

*International Journal of Learning, Teaching and Educational Research*  
Vol. 24, No. 10, pp. 372-393, October 2025  
<https://doi.org/10.26803/ijlter.24.10.17>  
Received Aug 8, 2025; Revised Sept 11, 2025; Accepted Sept 17, 2025

## Supporting Students with Learning Disabilities through Universal Design for Learning: Saudi Teachers' Perceptions in K-12 Education

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**Abstract.** Universal Design for Learning (UDL), a framework developed to address the needs of all learners, including those with learning disabilities, has gained recognition and support from educational research. This qualitative study aims to explore teachers' perceptions regarding the integration of UDL in educational settings in Saudi Arabia, within K-12 educational frameworks. The primary focus is on the impact on special learners, including those with learning disabilities. Key research questions include: (1) What are teachers' perceptions of UDL and its effectiveness in supporting students, particularly those with learning disabilities? (2) What challenges do teachers face in implementing UDL, and what strategies do they believe would facilitate successful implementation? and (3). What do teachers perceive they need from the school district to apply UDL in their schools? Ten teachers selected based on criteria such as experience levels and teaching subjects were utilized for the study. The findings revealed prevalent concerns among teachers regarding the feasibility of UDL implementation, citing challenges such as a lack of training, inadequate resources, and limited administrative support. Despite these obstacles, teachers emphasized the critical need for enhanced support and training in UDL principles to address deficiencies and enhance student outcomes. Furthermore, teachers highlighted the importance of infrastructure and resource allocation for effective UDL implementation, stressing the pivotal role of school administrators in providing necessary support. These findings underscore the importance of prioritizing professional development and resource allocation to create inclusive learning environments that benefit all students, including those with learning disabilities.

**Keywords:** Universal Design for Learning; Inclusive Education; Learning Disabilities; Teachers' Perceptions; Professional Development

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## 1. Introduction

Universal Design for Learning (UDL) is an instructional framework rooted in principles aimed at addressing the diversity of learners within inclusive classroom settings. Initially inspired by architectural concept where physical environments are made accessible for all users, UDL adapts these principles to the educational domain to ensure that learning environments accommodate diverse learners, such as those with disabilities, gifted students, and ESL students. The framework is not just about providing access; it is about crafting flexible and responsive classrooms that respect specific needs and strengths of every student (Barteaux, 2014; Rose et al., 2006).

Empirically, UDL has been shown to improve accessibility and engagement across diverse educational settings. Studies have shown adoption of UDL principles can lead to a more inclusive classroom where all students are given equitable learning and avenues to demonstrate their understanding. For instance, by offering varied methods of content representation, such as visual aids and interactive technology, teachers can cater to different learning styles and remove barriers for learners with special needs. Similarly, it offers multiple ways for students expression – whether through written, oral, or creative forms – and acknowledges the varying strengths students bring to the classroom (Barteaux, 2014; Rose et al., 2006).

While Assistive Technology (AT) focuses on individualized tools to help students with specific disabilities overcome barriers, UDL takes a broader approach, aiming to design curricula that are inherently accessible. The integration of AT and UDL are complementary; AT addresses individual needs, while UDL proactively removes learning barriers at a systemic level (Rose, Hasselbring, Stahl, & Zabala, 2006).

Despite the promising potential of UDL to address the diverse needs of learners, many educators remain resistant to its adoption. Teachers often perceive UDL as a burdensome framework due to need of diverse means of representation, engagement, and varied instructional strategies to benefit all students (Hartmann, 2015). For some educators, this has resulted in inconclusive outcomes, while others see it as a transformative approach to inclusive education. These mixed perceptions highlight the critical need to explore how teachers view UDL and identify barriers to its effective implementation. Understanding these diverse perceptions is crucial in promoting in coming up with strategic solutions and pathways for effective UDL implementation.

The problem is of main concern to Saudi Arabia, where education reforms under Vision 2030 emphasize focus on inclusive education in regular classrooms. Policy directions promote inclusion practices, but limited studies have been done on interaction with teachers within Saudi framework. It is vital to understand these perceptions because teachers are the main implementers, and perceptions, readiness, and access to resources have major impact on the success of UDL in practice.

In this respect, the purpose of the UDL in favor of students with learning disability is particularly important. Learning disabilities are frequent impediments to success in academic activities. There has been growing interest in learners with learning Disabilities in Saudi context. Learning from Aldousari, and Dunn (2022), there are over 20,000 registered students for special education services. Beginning in 1958, there was provision of special education services, with significant improvements aimed at improving the quality of service provision. For instance, in 1972, the Intellectual Education Institute was developed to educate learners with special needs, emphasizing communication, social behavior, and life skills.

Exploring the perceptions of Saudi educators towards UDL regarding learners with learning disabilities is thus a useful way of understanding both the potential and constraints of inclusive learning in the country. In their study, Melhem and Al-Rashid (2023) reported that teachers in Saudi Arabia demonstrated generally high levels of implementing Universal Design for Learning (UDL) principles when teaching students with learning difficulties, with representation ranking as the most central domain.

### **1.1 Research Problem**

Despite the growing recognition of UDL an inclusive framework, its practical implementation remains inconsistent. While the literature highlights UDL's potential to support diverse learners, there is limited empirical evidence on how educators perceive both its benefits and challenges in everyday classroom practice. Teachers' attitudes and perceptions are central to successful adoption, as they are the ones responsible for adapting curriculum, designing assessments, and managing instructional delivery.

In the Saudi educational context, the issue becomes more pressing. Many educators remain resistant to UDL adoption, and existing studies provide only a partial picture of why implementation is uneven. Without a clear understanding of teachers' perspectives, it is difficult to identify the barriers to full integration of UDL principles into instructional practices. This lack of knowledge creates a significant gap: while UDL is theoretically positioned to reduce barriers for learners with disabilities, its effectiveness in Saudi classrooms is constrained by underexplored teacher perceptions and institutional challenges. As a result, the promise of UDL to create equitable classrooms is not fully realized.

Therefore, the research problem can be stated as follows: Despite the theoretical promise of UDL for supporting special learners, there is a limited understanding of how teachers perceive its implementation challenges in practice, particularly in Saudi educational contexts. This gap in knowledge hinders effective adoption of UDL principles in classrooms where they could significantly benefit students with diverse learning needs.

### **1.2 Research Questions**

#### **A. Teachers' Perceptions of UDL**

1. What perceptions do instructors have on the implementation of UDL as an instructional framework?

2. How do teachers perceive UDL's effectiveness in supporting students, particularly those with learning disabilities that impact the learners' outcomes?

### **B. Implementation Challenges and Strategies**

1. What are some challenges faced by educators in implementing UDL in their classrooms?
2. What strategies do teachers believe would be effective for successful implementation of the framework?

### **C. Support from the School District**

1. What are some of resources the teachers perceive they need from the school district to effectively apply UDL in their schools?

### **1.3 Purpose of the Study**

This study aims to explore the perceptions and implementation of UDL among Saudi teachers, with a particular interest on principles that can support students with learning disabilities in achieving academic success. By linking the framework's theoretical foundations to empirical research on UDL in diverse educational contexts, the study will expound on potential of UDL to foster inclusive K 12 learning and identify specific challenges and successes teachers face in applying UDL principles in practice.

The research question is therefore centered on identifying how UDL principles are perceived, understood, and applied by teachers, and how these practices align with the broader literature on inclusive education. Understanding the perception of UDL will "sustain the implementation of effective practices and positively impact student outcomes" (Almutairi & Alsuwayl, 2023,p 2 ). Through this research, the goal is to contribute to inclusive education practices, identifying effective strategies for UDL implementation.

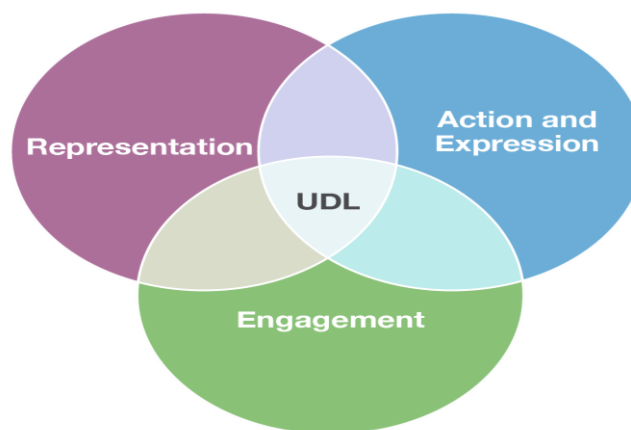
## **2. Literature Review**

### **2.1 What is Universal Design for Learning**

It is an educational framework demanding the creation of adaptable learning settings that assist learners with diverse backgrounds and capabilities. (Fuentes, Castro, Casas,Vallejo, & Zuñiga, 2016).. The framework is supported by evidence-based educational practices, cognitive neuroscience, and the integration of digital technology. Unlike traditional approaches that place responsibility for learning difficulties on the student, UDL assumes that barriers often lie within the environment's design—including curricular goals, instructional methods, materials, and assessment practices (CAST, 2011).

### **2.2 Principles of Universal Design for Learning**

The effectiveness of UDL implementation in addressing the needs of learners with special needs relies on three core principles rooted in neuroscience research, serving as the foundational framework for UDL (CAST, 2011). As shown in Fig. 1, the relationship between UDL principles and learning disabilities is interconnected in promoting a means of student representation, engagement, and expression.



**Figure 1: Relationship between UDL Principles and Learning Disabilities**

### 2.2.1 *Multiple means of representation.*

UDL advocates for delivering information through multiple modalities. For instance, while textbooks and magazines primarily offer visual content, supplementing with audio, visual materials such as videos, and hands-on learning resources provides learners with a range of options to access the materials in alignment with their individual learning strengths (Evans et al., 2010).

### 2.2.2 *Multiple means of action and expression.*

UDL suggests that learners should be provided with more than one way to act skillfully and demonstrate and express what they have learned (CAST, 2011). Students have the freedom to choose the method they want to present what they know. For instance, they can choose to take a pen and paper test, or choose to do an oral presentation, (Barteaux, 2014). UDL allows learners with special needs to choose whatever learning method suits their learning abilities.

### 2.2.3 *Multiple means of engagement.*

UDL provides a framework for learner's engagement. The model dictates that Learners should be left to make choices and should be given assignments that are somehow relatable to their lives and cultural backgrounds (Fuentes et al, 2016). Other ways of engagement are maybe creating opportunities where learners can get up and engage with others in the classroom.

## 2.3 Aim of Universal Design for Learning

UDL aims to create more access to learning by minimizing physical, cognitive, organizational, and intellectual barriers and many other obstacles that hinder learning and help all learn to become expert learners (CAST, 2011). This learning approach helps students to have flexibility in the way they access material, how they engage with the material, and how much they know. UDL helps the teacher to plan for all the diverse learners from the very beginning of the lesson, thus making it a very powerful approach (Al-Azawei, Serenelli, & Lundqvist, 2016).

Lesson plans developed this way to help all students but are more specifically helpful to students with learning disabilities and thinking differences. The general idea of UDL for learning is that curriculum should be inclusive for every learner.

## 2.4 Effectiveness of Universal Design for Learning

UDL has been recognized as a teaching approach that can enhance the learning without discrimination. The three principles offer a framework that can potentially support inclusive education (Abell et al., 2011). Katz and Sugden (2013) support the benefits of UDL using the three-block model, where UDL promotes inclusivity by promoting social and emotional well-being of learners. UDL is particularly beneficial for students with special needs, as it reduces stigma and fosters inclusivity. Adopting the model ensures that instructors are not only focused on curriculum promotion but holistic aspect to support the well-being of learners.

However, while UDL shows promise, its effectiveness is based on several factors including context of implementation, the availability of resources, and teacher training. The effectiveness of the model can also vary based on cultural backgrounds. Critics argue that the evidence supporting UDL's impact on learning outcomes is still evolving and often context-specific. Moreover, some researchers highlight that UDL's broad applicability across all educational settings requires further empirical validation (Abell et al., 2011). Although UDL has been shown to accommodate learners with disabilities by fostering participation and reducing stigma, it is important to acknowledge that these outcomes are not universally guaranteed. The approach's success depends on how effectively its principles are adapted.

## 2.5 Benefits of Universal Design for Learning

UDL aims make curricula more inclusive to diverse learners by offering multiple options for engagement, illustration, and expression. However, while UDL has been praised for its potential to reduce stigma and promote flexibility, the extent to which these benefits are universally achievable remains a topic of ongoing debate. Critics highlight its implementation often depends on contextual factors such as instructor training, resource availability, and institutional support.

Although UDL promotes increased student engagement by offering varied tools and content, the empirical evidence for its universal effectiveness is limited. While some studies suggest that allowing learners to make choices and engage with materials that align with their interests can enhance motivation, these findings are not uniformly applicable across different educational settings. Further research is needed to establish the generalizability of these outcomes.

One of the purported benefits of UDL is fostering self-directed dissemination. By enabling pupils to select their education materials and modes of expression, UDL theoretically empowers learners to develop autonomy and self-awareness in very early age (Abell et al., 2011). However, this approach assumes that all learners can make effective choices, which may not always be the case. Learners who struggle with decision-making or self-regulation may require additional support, a factor that is often disregarded in discussions about UDL's effectiveness.

UDL also aims to provide students express themselves in diverse ways. While this flexibility can benefit learners with varying needs, it also places significant demands on educators to design assessments that are both inclusive and equitable

(Evans, Williams, King, & Metcalf, 2010). Moreover, the assumption that flexible assessments inherently lead to better learning outcomes requires further empirical validation.

The framework's emphasis on flexibility in course design and delivery has been noted as a strength, allowing teachers to accommodate diverse learners effectively (Fuentes et al., 2016). However, this flexibility often requires substantial effort and resources to implement. Critics argue that the lack of standardized guidelines for UDL implementation can lead to inconsistencies in practice, limiting its effectiveness. UDL proponents claim that it reduces the need for individualized accommodations by addressing learner variability upfront. While this is a valuable goal, it is important to acknowledge that some students may still require personalized support beyond what UDL principles can offer (Rose et al., 2006).

Additionally, the framework's ability to support a highly diverse learning group depends on the availability of resources and teacher expertise, which are not always guaranteed. Finally, UDL's potential in meeting user-friendliness approach, such as those outlined in the Accessibility for People with Disabilities Act, has been highlighted (Rose, et al., 2005). While this is a promising feature, the implementation of UDL in diverse often faces practical challenges, such as inadequate training and limited institutional buy-in.

## **2.6 Teachers' Perspectives toward Universal Design for Learning**

Understanding teachers' perspectives is essential to evaluating the implementation the framework. Teachers are at the forefront of applying UDL principles in classrooms and play a critical role in determining their success or failure. Their insights reveal practical challenges, such as resource constraints, training gaps, and administrative support deficiencies, that directly impact UDL's feasibility.

Furthermore, teachers' perceptions provide valuable context for identifying strategies to enhance UDL adoption, ultimately contributing to more inclusive and effective educational practices. By analyzing these perspectives, this study aligns its research objectives with the broader goal of fostering a deeper understanding of how UDL principles translate into actionable classroom strategies, addressing both theoretical and practical dimensions.

UDL, as a High Leverage Practice (HLP), serves as a potent tool for educators (McLeskey et al., 2017). Having such curriculum checkpoints within the K12 learning system helps teachers reduce barriers and offer a standardized learning environment. The checkpoints are applicable across different learning levels. Izzo and Bauer (2015) emphasize how the framework fosters professional development, enabling instructors to address challenging topics effectively.

Alquraini and Rao's (2018) survey of 131 educators revealed that UDL strategies improve classroom environments by facilitating instruction delivery. In essence, UDL not only simplifies teachers' tasks but also enriches learning experiences by providing guiding principle in instruction dissemination.

UDL provides teachers with a range of strategies with which they can deliver content, such as cooperative learning, online tutorials, role-playing, among others (Rose & Strangman, 2007). Through the adoption of different materials, instructors support new material and design interesting learning experiences. When it comes to accomplishing learning objectives, it is possible to use different forms of expression (Boothe et al., 2018). It is, however, important to apply UDL principles to assessment and instruction practices (Rose & Strangman, 2007). This holistic method is in line with the UDL tradition of offering students enough content and data to help them meet their objectives.

Literature reviews by Chita-Tegmark et al., (2012) and Delaney and Hata, (2020) also support that incorporating UDL entails putting student's viewpoint into consideration. Employing diverse instructional formats, such as oral exams, accommodates various learning styles and eliminates reliance on traditional written exams UDL helps instructors understand students' needs across various domains, including on and off the classroom work (Al-Azawei et al., 2016). Evaluation options encompass a range of formats, from fill-in-the-blank tests to videos to support diverse learner's needs.

The educators who embrace the UDL model experience enhanced abilities. According to Kirsch et al. (2016), the instruction grounded in UDL enhances the amount of content covered and motivates educators to transform their teaching strategies to make learning content available to various learners. It may also increase the engagement of learning and motivation among learners, which is beneficial to teachers and learners (Kim and Slapac, 2015). The active involvement of students through UDL engagement, practical lessons, and result to increased retention and achievement rate (Al-Azawei et al., 2016).

While previous research underscores the potential of UDL to accommodate diverse learners, significant barriers remain. These include rigid school curricula, limited teacher training, and the challenge of preparing differentiated work plans to meet varied student needs. These obstacles often lead to a lukewarm reception of UDL, especially among educators tasked with managing large, diverse classrooms. Understanding these challenges from teachers' perspectives is crucial to evaluating UDL's feasibility and impact, offering insights into strategies for improving its adoption.

## **2.7 Gaps in Literature**

Although there voluminous literature on the framework, there are still some gaps of significance. To begin with, most of the literature addresses the theoretical basis of UDL or its use within a Western context, and there is a relative paucity of empirical studies that investigate the perceptions of teachers in Saudi Arabian learning institutions. This reduces application in diverse cultural and institutional settings.

Educators have constantly been focused on special learners. However, as the Saudi population grows and becomes more diverse, there is a need for access to more high-quality research to explore the diverse needs. Third, previous research

has focused on the student outcome or overall approach to implementation but has not devoted as much attention to teacher views- their experience, their perceived obstacles, and their requirements to undertake UDL. Educators play a central role in the successful application and, in the absence of their points of view, the adoption of UDL might be resisted or more uneven.

### **3. Methodology**

This section outlines the methodology for understanding teachers' perceptions of UDL implementation, with a specific focus on special learners. Ten teachers carefully selected based on specific criteria to be detailed, who have successfully implemented UDL in their schools, will participate in this qualitative study. The selection aims to comprehensively explore UDL implementation, with participants recruited through emails from the school district's website, ensuring a diverse representation of both male and female teachers. A qualitative approach is chosen to comprehend teachers' perceptions of UDL implementation.

The methodology aligns with the study's focus on processes rather than outcomes, enabling the analysis of themes and connections related to teachers' perceptions of UDL implementation. Semi-structured interview questions have been crafted to explore the study questions ensuring in-depth responses. Consideration for reliability and validity measures, such as member checking or triangulation, may enhance data quality. Participants are assured of ethical considerations, with the option to refrain from uncomfortable questions, and anonymity is maintained to ensure confidentiality. Before interviews, participants receive interview questions to prepare for discussions, facilitating the gathering of relevant information about UDL implementation and ensuring informed responses during the interview process.

#### **3.1 Participants**

The study included 10 teachers who were purposefully selected based on their application of UDL in their schools. These participants represented a diverse range of demographics, ensuring an understanding of UDL across different contexts. Specifically, the participants included both male and female teachers, with varying age ranges, years of teaching experience, and educational backgrounds. They taught across different grade levels, including elementary and secondary education. Additionally, the student populations they served were diverse, encompassing general education students as well as those with learning disabilities.

This sample size was deemed sufficient for qualitative inquiry, as 10 participants allow candid exploration of individual experiences while ensuring the study group is manageable (Malterud et al. 2016). The authors explain that "Information power indicates that the more information the sample holds, relevant for the actual study, the lower the number of participants is needed." (p.1753). This justifies the need of having a smaller size of study sample to improve the depth and relevance of data.

The recruitment process was conducted via email, using contact information obtained from the school district's website. This approach ensured that participants were not only willing but also actively involved in UDL practices. The diverse demographic backgrounds of the participants were critical for understanding how factors such as teaching experience, educational settings, and student demographics influenced their perspectives on UDL implementation. Demographic summary of participants is provided below:

**Table 1: Demographic Summary of the Participants**

Participant	Gender	Age	Years of Teaching Experience	Educational Background	The Subject they teach
1	Male	32	8	Bachelor's Degree	Math
2	Female	28	5	Master's Degree	Reading
3	Male	29	4	Bachelor's Degree	Reading
4	Male	31	5	Master's Degree	Writing
5	Female	33	9	Bachelor's Degree	Math
6	Male	39	15	Bachelor's Degree	Math
7	Male	42	19	Master's Degree	Reading
8	Male	36	13	Bachelor's Degree	Math
9	Female	47	21	Master's Degree	Reading
10	Male	42	18	Bachelor's Degree	Writing

### 3.2 Study Design

A qualitative research design was deemed suitable for the study. This approach allowed the researcher to focus closely on various participants' perspectives, fostering intimate exchanges of information on a one-on-one level. For instance, in this study, information was gathered from teachers through individual interviews, facilitating insight into various aspects of UDL implementation. Individual interviews enabled the restructuring and refinement of questions to elicit clear responses from the teachers. Furthermore, qualitative methodology was chosen for its alignment with process-focused analysis rather than outcome-focused approaches. This methodology allowed pointing of recurring themes and connections relevant to the topic under investigation.

The qualitative research boasts the ability to provide in-depth descriptions rather than relying solely on numerical data. This approach was handy, as it sought to uncover the underlying reasons and factors influencing teachers' perceptions of UDL implementation. Original interview questions were crafted to gather intrinsic data, with teachers providing valuable insights to paint a clear picture of UDL implementation in their classrooms.

### 3.3 Setting

The setting of the study was conducted via the Zoom platform, making it convenient for the participating teachers. Essentially, this is meant to provide convenience for the interviewees, ensuring their comfort and ease in answering

the questions presented to them. The respondents were also informed to prepare well in advance to avoid disruption from external factors, such as power outages, background noise, and internet accessibility issues.

### 3.4 Data Collection

Semi-structured interviews designed to elicit both basic information and deeper responses were used. These queries were developed, studied the literature, and validated by a panel of experts. A pilot test was also done to confirm the efficacy of the questions. The interviews were carried out over two months, with each session lasting approximately 30–45 minutes. Participants were interviewed individually at times convenient for them, via video conferencing platforms. The frequency of interviews was limited to one session per participant to minimize inconvenience and ensure comprehensive responses.

Ethical considerations were strictly adhered to, including informed consent, the option for participants to skip any questions they were uncomfortable with, and the assurance of anonymity and confidentiality. To ensure transparency and replicability, the interview questions were open-ended, allowing participants to elaborate freely. Recording were digitally captured and transcribed verbatim for analysis with participants' consent.

### 3.5 Procedure

The interview questions were given to the 10 participants so that they would prepare for the interview. Essentially, this strategy is meant to prepare them at a level where they gather relevant data regarding UDL implementation in their schools so that it becomes easy for them to answer the questions that were posed during the interview.

### 3.6 Instruments

Below are the questions that were used in the interview:

1. How well do you know Universal Design for Learning (UDL) and its principles for accommodating diverse learning needs?
2. What are your perceived merits/ demerits of UDL to students?
3. What is your perception of how UDL should be implemented in your school?
4. How do you view the importance of UDL in your school?" What is your perception in application of UDL within K12 settings, especially in supporting students with special needs?
5. Do you believe that UDL is feasible and practical for implementation in your classroom, considering the diverse needs of your students?
6. What factors, in your opinion, contribute to the feasibility or challenges of implementing UDL in your teaching practice?
7. What specific barriers or limitations do you anticipate in applying the framework principles to address concerns for learners with learning disabilities?
8. What support or resources do you believe would be necessary to facilitate successful implementation of UDL for students with learning disabilities in your classroom?
9. What specific resources or supports do you believe are necessary within your classroom to successfully implement UDL for students with learning disabilities?"
10. What forms of support do you need from the school district to facilitate UDL implementation across your school?"

### 3.7 Data Collection and Analysis

Respondents were briefed on the study's objectives before the interviews to help them prepare. Personal conversations were conducted to establish rapport and confirm their willingness to participate. The data collected during the interviews were analyzed systematically against the research questions. A thematic analysis approach was employed, whereby the responses were reviewed and coded to identify recurring themes.

The coding process involved multiple rounds of reading and refining in the identification of themes. Major themes were coded by identifying the number of times a topic was discussed by participants. To enhance the reliability and validity of the analysis, triangulation methods were applied. This included cross-checking findings with existing literature and peer debriefing to confirm the accuracy of the emerging themes. Additionally, inter-code reliability checks were conducted by having a second researcher review and validate the coding process.

### 3.8 Researcher Bias

Recognizing the potential for researcher bias, steps were taken to mitigate its influence. Some possible research biases include researcher confirmation bias, selection bias, and observer bias from the tendency to interpret responses using pre-existing beliefs, and respondents' social desirability bias. Cairns-Lee et al. (2022) acknowledge the need to use open-ended, non-leading interview questions, and participants were encouraged to elaborate freely. Before publication, the study findings were shared with the participants to validate and countercheck interpretations. Regular reflection and peer feedback further helped in minimizing subjective interpretation.

To promote the validity of the study, various strategies were used. The intervention was provided in terms of content validity because the questions of the interview were created as a result of a comprehensive analysis of the UDL literature and their examination by a team of specialists in the fields of education and instructional design. A pilot interview was also done to make the questions clear and relevant before involving the entire sample. Also, the member checking was applied by giving the participants summaries of their answers and initial themes so that they could check them and clarify whether they misinterpreted anything. Triangulation was ensured by contrasting the emerging themes with the results of the previous research, such that the interpretations would be consistent with the existing data but also indicate new contributions.

### 3.9 Validity and Reliability

To ensure consistency, various systematic procedures were used. Each of the interviews was conducted according to the same semi-structured protocol, and it was recorded and transcribed word-to-word to eliminate loss of data. The data was recoded several times, and initial codes were developed into themes using an iterative process. To assess the coding consistency, a second researcher was commissioned to conduct an inter-coder reliability check, where a subset of transcripts would be coded independently and the results analyzed in comparison to the original coding. Thematic inconsistencies were also addressed and solved in a consensus, which enhanced the validity of the thematic framework. Through

these measures, the research study reduced the chances of researcher bias, enhanced the quality of research findings.

#### 4. Results

The integration of UDL in educational settings shows great potential for fostering inclusive learning environments. Through thematic analysis of the interview data, several key themes were identified. Table 1 below shows A thematic map showing the relationships between identified themes in the findings.

**Table 3: Thematic Map of UDL Implementation and Challenges**

	<b>Description / Indicators</b>	<b>Frequency (based on interviews)</b>	<b>Impact on Teaching Practice</b>	<b>Priority Level</b>
<b>1. Lack of Adequate Training and Professional Development</b>	Insufficient training in UDL principles; lack of workshops, seminars, and ongoing skill-building.	Mentioned in 80% of interviews	Teachers feel unprepared to apply UDL strategies effectively, limiting inclusivity and differentiation.	<b>High</b>
<b>2. Inadequate Resources and Infrastructure</b>	Limited assistive technologies, instructional materials, adaptable classrooms, and resource rooms; poor maintenance of tools.	~50% of interview time dedicated to this theme	Restricts the ability to implement UDL strategies effectively; students' diverse needs remain unmet.	<b>High</b>
<b>3. Limited Administrative and Leadership Support</b>	Lack of prioritization from leadership; difficulty securing funds/resources; weak policy guidance.	Repeatedly mentioned in interviews by 40 %)	Without leadership backing, UDL cannot be institutionalized; teachers lack direction and advocacy.	<b>Moderate-High</b>
<b>4. Workforce Development Gaps</b>	Shortage of UDL-trained teachers; limited peer-learning and collaboration opportunities.	Raised by 20% of participants	Results in uneven implementation and weak professional capacity for inclusive education.	<b>Moderate</b>
<b>5. Perceived Feasibility Concerns</b>	Teachers see UDL's potential but doubt its practicality in under-resourced schools; only a minority report success.	Noted by 10% of the participants	Creates skepticism, reducing motivation and commitment to UDL adoption.	<b>Moderate-Low</b>

These themes were weighted and prioritized based on the frequency of responses, the depth of discussion, and their explicit relevance to the research questions. For example, the theme of "Need for Enhanced Support and Training" emerged in 80% of the interviews. On the other hand, infrastructure-related challenges accounted for approximately 50% of interview time, showing how salience was determined. These insights provide valuable pathways for improving educational practices and ensuring that diverse student needs are met effectively.

In addition, divergent perspectives among participants were noted. While most emphasized the lack of training and resources, a minority of teachers reported moderate success in adapting UDL strategies within their existing classroom contexts. These contrasting viewpoints provide a more nuanced understanding of UDL's perceived feasibility.

#### **4.1 Perceptions of UDL Effectiveness and Challenges**

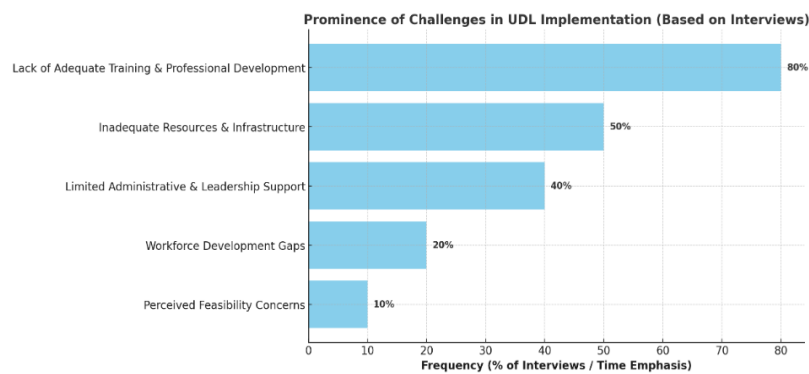
The interviews revealed a prevalent concern among teachers regarding the possibility of UDL implementation in their schools, with challenges including a lack of training, inadequate resources, and limited administrative support. During the interviews, teachers expressed a prevailing concern regarding the feasibility of implementation in their schools, particularly concerning students with learning disabilities.

One prominent challenge identified by several participants was the lack of adequate training and professional development. Participant 2 articulated this concern, stating, "We face significant obstacles in UDL implementation due to a lack of training and resources. Without proper training, it's difficult to effectively utilize UDL strategies in the classroom, especially for students with diverse learning needs, including those with learning disabilities."

In addition to insufficient training, teachers highlighted the issue of inadequate resources as a substantial barrier to UDL implementation. Participant 5 remarked, "Limited access to instructional materials and technologies poses a significant challenge in incorporating UDL principles into our teaching practices. Without the necessary resources, it's challenging to provide differentiated instruction to meet the diverse needs of all students, including those with learning disabilities."

Furthermore, several teachers noted the impact of limited administrative support on UDL implementation efforts. Participant 4 emphasized the standing of strong leadership stating, "Without the backing of school leadership, it's challenging to prioritize UDL implementation and secure necessary resources. We need administrative support to advocate for UDL initiatives and provide guidance on effective implementation strategies, especially for students with learning disabilities who require additional support."

Participant 5 was also skeptical of the implementation of UDL. Almutairi and Alsawayl (2023) confirm that teachers' habits and perceptions hugely impact theoretical developments in UDL. Instructors having a negative perception can reduce motivation and commitment to UDL adoption. Figure 1 below summarizes the frequency of key challenges in UDL implementation as reported by participants.



**Figure 1: Frequency of key Challenges in UDL Implementation**

Despite these challenges, teachers acknowledged the potential effectiveness of UDL in promoting inclusive education practices and enhancing learning outcomes. Participant 8 highlighted the impartial learning opportunities, stating, "UDL allows us to address the diverse needs of all students, including those with learning disabilities, by providing multiple means of representation, engagement, and expression. It promotes inclusivity and empowers students to succeed academically and socially."

Overall, teachers' perceptions of UDL effectiveness were tempered by the challenges they faced in implementing it effectively, particularly concerning students with learning disabilities. Their insights underscored the need for all-inclusive training, adequate resources, and strong administrative support to facilitate successful UDL application.

#### **4.2 Need for Enhanced Support and Training**

During the interviews, teachers underscored the critical need to increase support and training to address deficiencies and enhance student outcomes. Participant 1 emphasized the importance of expanding the number of educators trained in UDL to better meet the diverse learning needs. They stressed, "We need more teachers trained in UDL principles to effectively support students with diverse learning needs, including those with learning disabilities. Increasing the pool of trained educators will help ensure that all students receive the support they need to succeed academically."

Furthermore, participants advocated professional development. Participant 3 highlighted the importance of training for effective UDL implementation in the classroom. They stated, "We need continuous professional development to stay updated on best practices and practical strategies for implementing UDL. Workshops and seminars focused on UDL principles and practical application would be highly beneficial in enhancing our teaching practices and supporting students with diverse learning needs."

In addition to increasing support and training, teachers emphasized the importance of collaboration and shared resources to facilitate UDL implementation. Participant 6 highlighted the value of collaborative learning

communities in sharing ideas and resources for implementing UDL effectively. They stated, "Collaboration among educators is essential in sharing best practices and resources for UDL implementation. Creating collaborative learning communities where teachers can exchange ideas and support each other in implementing UDL strategies would be highly beneficial in meeting the diverse needs of all students." Overall, teachers emphasized the critical need for heightened institutional support, professional development, collaboration, and shared resources in facilitating effective UDL implementation.

#### **4.3 Infrastructure and Resources for UDL Implementation**

Teachers highlighted the pressing need for enhanced infrastructure and resources. A prevalent theme highlighted by participants was the necessity for dedicated spaces, such as resource rooms or learning centers, equipped with appropriate materials and tools tailored for UDL implementation. These spaces would offer a supportive environment where teachers can deliver differentiated instruction, and students can access specialized support as needed.

Participant 3 succinctly captured this sentiment, stating, "We need dedicated spaces equipped with the necessary materials and tools for implementing UDL strategies effectively. Increasing the availability of UDL-focused classes or workshops would provide more targeted support for students and professional development opportunities for teachers."

Additionally, participants stressed the urgency of addressing infrastructure and resource deficits within mainstream classrooms. Participant 2 emphasized the importance of providing access to assistive technology, adaptable furniture, and specialized instructional materials to create inclusive learning environments. They noted, " We require additional designated areas and support tools to successfully apply Universal Design for Learning (UDL) strategies. This encompasses the availability of assistive technology, flexible furniture, and tailored teaching materials."

Moreover, participants highlighted the need for ongoing maintenance and updates of infrastructure and resources to ensure their accessibility and functionality over time. Participant 5 emphasized this point, stating, "It's essential to prioritize ongoing maintenance and updates of infrastructure and resources to ensure their accessibility and functionality. Regular maintenance of assistive technology and adaptive equipment is critical in providing students with the support they need to succeed academically."

Overall, teachers underscored the indispensable role of infrastructure and resources in supporting UDL implementation. Their insights, supported by quotations, underscored the importance of investing in dedicated spaces, providing essential tools and materials for equitable learning.

#### **4.4 Workforce Development and Instructional Needs**

Teachers stressed the pivotal role of school administrators in supporting UDL implementation and called for increased administrative support, including access to resources and ongoing training. Participant 1 proposed utilizing diverse

teaching aid stating, "We need access to a wide range of teaching aids and interactive methods to cater to diverse learning styles and abilities. With adequate resources and support, we can create engaging and inclusive learning experiences for all students." Furthermore, Participant 6 emphasized equipping teachers with needed skills and knowledge for effective UDL implementation. They highlighted, "Intensive training programs are essential to ensure that teachers are equipped with the skills and knowledge needed to implement UDL effectively. Ongoing professional development opportunities will empower teachers to address the diverse needs of their students and foster inclusive learning environments."

Additionally, Participant 5 underscored the importance of collaboration among educators in supporting UDL implementation. They emphasized the need for peer learning and collaboration in implementing UDL effectively. Participant 5 stated, "We need opportunities for peer learning and collaboration to share best practices and support each other in implementing UDL effectively. Collaborative learning communities can provide valuable support and resources for teachers as they work to create inclusive learning environments." Overall, teachers highlighted the critical need for increased administrative support, intensive training programs, and opportunities for collaboration among educators to support UDL implementation effectively.

## **5. Discussion**

The outcomes of the study provide meaningful intuitions into the perceptions, challenges, and recommendations shared by teachers regarding the implementation of Universal Design for Learning (UDL). While the findings highlight the potential of UDL to foster inclusive learning environments, they also reveal the significant challenges in applying UDL principles in real-world contexts. Teachers expressed concerns about the feasibility of the model. Key challenges included inadequate training, limited resources, and insufficient administrative support. These barriers indicate a pressing need for systemic efforts professional development.

These findings connect directly with the academic framework, which positions UDL as a proactive approach to inclusivity grounded in cognitive and learning sciences. For instance, the study of resource availability underscores the impact on diverse means of curriculum dissemination, engagement and student expression. UDL theory emphasizes flexibility and accessibility for all learners; the persistent challenges, such as lack of resources and administrative backing, highlight the gap that exist in putting theory to practice.

These challenges align with findings from previous research. A systematic literature review synthesized 32 studies (1999 -2023) focusing on UDL use in K-12 educational settings. The review identified multiple obstacles on the mismatch between UDL theoretical background and implementation. in (Zhang et al., 2024). The persistence of such barriers, despite the theoretical promise of UDL, may stem from structural issues within school systems, such as insufficient professional development frameworks, resource allocation policies, and limited institutional

incentives for adopting new pedagogical models. This tension underscores the difficulty of translating theory into sustainable practice.

In addressing the barriers, this study stressed the need of professional expansion opportunities tailored to UDL. Collaboration among educators was highlighted as a valuable strategy for sharing best practices and overcoming barriers. Participants also called for greater investment in infrastructure and resources to support UDL implementation, such as updated instructional materials and accessible learning tools. Moreover, the role of school administrators remains key in UDL implementation. Participants noted that administrative support, including ongoing training and opportunities for collaboration, is essential to empower educators and create inclusive learning environments.

## **6. Study Conclusion**

The paper examined the perception of teachers in Saudi Arabia regarding UDL implementation primarily regarding promoting inclusivity for students with learning disabilities. 10 instructors were interviewed, with results showing existing barriers, such as lack of proper training, resources, and administrative support, as well as the uncertainty/skepticism in implementation. Simultaneously, respondents were hopeful that UDL could improve the engagement, equity, and outcomes of students, given the right support. The findings confirm the theoretical basis of UDL as a model of inclusive education, despite there being a disconnect between theory and practice. There is a need for extensive investment in teacher training, infrastructure, and administration support.

The remedy in this gap would rest in the alignment of policy pledges to classroom facts and the incorporation of UDL in the further professional growth and development plans of schools. The findings give feasible guidelines to education stakeholders in the future. The insights enable schools and districts to design intentional training programs, plan resource allocation, and build communities of practice. Policy makers can use these findings to develop policies that adapt the application of UDL to national education interests. Lastly, based on the translations of the teachers' perceptions into actual action, UDL will be brought to the mission statement of offering all Saudi learners with equitable learning opportunity.

### **6.1 Study Limitations**

While affirming the success of the study for rich qualitative insights, it is also imperative to consider the study's limitations. The study relied on self-reported data, which can be impacted by biases and inaccuracies. Although efforts were made to encourage candid responses, the potential for subjective interpretation remains. The use of a small study sample may also increase the risk of generalization.

Future studies should use additional methods, like classroom observations or analysis of student outcomes, to validate the findings. Additionally, the study utilized general educators. Using special education teachers may provide unique

and valuable insights. This exclusion limits the scope of the findings and underscores the need for future studies with a more inclusive approach from diverse stakeholders. Nonetheless, the depth of the data offers valuable perspectives on the nuanced experiences of teachers navigating UDL implementation.

## **6.2 Study Recommendations**

Further studies should explore the perspectives of diverse stakeholders for a more comprehensive understanding of the study topic. Including these perspectives in the unique strategies and challenges involved in supporting students with disabilities. Expanding the participant base to special educators would enrich the evidence base and highlight additional classroom realities. Longitudinal studies are also endorsed to track the impact of UDL implementation over time, to offer long-term insights. Future studies would enable researchers to observe how training, resources, and policies influence implementation trajectories across multiple years. Furthermore, examining contextual factors, such as administrative policies and cultural influences, could deepen understanding of the conditions necessary for successful adoption of UDL.

Future research can build on this by performing cross-cultural comparative studies, comparing UDL implementation in Saudi Arabia to other education systems. This would give a better understanding of the role of cultural, institutional, and policy settings in the UDL outcomes. Lastly, additional studies need to go beyond teacher perceptions and direct analysis of student outcomes in UDL-implemented contexts. Research on the role of UDL on student engagement would be a much better demonstration of its efficacy and would provide a more comprehensive picture of the influence UDL has on diverse students.

## **6.3 Implications for Practice**

The findings highlight several actionable inferences for educational practice. In providing a pathway for implementations, the implications and recommendations can be integrated within the Vision 2030 framework in promoting inclusive learning. UDL can be used as an approach for transforming the education system by providing a proactive framework in guiding curriculum development, strengthening teachers' inclusive attitudes, and guiding resource distribution.

Policymakers in Saudi Arabia need to establish clearer guidelines for UDL integration, prioritize funding for assistive technologies, and mandate structured professional development to build teacher capacity. At the school level, policies that incentivize collaboration, provide release time for training, and embed UDL into curriculum planning could help bridge the gap between policy ambitions and classroom realities. School administrators should prioritize training and professional growth. The implementation pathway is summarized in Figure 2 below.

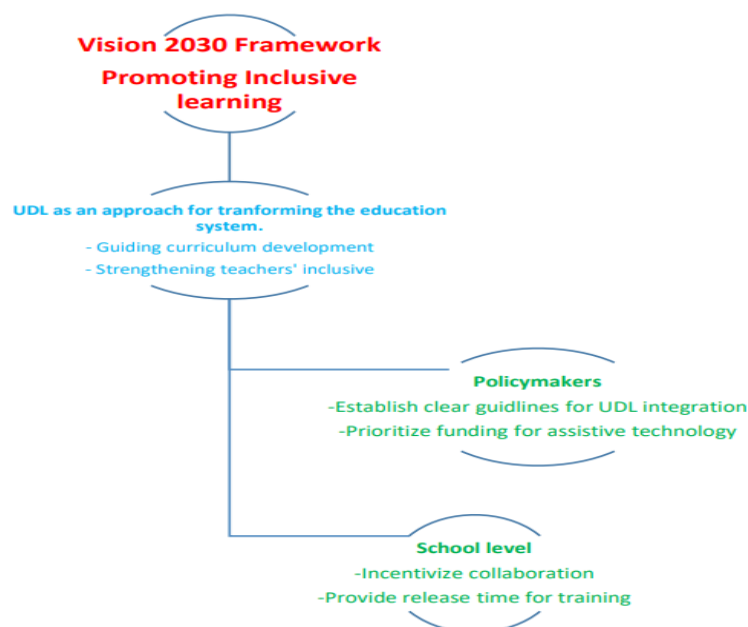


Figure 2: Support Structures for Effective UDL Implementation

## 7. Funding

This study is supported via funding from Prince Sattam bin Abdulaziz University project number (PSAU/2025/R/1447).

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