engagement domains ranked second and third, respectively. Furthermore, the barriers that prevent teachers from implementing UDL principles in teaching were found within the intermediate level. Lastly, we recommend that professional development programs be conducted before or in service to increase teachers' knowledge of the UDL principles. Educational institutions should also overcome all barriers by creating an educational environment that supports teachers of students with learning difficulties by implementing the principles of UDL in teaching.

Keywords: Universal Design for Learning (UDL); Learning Difficulties; Teaching; Descriptive-Analytic Method; Implementation; Barriers

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Introduction

A teacher is the primary element of the educational process. An ideal teacher not only aspires to create a learning environment that considers the individual differences among students but also strives to remove any barriers to the educational process by effectively designing educational activities that encourage students to participate in the classroom environment (Al-Lasasmeh & Al-Shara, 2019).

To provide the highest quality educational outcomes that align with each student's needs, educators and curriculum designers must use the most well-known evidence-based educational models and practices when creating and implementing educational curricula that are appropriate to the needs of all learners. The learning process is affected by various factors, including learner characteristics and the learning environment. Therefore, learners' school experiences are influenced by the interaction and interdependence of learning, classroom culture, students' social and emotional well-being, academic engagement, and self-concept. Learners differ in their learning methods, hobbies, and interests, such as their diverse experiences, tendencies, abilities, and attitudes, prompting educators to pay special attention to addressing learning problems and providing equal access to educational opportunities for all students to gain knowledge and hone their skills and abilities (Al-Sheikh, 2017).

As a response to gaps between their students' demands and their productive access to various educational environments, educators and researchers at the Center for Applied Special Technology (CAST) established the concept of UDL in the early 1990s. The CAST has expanded on the fundamental ideas of the Universal Design (UD) conceptual framework, which holds that physical environments can be created to accommodate a wide variety of access requirements (Center for Universal Design 2008), and also applied the same concept to educational settings (Al-Sheikh, 2017; Al-Salem, 2016).

Literature Review

UDL is based on the idea that lessons can be purposefully created to include multiple ways of accessing, processing, and assimilation information, making education accessible to many learners (Rose & Gravel, 2010). Meyer, Rose, and Gordon (2014) defined UDL as an educational framework based on the work of brain functions that happen during the learning period that consists of four principles: offering the learner a variety of ways to participate, encouraging his motivation towards learning, offering the teacher a variety of ways to present and display information to the learners, and offering the learner a variety of opportunities to perform and express his understanding in a way that is clear and understandable. The National Center on Universal Design for Learning (NCUDL) (2013) defines UDL as offering a flexible framework that accommodates all educational objectives, approaches, resources, and evaluations and does not just offer a one-size-fits-all response. It does, however, provide some adaptable solutions that can be altered to suit the particular requirements of each individual. According to Huang et al. (2020), it is a strategy for addressing a diverse variety of requirements of learners by creating objectives, procedures, resources, and evaluation techniques that support teachers in meeting these needs. With the possibility of personalization, this method offers a flexible design of learning circumstances, allowing all learners to start from their starting point.

Similarly, Akhdar (2017) remarked that the UDL principle relies on tailoring the curriculum to each student's aptitude. UDL has been adapted in an instructional way using the universal accessibility principles of architecture as a starting point. Its framework is based on neuroscience studies of the functioning of the brain. With bold curriculum design, the three basic tenets of UDL were addressed based on identifying various learners' strategic and emotional brain areas. These tenets are built on repetition, making things more transparent and straightforward to grasp instructions. The three core principles expressly stipulated are: (1) Multiple Means of Representation (presenting information and content in different ways), (2) Multiple Means of Action and Expression (differentiating ways in which students can express what they know), (3) Multiple Means of Engagement (stimulating interest and motivation to learn) (McKenzie & Dalton, 2020). The three core principles included: First supporting students' development of executive

functions, such as: supporting planning and the use of the strategy and enhancing self-monitoring capacity, second providing different means of expression and communication, such as: using technology to support speaking, writing, or drawing, third providing of alternative business options, such as: providing of assistive technology (Abba Hussein, 2020). Figure 1 shows the components and essential elements of the principles of UDL according to the latest version (2.2).

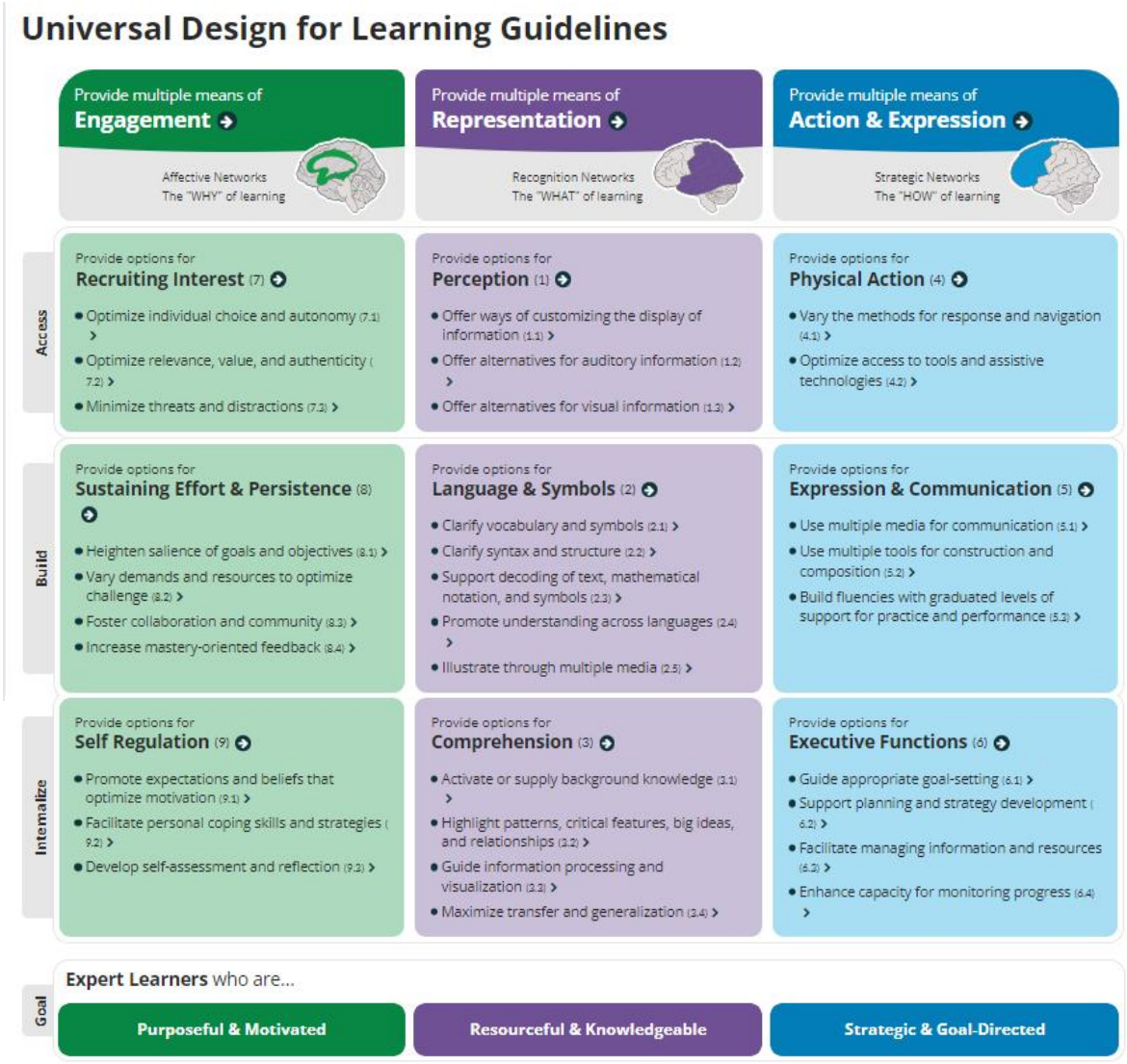

Figure 1. Components and basic elements of the principles of Universal Design for Learning (UDL) Guidelines version 2.2 (CAST, 2018)

UDL begins with planning and attempts to create and give instructions for the most excellent variety of learner variability. It accomplishes this by taking into account the differences in how teachers convey the subject matter being taught, how they motivate and pique students' interest in what they are learning, and how students demonstrate what they have learned in a variety of ways and products (McKenzie & Dalton, 2020).UDL is a scientifically valid framework to guide educational practice that: (a) provides flexibility in ways of providing information and ways in which students respond or demonstrate knowledge and skills, and ways of engaging students, and (b) reduces the challenges in teaching, provide appropriate facilities, support and maintain high expectations of achievement for all students including students with disabilities (Dalton, 2017).

Ministry of Education (MoE) (2020) has developed the Tenth Development Plan (2017/2018 - 2019/2020), which aims to: maximize equal educational opportunities for all students. Its objectives include improving the polarization, preparation, qualification, and development of teachers and faculty and improving the educational environment that stimulates creativity and

innovation (Akhdar, 2017). This made education in the Kingdom of Saudi Arabia move towards progress and development and stimulated creative students. MoE focused on teaching teachers the latest educational practices and modern educational models to apply them in schools. Nevertheless, the field of special education in Saudi Arabia still needs to rely on the latest modern trends and evidence based on the latest practices in special education used in developed countries, such as the United States. Hence, the field of special education needs to adopt new practices that meet differences between peers and their educational needs (Al-Salem, 2016). Researchers see from their experience, looking closely at the models and educational means currently used are unreliable and not studied in an environment based on research and scientific evidence.

Consequently, this study must use a modern educational model (UDL) that was never used in any scientific research based on evidence-based practice for teachers of students with learning difficulties in Saudi Arabia. Eagleton (2021) reported that UDL is one of the modern evidence-based practices in special education, which consists of several criteria mentioned previously. Additionally, several research focusing on UDL as an educational framework indicated a significant improvement in teachers' performance, the level of learners' achievement, and the smoothness of the educational process (Abba Hussein, 2020; Al-Salem, 2016; Spooner, Baker, Harris, Ahlgrim-Delzell, & Browder, 2007).

Previous studies, which investigate teachers' perceptions of using UDL in teaching their students with learning difficulties, are few. Recently, Al-Thawadi (2020) conducted a review study of many studies that dealt with the applications of UDL with students of general education, people with disabilities, and especially those with learning difficulties. Several researchers have confirmed the existence of a clear benefit in using UDL with students with learning difficulties in the basic subjects that these students often fail in them. Ananbeh (2022) observed that the degree to which teachers of the first three grades possess educational competencies to apply the principles of UDL from their point of view was medium after responding 150 teachers to a questionnaire of UDL in Ajloun City. The study recommended including the principles of UDL in preservice teacher qualification programs.

Similarly, Al-Qahtani and Al-Salim (2022) found the availability of UDL criteria with the teaching performance of teachers with a mean of (1, 57) and a degree (not available) after using notecards with a UDL implementation rubric for 30 teachers of inclusive education – public education - at the primary stage in Riyadh. Al-Tantawy and Al-Ghamdi (2020) reported that the knowledge of general education teachers and special education teachers about how to apply UDL was low. Al-Nasyan (2018) reached the same result that the level of special education teachers' knowledge of the principles of UDL among teachers was below medium. The study by Alquraini and Rao (2018) showed that teachers need training and professional development to implement UDL. In a study that investigated teachers' perceptions of UDL, applied to 20 teachers, the results indicated that teachers' perceptions of UDL were negative, and their knowledge of UDL was slight (Anstead, 2016).

On the contrary, In the United States of America, Vitelli (2015) conducted a study to identify preservice teacher preparation programs in higher education institutions by establishing them within the framework of (UDL). The questionnaire tool was used to collect data from (712) teachers in the United States of America. The results showed their knowledge of UDL and their application of it in some of their classes. In Kuwait, Almumen (2020) conducted a study to investigate the role of UDL in inclusive schools where students with and without disabilities learn and acquire knowledge. The researcher used interviews with (5) teachers. Results indicated that UDL effectively involves students in the learning process, whether expected or disabled. Similarly, Al-Salem (2016) found a low level of perception of the participation principle and a high level of perception of the work and expression principle compared to other principles by using a questionnaire with 269 teachers of the deaf and hard of hearing to find out their perceptions of UDL.

However, many studies recommended training teachers in inclusive education schools on working in such schools (Yilmaz & Yeganeh, 2021; Al-Mutairi & Al-Rubaiaan, 2019; Zwane & Malale, 2018). Based on the researchers' experience, through their work in inclusive education, they felt the need for teachers to know how to adapt the general curricula to ensure all learners have access to the educational content. Their practice of UDL may achieve this. In the Arab world,

some studies which conducted recommended the need to train teachers on the UDL, and as a preliminary step to their training, it was necessary to measure the extent of their practice of UDL (Al-Thawadi, 2022; Ananbeh, 2022; Al-Qahtani & Al-Salim, 2022; Al-Tantawy & Al-Ghamdi, 2020; Alquraini & Rao, 2018; Al-Nasyan, 2018; Al-Sheikh, 2017; Al-Salem, 2016).

In summary, UDL offers the idea that teachers must plan for educational support before planning lessons, which is one of the solutions that help special education teachers and general education in developing lesson plans that suit a variety of students. The importance of UDL lies in linking principles to learning objectives, learner characteristics, appropriate teaching strategies and support, technology, and outcomes (Edyburn, 2010). Therefore, this study seeks to answer two research questions: 1) What is the level of implementing UDL principles among teachers in teaching students with learning difficulties? 2) What are the barriers that face teachers of students with learning difficulties to implementing UDL in their students? Studies have yet to be conducted in the Al-Hasa Province of Saudi Arabia for the same purpose.

Methodology

In the current study, the descriptive survey approach was used to describe participants' experiences using the UDL framework. the findings were analysed and concluded by considering the current situation.

Participants

During the school year 2021 – 2022, 78 teachers of students with learning difficulties from public education institutions in Al – Hasa Province, Saudi Arabia, were selected. Due to the small study population, the comprehensive inventory method was followed by applying the study scale to the entire population. After that, 78 questionnaires were obtained valid for statistical analysis.

Data Collection and Analysis

A scale was developed to measure teachers' perceptions regarding UDL principles in teaching students with learning difficulties. The initial version of the scale was prepared after reviewing the theoretical literature and results of some previous studies related to the study topic (King-Sears & Johnson, 2020; Al-Tantawy & Al-Ghamdi, 2020; Almumen, 2020; Katz & Sokal, 2016; Al-Salem, 2016; Vitelli, 2015; Elder Hinshaw, & Sakalli Gumus, 2013; Saito-Kitanosako, 2012). In addition to the literature on UDL, the scale included two parts. The first part included primary data for teachers regarding academic qualifications and teaching experience. The second part included scale items that measure teachers' perceptions and barriers to implementing UDL in teaching their students. Likert scales were used to assess the respondents' responses (strongly disagree, disagree, neutral, agree, strongly agree) with grading 1, 2, 3, 4, and 5.

The scale had 36 items distributed over the positive and negative on four domains, namely, Engagement (9 items), Representation (9 items), Action & Expression (9 items), and Barriers to implementing UDL (9 items). The scale also had acceptable validity and reliability indications for its use in the study. Internal consistency was used to verify the scale validity (Table 1).

Table 1. Pearson's correlation coefficient values used to calculate the overall domain score from the study scale's items' internal consistency

Engagement domain		**Representation domain**		**Action & expression domain**		**Barriers to implementing UDL domain**	
No	Correlation coefficient	No	Correlation coefficient	No	Correlation coefficient	No	Correlation coefficient
1	0.355**	1	0.704**	1	0.682**	1	0.696**
2	0.570**	2	0.765**	2	0.566**	2	0.602**
3	0.531**	3	0.717**	3	0.712**	3	0.705**
4	0.589**	4	0.593**	4	0.656**	4	0.643**
5	0.550**	5	0.799**	5	0.791**	5	0.655**
6	0.631**	6	0.722**	6	0.703**	6	0.607**
7	0.312**	7	0.771**	7	0.650**	7	0.733**

Engagement domain		Representation domain		Action & expression domain		Barriers to implementing UDL domain	
8	0.702**	8	0.714**	8	0.709**	8	0.550**
9	0.672**	9	0.723**	9	0.718**	9	0.499**

** Pearson's Correlation Coefficient is statistically significant at the significance level (α = 0.01)

The results presented in Table 1 show that the correlation coefficients between each item's total score and the domain to which it belongs were positive and statistically significant at α = 0.01, indicating that the items were suitable for measuring the subject matter. Consequently, no item on the scale was deleted according to the internal consistency results. While the value of the reliability coefficient for the total scale is 0.917, the values of the reliability coefficients for the first (Engagement), second (Representation), third (Action & Expression), and fourth (Barriers to implementing UDL) domains were 0.668, 0.881, 0.858 and 0.813, respectively (Table 2). Hence, the item reliability index was excellent, given its closeness to 1.0. The estimation repetition for all constructs was high if administered to the different respondent groups with the same abilities. Therefore, Cronbach's Alpha coefficient values suggested that the scale displayed adequate internal consistency (Table 2).

Table 2. Values of the Cronbach's Alpha coefficient for the four domains of UDL scale

Domain	No. items	Cronbach's Alpha
Engagement	9	0.668
Representation	9	0.881
Action & expression	9	0.858
Barriers for implementing UDL	9	0.813
Total	36	0.917

Results and Discussion

Teacher's Perception Regarding Implementation of UDL

The first question in this study sought to determine the level of the implementation of UDL principles among teachers in teaching students with learning difficulties. The results of the first question demonstrate many outcomes, which are shown in Table 3. The results indicated that the levels of implementation of UDL were within the high level, with an overall mean of 4.07 with SD= 0.560. In addition, results also indicate that the most prominent implementations of the principles UDL by teachers of students with learning difficulties in teaching were represented by the mean of the representation value domain, which was 4.16 with SD= 0.672, ranking first with a high level. The action & expression domain had a mean of 4.07 and SD= 0.653, while the engagement domain had a mean of 3.96 and SD= 0.483 with a high level. Although these results differ from some published studies (Ananbeh, 2022; Al-Qahtani & Al-Salim, 2022; Al-Tantawy & Al-Ghamdi, 2020; Al-Nasyan, 2018; Alquraini & Rao, 2018; Anstead, 2016), they are consistent with those of Vitelli (2015), Almumen (2020), and Al-Salem (2016).

Table 3. Mean and standard deviation values of the level of implementation of UDL by teachers of students with learning difficulties in teaching in general

Ranking	Number of domains	Domains of UDL	Mean	Std. D	The level of domain
3	1	Engagement	3.96	0.483	High
1	2	Representation	4.16	0.672	High
2	3	Action & expression	4.07	0.653	High
Overall level of implementation of UDL			4.07	0.560	High

Engagement Principle Domain

The findings of the first domain of the Engagement principle indicated several outcomes

(Table 4).

Table 4. Means and standard deviations of the level of implementation of UDL by teachers of students with learning difficulties in teaching related to the first domain of the Engagement principle

No	Items	Mean	Std. D	The level of item	Ranking
4	I allow students to choose activities that suit their interests in classroom	4.38	0.725	Very high	1
6	I try to design classroom activities that match the students' interests	4.32	0.712	Very high	2
9	I provide various options for carrying out activities in the classroom	4.07	0.653	Very high	3
2	I encourage the students to work in small groups during the lesson	4.10	0.847	High	4
8	I provide opportunities for students to develop their self-monitoring	4.08	0.937	High	5
5	I encourage students to communicate online or face-to-face to discuss course subjects	3.99	0.987	High	6
3	I provide students with online assignments	3.86	0.963	High	7
7	I encourage students to study in groups outside of the classroom	3.63	1.046	High	8
1	I use direct indoctrination as the primary method of teaching	3.10	1.202	Intermediate	9
Overall level of the engagement principle		3.96	0.483	High	

Analysis of the results presented in Table 4 reveals that the levels of implementation of the first domain of the Engagement principle were within the high level, with an overall mean of 3.96 with SD= 0.483. In addition, it was also indicated that the level of response of the study sample came with a very high degree on three of the uses of the principles of UDL in teaching regarding the first domain of the Engagement principle, represented by items no. 4, 6, and 9 that were arranged in descending order according to the level of response of the study sample.

In contrast, the level of response of the study sample came with a high degree on five of the uses of the principles of UDL in teaching, represented by items no. 2, 8, 5, 3, and 7, which were also arranged in descending order according to the level of response of the study sample. Finally, item no. 1 came in the last ranking with a mean of 3.10 and SD= 1.202 with intermediate level.

The findings also affirmed that the most prominent use by teachers of students with learning difficulties of UDL principles in teaching about the first domain of the principle of UDL (Engagement) is that they allow students to choose activities that suit their interests in the classroom. This result is explained by the fact that teachers of students with learning difficulties seek to enhance motivation and educational tendencies for their students; therefore, results find that teachers allow their students to choose the activities that suit their interests in the classroom — encouraging students and giving them lessons with the best teaching methods and appropriate strategies to suit the desires and tendencies of the student. This is what the UDL focuses on; the UDL is an educational frame that cares about individual differences and the needs of each student when designing the lesson plan; this makes the teacher avoid everything that is an obstacle to the implementation of the plan or deprives the learner of access to the knowledge necessary for the scientific content of the required curriculum by reducing the physical, cognitive, intellectual, and organizational barriers to learning (Hayes et al., 2018; Abu-Nayan, 2020).

To discover a cause for learning, improving students' motivation and educational tendencies is crucial to setting them self-achievement goals throughout the educational process. This is one of the most fundamental elements of the UDL. The UDL covers various curriculum areas that fulfill the needs of all people so that education can be meaningful for them (Evmenova, 2018). Meyer et al. (2014) reported that the personal capabilities and characteristics of the individual are constantly changing as they overlap between the individual and the environment. Finding a reason for learning that connects the learner's inner desire and the environment is necessary to enjoy

learning and achieve the learning goal. As a result, when the learner understands that everything he learns will be applied to and benefit from his environment and personal life, he will become a learner with greater desire and motivation. Motivation for learning works to gain a positive attitude toward the learning process (love of learning) for the learner and effective and qualitative participation in the educational experiences in which he participates (Melhem, 2014).

Similarly, this is consistent with the Katz and Sokal (2016) study, whose findings revealed that interventions using UDL principles support access, participation, and progression for all learners and research to explore literacy and math learning. Students with significant disabilities and those with significant achievement difficulties showed increased interaction with their peers without disabilities. They were more involved in their learning and developed more age-appropriate social skills in UDL classrooms.

Representation Principle Domain

The findings of the second domain of the Representation principle indicated several outcomes, which are presented in Table 5.

Table 5. Means and standard deviations of the level of implementation of UDL by teachers of students with learning difficulties in teaching related to the second domain of the Representation principle

No	Items	Mean	Std. D	The level of item	Ranking
2	I clearly define key concepts in a variety of ways that help students understand the topic	4.42	0.782	Very high	1
1	I present information to students through a variety of methods (verbal, visual, auditory, and tactile)	4.41	0.729	Very high	2
7	I provide different educational resources for students to support learning	4.26	0.959	Very high	3
3	I Present information to students in various forms, such as diagrams, illustrations, or visual concept maps	4.26	0.959	Very high	4
4	I provide students with a summary of each lesson	4.19	0.954	High	5
9	I provide students with software and apps that can be used in their education.	4.08	0.937	High	6
5	The visual subjects that I provide contain written phrases	4.04	1.025	High	7
8	I encourage students to use online resources to support their education	3.99	1.000	High	8
6	I use digital and electronic books in teaching	3.78	1.158	High	9
Overall level of the representation principle		4.16	0.672	High	

The results, as shown in Table 5, indicate that the levels of implementation of the second domain of the Representation principle were within the high level, with an overall mean of 4.16 with SD = 0.672. In addition, results also indicate that the level of response of the study sample came with a very high degree on four uses of the UDL principles in teaching regarding the second domain of the Representation principle, represented by items no. 2, 1, 7, and 3 that were arranged in descending order according to the level of response of the study sample. While the level of response of the study sample came with a high degree on five uses of the UDL principles in teaching by the teachers of students with learning difficulties regarding the second domain of the Representation principle, represented by items no. 4, 9, 5, 8, and 6 that were arranged in descending order according to the level of response of the study sample.

The findings also affirmed that the most prominent use by teachers of students with learning difficulties of UDL principles in teaching regarding the second domain of the principle of UDL (Representation) is that they clearly define the basic concepts in various ways and diverse methods in order to deliver information to their students to help students understand the subject. These findings further support the idea that teaching using the principles of UDL in inclusive classrooms led to a significant increase in student behaviors, interaction, active participation, enhanced social participation by increased peer interactions, and increased student independence

and inclusiveness (Katz, 2013). As mentioned in the literature review, the guidelines for the UDL in how to plan the lesson encourage teachers to build flexible learning methods based on the student's background and preferences in terms of elements and teaching methods so that the teacher considers the capabilities and needs of students, which in turn leads to educational lessons being understandable and attractive to all (Al-Sheikh, 2017). Teachers should take into account when planning a lesson that they ask the following questions: What are the previous educational experiences of the students?; what should the students learn?; how will the students learn?; do the students know what they want? Interestingly, the latest version of the UDL Guidelines, version 2.2, emphasizes the development of expert learners as the ultimate goal of instruction, defining expert learners as purposeful, motivated, helpful, knowledgeable, strategic, and goal-oriented (McKenzie & Dalton, 2020).

Action and Expression Principal Domain

The findings of the third domain of the Action and Expression principle indicated several outcomes, as presented in Table 6.

Table 6. Means and standard deviations of the level of implementation of UDL by teachers of students with learning difficulties in teaching related to the third domain of the Action and Expression principle

No	Items	Mean	Std. D	The level of item	Ranking
8	I clearly define key concepts in a variety of ways that help students understand the topic	4.36	0.702	Very high	1
2	I encourage students to self-monitor their own behaviours or conducts in the classroom	4.24	0.856	Very high	2
4	I provide students with different types of activities to demonstrate their knowledge through multiple methods (e.g.: writing, presentation, drawing, etc)	4.18	0.922	High	3
5	I provide students with guided procedures for completing homework assignments	4.17	0.932	High	4
3	I encourage students to use modern technology (e.g., iPad, laptops, and computers) in the classroom for the purpose of learning	4.01	1.026	High	5
7	I allow students to choose their preferred appropriate way of completing assignments	4.01	1.038	High	6
9	clearly define the grading system for all tasks and assignments before they are given to students	3.95	1.031	High	7
6	I provide students with models or examples of class projects and assignments	3.88	1.006	High	8
1	I provide students with different types of assignments that include modern teaching means, such as presentations and videos	3.86	1.028	High	9
Overall level of the action and expression principle		4.07	0.653	High	

The results, as shown in Table 6, indicate that the levels of implementation of the third domain of the Action and Expression principle were within the high level, with an overall mean of 4.07 with SD = 0.653. In addition, results also indicate that the level of response of the study sample came with a very high degree on two uses of the UDL principles in teaching by the teachers of students with learning difficulties regarding the third domain of the Action and Expression principle, represented by items no. 8 and 2 that were arranged in descending order according to the study sample's response level. While the level of response of the study sample came with a high degree on seven uses of the UDL principles, represented by items no. 4, 5, 3, 7, 9, 6, and 1 that were arranged in descending order according to the level of response of the study sample.

The most exciting finding was that the most prominent use by teachers of students with

learning difficulties of UDL principles in teaching regarding the third domain of the principle of UDL (Action and Expression) is that they provide students with clear directions on how to complete all the tasks given to them. These results are consistent with those of other studies. They suggest that enabling teachers to plan effectively for the lesson with the UDL to meet students' individual needs makes the teaching and follow-up process more effective (Courey, Tappe, Siker, & LePage, 2012). Following the present results, previous studies have demonstrated that differentiated studies within the inclusive classroom take the dynamic approach; Since it meets the needs of all students, especially students with learning difficulties (Huang et al., 2020), also the quality of teachers and their competence in using effective and appropriate educational methods and evaluating and adapting these methods to students is essential (Moberg, Muta, Korenaga, Kuorelahti, & Savolainen, 2020). Consequently, it is crucial for teachers to adjust their teaching plan according to the individual needs of learners and to achieve equal opportunities for educational progression by having students receive instruction commensurate with their diverse learning abilities and preferences (Geeraerts, Van den Bossche, Vanhoof, & Moolenaar, 2017).

Barriers Teachers Face in The Implementation of UDL

The study's second question was to identify the barriers faced by teachers of students with learning difficulties to implementing UDL in their students. The results of the second question demonstrate many outcomes, which are shown in Table 7. The results indicated that the barriers that prevent teachers of students with learning difficulties from implementing the principles of UDL in teaching were within the intermediate level, with an overall mean of 3.30 with SD= 0.749.

Table 7. Means and standard deviations of the responses of the study sample about the barriers that prevent teachers of students with learning difficulties from implementing the principles of UDL in teaching

No	Items	Mean	Std. D	The level of item	Ranking
6	There is limited internet access at my school	3.86	1.192	High	1
8	The students I work with lack the technical skills to use in their learning	3.67	1.147	High	2
4	There are not enough training courses related to providing modern information in the field of education	3.67	1.147	High	3
5	There are no computers in my school	3.44	1.212	High	4
1	I have no understanding about UDL	3.36	1.162	Intermediate	5
2	I have knowledge of the basics of UDL, but not enough knowledge of how to implement it	3.29	1.152	Intermediate	6
7	The use of technology reduces the process of communicating with students	3.24	1.229	Intermediate	7
9	I believe that the use of technology in the classroom disrupts the educational process	2.69	1.199	Intermediate	8
3	I provide students with different types of assignments that include modern teaching means, such as presentations and videos. I don't know how to use technology in the classroom	2.45	1.234	Low	9
The overall mean		3.30	0.749	Intermediate	

The results, as shown in Table 7, indicate that the level of response of the study sample came with a high degree on four barriers that prevent teachers of students with learning difficulties from implementing the principles of UDL in teaching, represented by items no. 6, 8, 4, and 5 that were arranged in descending order according to the responses of the study sample. While the level of an intermediate degree on four barriers that prevent teachers of students with learning difficulties from implementing the principles of UDL in teaching, represented by items 1, 2, 7, and 9, were arranged in descending order according to the responses of the study sample. Finally, item no. 3 came in the last ranking with a mean of 2.45 and SD= 1.234 with a low level. These findings agree with Scott's (2018) findings which showed barriers to the implementation of the UDL as follows: (1) the necessity for teachers to reinforce inclusion, (2) the necessity for managerial reinforcement,

(3) the necessity for enhancing teachers' knowledge of UDL.

A possible explanation for these results may be that the school's limited access to the internet prevents teachers of students with learning difficulties from making good use of the internet, which hinders their implementation of the principles of UDL in teaching. Therefore, the general principles of UDL in online environments should be adapted to meet the teacher's and the student's individual and collective needs in controlling the technological educational atmosphere (F. B. A. Al-Naim, Al-Rasheed, Al-Tessan, M. F. Al-Naim, & Al-Hamdan, 2022). These results match those observed in earlier studies, which showed the low competencies of general education teachers and special education teachers regarding their ability to implement UDL in inclusive schools and the lack of material capabilities, especially the technology necessary to implement UDL (Al-Tantawy & Al-Ghamdi, 2020; Scott, 2018). Prior studies that have noted the importance of the presence of technology and the internet in school facilities have positive effects in terms of ease of implementation of the UDL principles, which in turn helps students with learning difficulties to enhance their self-esteem, facilitate their acquisition of practical life skills, improve independence in academic tasks, access a full range of educational options. Moreover, achieve independent learning for the students by providing the necessary resources to achieve their goals and to master complex academic tasks (Ouherrou, Elhammoumi, Benmarrakchi, & El Kafi, 2019).

Conclusion

The results of the present study affirmed that the level of teachers' implementation of UDL principles in teaching students with learning difficulties was within the high level. The most prominent implementation of the principles of UDL in teaching was the representation domain, which ranked first with a high level. The action & expression domain ranked the second highest, while the engagement domain ranked the third highest. Moreover, the results showed that the barriers that prevent teachers of students with learning difficulties from implementing the principles of UDL in teaching were within the intermediate level. Hence, this combination of results provides some support for the conceptual premise that professional development programs must be conducted during or before service to increase teachers' knowledge of the UDL principles by including the principles of UDL within the curricula and teacher preparation programs within the colleges of education in all departments, whether for special or general education, as it ensures integration between the educational process (Scott, 2018).

Moreover, educational institutions should overcome all barriers by providing computers and improving the quality and speed of the internet in public schools, paying attention to improving the necessary technical skills of students with learning difficulties to use them in their learning and creating an educational environment that supports teachers of students with learning difficulties by implementing the principles of UDL in teaching. Future research should therefore concentrate on the investigation of designing educational curricula based on the UDL principles and modern teaching methods for students with learning difficulties. Another possible area of future research would be to investigate how to reduce the barriers that prevent teachers of students with learning difficulties from implementing the principles of UDL in teaching.

Limitation

Despite these favorable results, a set of determinants was considered. First, the comprehensive inventory method was followed because of the small study population with 78 teachers of students with learning difficulties from public education institutions. Therefore, restrict the generalization of findings to teachers of learning difficulties who are more likely than others to involve in studies of this kind. Second, the UDL can also be viewed as a learning frame, although much needs to be learned from it. Creating an inclusive classroom environment may be influenced by other instructional practices as teachers and school officials work toward improving inclusion for students with and without learning difficulties. The current study was not focused on the use and application of other inclusive practices. Consider this, there was no investigation into what other practices could be used. As a result, the current study is a good place to start for researchers interested in these areas. our opinion that the results reflect positively on methods by

which hurdles to the implementation of UDL as a framework for learning can be addressed.

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