

Universal Design for Learning (UDL): The Application of UDL in Early Childhood Inclusive Classrooms from Jordanian Teacher's Point of View.

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ABSTRACT:

In light of a number of factors, this study aimed to determine the extent to which early childhood educators in inclusive schools in the capital Amman utilize the concepts of Universal Design for Learning. To achieve the objectives of the study, the descriptive-analytical method was used, where the sample was selected by the available method and consisted of (300) male and female teachers. To achieve the objectives of the study, a self-assessment scale was prepared for the principles of Universal Design for Learning, which consists of (41) items, distributed over three dimensions: the principle of participation, the principle of representation, and the principle of performance and expression. The results indicated that the degree of application of the principles of Universal Design for Learning by early childhood teachers in inclusive schools in the capital Amman from their point of view was moderate, and the results of the study indicated that there were no statistically significant differences attributed to the variable of gender and educational qualification, while the results indicated that there were statistically significant differences attributed to the variable of years of experience in favor of years of experience more than 10 years.

Keywords: Universal Design for Learning, Inclusive Education, students with Disabilities, Early Childhood

Introduction

Educational systems seek the best methods of educational care for students with disabilities by achieving cooperation between general education teachers and special education teachers on the one hand, and students with disabilities and their peers on the other hand. Laws and legislations come to promote the idea of inclusive education for students with disabilities in various

educational institutions, as they include the Individual with Disabilities Education Act (IDEA) and the No Child Left Behind (NCLB) Law on the social and educational rights of students with disabilities and their education in less restrictive environments (Clarke et al., 2016). Attending a regular school for students with disabilities provides them with equal learning opportunities with their regular peers and helps

them to grow socially and academically. Education of persons with disabilities in mainstream schools is a right guaranteed by legislation and laws locally and internationally (Angelides & Aravi, 2007).

Because inclusion guarantees the rights of all children regardless of their differences, needs and abilities, all students have the right to learn and prohibit discrimination on the basis of disability, the universal design for learning (UDL) framework is a teaching approach that aims to use a variety of teaching, participation, and assessment methods to remove any barriers to learning in the field of architecture through the idea of universal design (UD) as well as the results of special research in the science of growth and learning and its relationship to brain function (Dalton, 2017).

Early childhood is a critical period in the academic and social development of children, especially for children with disabilities who need specialized teaching strategies to enhance their skills and abilities. One of the pedagogical measures that has been proven to facilitate learning for this group is (UDL), where both the practices of the National Association for the Education of Young Children (NAEYC) and the Early Childhood Department The recommended Division of Early Childhood (DEC) is aligned with the concept of Universal Design for Learning (UDL). Universal Design for Learning is a framework to proactively address the needs of diverse and exceptional learners by ensuring that all children have access to the curriculum. Universal Design for learning involves the use of multiple means of participation, multiple means of representation, and multiple means of expression (Lohmann, Hovey, & Gauvreau, 2018).

Considering the aforementioned, the significance of carrying out the present study, which seeks to reveal the degree to which early childhood teachers in inclusive public schools in the capital Amman apply the principles of Universal Design for Learning in light of a set of variables, especially since it is one of the few studies in the field of researchers' knowledge that dealt with the

principles of Universal Design for Learning in this context.

Theoretical Framework and Previous Studies

First: Universal Design for Learning (UDL)

In today's early childhood classrooms, teachers are required to meet the diverse learning needs of children with different cultural and linguistic backgrounds, and with different abilities and needs, while adhering to the guidelines set by the National Association for the Education of Young Children (NAEYC) and (DEC) the Division of Early Childhood (Lohmann, Hovey & Gauvreau, 2018). Universal Design for Learning allows teachers to remove barriers to learning by giving students freedom of expression and choice. Universal Design for Learning cannot be effective in the absence of inclusion. When inclusion is present, and the Universal Design for Learning is applied, students have real opportunities to develop their abilities (Bonnici, 2022).

Universal Design for Learning (UDL), an instructional design framework to address a wide range of learner diversity in particularly inclusive schools, can be applied effectively to enable all students to access, understand, and participate in learning different skills. Universal Design for Learning supports constructivist learning principles and UDL principles encourage the development of expert learners through personal engagement and motivation (Dalton, 2017).

The principles of Universal design for learning include three basic concepts:

First: Engagement: It is to focus on students' interests and identities, to affirm and support them, to emphasize the role of belonging in teaching and learning, to enhance the role of fun and play for students and teachers alike, and to provide multiple examples that can be modified in their degree of complexity to meet a range of learning needs.

Second: Representation : Representation means the diversity of identities and perspectives in an authentic way, in accordance with students, taking into account their perceptions, cultures, and languages, and using strategies that enable

the student to practice tasks with different levels of support, and to demonstrate his knowledge and skills in a variety of ways.

Third: Performance and Expression : It includes accepting and appreciating a wide range of forms of communication, focusing on overlooked or overlooked forms of expression, and teachers can design and plan instruction that includes creating interesting and diverse learning opportunities that motivate students according to their personal backgrounds and interests (CAST, 2024).

These principles aim to ensure the right of all students to education regardless of their disabilities. Universal Design for Learning (UDL) also encourages the use of inclusive methods and techniques that can be applied in school. In this way, all children receive the support needed to develop their abilities successfully, and their school life is positively enriched. It is best that the way tasks are presented is different from traditional methods in which students could not participate. When teachers apply the UDL approach, they can reach all students regardless of their abilities. Teachers should always keep in mind that students are highly diverse learners. They need to be aware of students' different skills and learning styles so that they can meet their needs and enhance their strengths, while maintaining their interest and motivation to reach their fullest potential (Bonnici, 2022).

Second: Early Childhood

The 2030 Agenda for Sustainable Development, launched by the United Nations in 2015, has positioned early childhood education as an indispensable cornerstone. The goal was not just to provide school seats, but to focus on access equity to ensure that every child, regardless of their background, has a strong educational foundation before entering school. Investing in this stage not only develops children's minds, but also extends to their mental and physical health and builds their social skills, which directly contributes to reducing class and social disparities and creating an inclusive educational environment (UNICEF, 2019).

Early childhood is a sensitive stage in which a

child's brain is flexible and responsive to change (World Health Organization, 2018) Investing in this stage is one of the most effective ways to improve growth, enhance skills and abilities, especially since this stage is characterized by what are called critical developmental periods, which are periods when the child is most responsive to learning, and this stage lays the foundation for language development, literacy acquisition, and cognitive processes (Olusanya, et al., 2023).

While the early years of life are important for all children in general, they are even more important for children with disabilities who suffer from many types of developmental delays, which emphasizes the need to provide special educational services to these children, as a child with a disability who can access a kindergarten program at the age of five has a better chance of developing the essential skills needed to succeed later in life (Houlihan, 2017).

Efforts have focused on building the capacity of early childhood teachers in early intervention and education through the Disability Education Act of 1986, which provided for "training on exemplary models and practices for government and local employees who provide services to children with disabilities from birth to age eight (Bruder, et al., 2020). This law reflects the important role that early childhood educators play in supporting, developing, and educating children (Lipscomb, et al., 2022).

Previous Studies

Vitelli, 2015 conducted a study that aimed to investigate the extent to which the Universal Design for Learning (UDL) framework was included in pre-service general education teacher preparation programs, the study adopted the descriptive method, where an electronic questionnaire was applied to the faculty members in the teacher preparation programs participating in the Teacher Quality Enhancement (TQP) grants. In the USA. The results showed that the teaching of EHS principles in educational programs is prevalent, but the depth of this framework is still limited and the results described the level of awareness of EHS principles and instruction provided in targeted

programs as modest. Barriers to effective teaching of the framework were also apparent, as they were represented by a lack of public awareness among some faculty and a lack of deep knowledge on how to implement Universal Design for Learning. The study recommended emphasizing that UDL is an essential input to promote inclusive practices and improve learning outcomes for all students, and recommended the need to enhance the professional knowledge of university faculty members on this framework to ensure that teachers are qualified to reduce learning barriers in regular classrooms.

A study (Smith Canter et al., 2017) in the United States of America explored the impact of a professional development program on teachers' perceptions and practices related to the principles of Universal Design for Learning (UDL) within inclusive classrooms in public schools. The study followed a mixed method, which was applied to a sample of 14 teachers from general education and special education teachers working in primary, middle, and secondary education. To achieve the objectives of the study, The researchers used multiple tools including a questionnaire, a note card based on the teachers' checklist of UDL principles, and semi-structured interviews with participants. The study found a substantial improvement in teachers' knowledge and perceptions of Universal Design for Learning. During the interviews, teachers confirmed that adopting the UDL framework made them more aware of the need to ensure accessibility of the curriculum, and help them think creatively to provide educational alternatives that meet the needs of all students. The study concluded that the provision of intensive hands-on training coupled with technical support and necessary resources effectively contributes to the transformation of teaching practices to become more inclusive, enhancing the chances of success and participation of students with diverse needs in general education environments.

To find out the impact of teachers' experience of the principles of Universal Design for Learning (UDL) for graduates and its impact on how they

learn this framework and plan for its practical application in classrooms. Evmenova, 2018 conducted a study that adopted the Mixed Methods curriculum in the United States of America through an online course, so that the study sample consisted of (70) teachers in general education and special education from preschool to twelfth grade, in addition to specialists and administrators. In the study, the draft teaching plans were analyzed according to the UDL principles prepared by the participants. The results showed that all participants were able to identify UDL criteria and checkpoints in the lessons observed across different grades and learning materials. In addition, there was a significant increase in the frequency of using UDL strategies to address the diversity of students' needs. 93% of teachers reported an increase in confidence in their understanding of the UDL. At the end of the course, they expressed a strong desire to integrate these strategies into their learning environments regardless of the stage or subject. The study recommended the importance of shifting teachers' mindset towards adopting flexibility in teaching and providing multiple options for students to enhance their independence, and the need to provide more professional development programs around this framework within schools.

A study conducted in the United States of America (Owiny et al., 2019) sought to explore the extent to which trainee teachers (pre-service) are able to apply the principles of Universal Design for Learning (UDL) in the preparation of their study plans. The mixed curriculum was adopted in the study, where the UDL Lesson Plan Rubric Evaluation Scale was used as a key tool for analyzing and evaluating the study plans prepared by the participants, in addition to analyzing the qualitative content of the comments and reflections provided by the participants. The results showed a significant improvement in teachers' ability to apply the principles of UDL when comparing pre-training plans with those prepared immediately after training. The study also recommended that face-to-face and structured training on the UDL model effectively contributes to changing

teachers' mindset towards a more flexible instructional design that accommodates the diversity of classrooms from the initial planning stage.

One of the studies that was interested in reviewing and analyzing the previous literature was a study (**Dewi et al., 2019**), which aimed to evaluate the effectiveness of the application of the Universal Design for Learning Framework (UDL) in improving the quality of students' learning process. The study adopted the methodology of meta-analysis of (12) previous studies published in peer-reviewed scientific journals between 2013 and 2017, and these studies included various educational stages from primary school to university education, and targeted various groups of students. The results showed that the application of the principles of UDL has significantly contributed to improving the quality of the learning process for all students, regardless of their abilities and characteristics. Training in this framework also contributed to enhancing academic and social inclusion within inclusive classrooms, raising the level of self-efficacy and self-confidence among learners, in addition to reducing stress and improving the interpersonal relationship between teacher and student. The study concluded that the UDL framework represents an effective solution to achieve academic success for all by removing environmental and educational barriers. It recommended that this framework should be adopted in both mainstream and inclusive schools, while emphasizing the importance of providing intensive training programs for teachers to enable them to develop flexible instructional planning skills according to this framework.

In Brazil, **Zerbato & Mendes, 2021** conducted a study that aimed to verify the effectiveness of a teacher training program based on the principles of Universal Design for Learning (UDL) in improving the participation and learning of students with disabilities in the regular classroom. The study adopted a collaborative research approach to produce knowledge and provide training at the same time, where (10) primary education teachers participated in the

study, including five early childhood teachers and (7) university students. The results indicated the effectiveness of training strategies based on the principles of UDL in developing teaching practices that are compatible with student diversity in the classroom. The results of the application of lesson plans, especially in early childhood, also showed that the use of UDL strategies enabled students with disabilities to participate effectively and actively in group activities. The results also confirmed that UDL framework helps remove learning barriers and provides diverse ways to participate, which promotes inclusion within the school. On the other hand, the study indicated that there are challenges in the school environment such as a lack of a culture of collaborative work among teachers, and the lack of sufficient time for joint planning. Training models that allow teachers to experience collaborative work and apply UDL principles, enabling them to address the challenges of student diversity in mainstream schools.

A study (**Bonnici, 2022**) examined the perceptions of Maltese teachers about the use of the Universal Design for Learning (UDL) framework and its relationship to inclusive classrooms at the primary level. The study sought to understand the level of teachers' awareness of this framework, the strategies used to reach students with diverse abilities, as well as the challenges facing its application in school reality. The Qualitative Study was used to conduct in-depth interviews with a sample of four teachers teaching in early childhood and primary years in public schools in Malta. The results showed a heightened awareness among teachers of the importance of an inclusive environment and that the UDL framework gives students an active role in the learning process and enhances their academic achievement and skills. Digital technology (e.g., tablets) has also emerged as a powerful and flexible tool, especially at the primary level, to increase access to the curriculum and individualize education, while early childhood teachers have focused more on visual aids and hands-on activities. The study identified significant obstacles to the optimal

implementation of UDL, foremost of which was the lack of time and the intensity of the curriculum. The results also indicated a lack of specialized and ongoing training on how to integrate the principles of UDL in practice, in addition to financial challenges related to school budgets and the provision of resources for planning. The study concluded that adopting the principles of UDL requires a comprehensive review of the curriculum to be more flexible, and to provide sufficient time for teachers to collaborate and plan together.

Rusconi & Squillaci, 2023 conducted a systematic review that aimed to analyze the effects of UDL

courses on developing the competencies of teachers working in inclusive classrooms. The study adopted the methodology of systematic review of 12 studies extracted from various scientific databases, and the results were organized and analyzed based on the four dimensions of the Profile of Inclusive Teacher (PIT) namely: appreciating the diversity of learners, supporting all learners, working with others, and personal professional development. The studies included a review of samples of general education teachers and special education teachers, both before and during the pre-service stages. The review found that EBS training has significant effects on teachers' skills to appreciate learner diversity and enhance their perception of individual differences as an essential part of the learning process. In addition to the training contributing to improving the skills of planning and implementing accessible lessons. The study concluded that the EDF provides useful operational tools to support teachers in their practices in heterogeneous classrooms, and recommended that UDL principles should be integrated into teacher preparation programs to enhance their competencies in inclusive education.

In a systematic review that included a meta-analysis conducted by **Almeqdad et al., 2023**, it aimed to assess the effectiveness of the principles of Universal Design for Learning (UDL) in diverse educational environments. The review

included (13) experimental studies published in Arabic and English between 2015 and 2021, covering six different countries and targeting various educational stages from kindergarten to higher education. The results indicated that the application of the UDL principles significantly enhances learning outcomes. The study noted that the application of UDL principles contributes to reducing the gap between curriculum and learners by shifting the focus from learner inability to teaching and curriculum inability to meet everyone's needs. The study concluded that UDL represents a promising strategy to promote inclusivity and equity in education. It recommended that teachers and instructional designers should be encouraged to work collaboratively to plan and implement high-quality teaching and assessment based on UDL principles, to ensure the success of all students in inclusive learning environments.

Commenting on previous studies

Several studies have examined the impact of training on the UDL principles in improving lesson planning skills, such as the study of (Evmenova, 2018), the study of (Owiny et al., 2019), and the study of (Vitelli, 2015). While studies have dealt with the practical application and classroom practices according to the principles of UDL, such as the study of (Smith Canter et al., 2017). While other studies have aimed to provide a comprehensive view of the effectiveness of UDL. Based on the results of dozens of previous studies such as the study (Almeqdad et al., 2023) and the study (Dewi et al., 2019) in a systematic analysis of these studies. The study (Rusconi & Squillaci, 2023) and the study (Zerbato & Mendes, 2021) also aimed to analyze the effects of UDL training courses on developing the competencies of teachers working in inclusive schools. A study (Bonnici, 2022) examined teachers' perceptions about the use of the (UDL) framework and its relationship to inclusive classrooms in the primary stage.

It is clear from the presentation of previous studies that there is scientific evidence of the effectiveness of UDL in improving teaching practices, however, the UDL principles in early

childhood education for teachers has not been addressed, and this is what this study tries to answer, and the study seeks to provide tools that have acceptable honesty and consistency to be applied in early childhood. Most studies focused on elementary or general education and did not adequately study early classroom environments or the principles of UDL in early inclusive programs. The present study aims to find out the degree to which early childhood teachers apply the principles of UDL in inclusive schools in the capital Amman from their perspective and the impact of some demographic and occupational variables.

The study problem and its questions

The Ten-Year Plan for Inclusive Education represents a qualitative transformation in the educational system towards full inclusion, as it sets a time frame for the integration of students with disabilities in regular classrooms as their inherent right. As this strategy moves to the stages of implementation in the field, there is an urgent need to enhance teachers' competencies to keep pace with this transformation, as the new role of the teacher requires the teacher to possess various skills to meet the needs of students and modify the classroom environment to suit the differences in abilities (Ministry of Education, 2020).

Early childhood is the cornerstone of the success of the national directions established by the Ten-Year Plan for Inclusive Education, as this stage requires a high sensitivity in dealing with the natural diversity among students in their tendencies and developmental abilities. As inclusive schools welcome children with disabilities at an early age, there is an urgent need to provide teachers with accurate scientific tools to understand this diversity, foremost among them the principles of UDL. Providing teachers with these skills allows them to understand the functions behind the diversity of abilities and needs Children facilitate the design of educational interventions that enhance learning opportunities and social inclusion, rather than relying on traditional methods that may not take into account the broad individual differences at this

critical age stage (Dewi et al., 2019).

The adoption of the principles of UDL within daily classroom practices contributes to building a safe, stimulating and receptive learning environment for students, capable of accommodating the needs of children with developmental disorders alongside their peers, which embodies the essence of full inclusion that the Ten-Year Plan seeks to achieve by moving from merely receiving children to providing specialized support that suits their individual characteristics and needs.

Hence, the problem of the current study can be identified in answering the following two questions:

- Question 1: To what extent do early childhood teachers apply the principles of Universal Design for Learning from their point of view?
- Question 2: Are there any statistically significant differences at the level of significance ($\alpha=0.05$) in the degree of early childhood teachers' application of the principles of Universal Design for Learning from their point of view due to variables (gender, years of experience, educational qualification)?

The importance of the study

The theoretical importance of the study is to provide a scale with connotations of honesty and consistency that measures the degree of application of Universal Design for Learning principles among early childhood teachers, in addition to the interest of this study in the integration of students with disabilities in early childhood in public schools, and this study will contribute to providing research data that can benefit researchers on the principles of UDL for early childhood learning. The practical importance of guiding decision-makers in improving the public policies in place in the field of early childhood comes towards the preparation and development of training programs that are concerned with practices related to the principles of UDL for teachers, which can contribute to improving the teaching performance of teachers, especially in inclusive environments.

Method and Procedures

Study Methodology

To achieve the objectives of the study, the descriptive-analytical approach was followed, and it is the most appropriate method for such studies to answer its questions.

Study population and sample

In order to achieve the objectives of the study, an

accessible sample of (300) teachers from the study community from the early childhood stage in inclusive schools in the capital Amman was selected during the second semester of the year (2025/2026). They were selected according to the available method and the study tool was distributed to them electronically, and all the retrieved questionnaires were subject to coding and analysis.

Table (1) shows the distribution of the sample members:

Study Variables	Categories		Repetition		Percentage	
Gender	Female		188		62.7	
	Male		112		37.3	
Years of Experience		Less than 5 years		48		16.0
		5-10 years		97		32.3
		More than 10 years		155		51.7
Educational Qualification		Diploma		44		14.7
		Bachelor		186		62.0
		Postgraduate studies		70		23.3
Total			300		100.0%	

Table (1) Distribution of study subjects according to their demographic variables

Study Tool

To achieve the objectives of the study, the theoretical literature was reviewed, and the relevant previous studies were referred to as a study (Spooner et al., 2007) (Unluol Unal et al., 2022) (Rusconi & Squillaci, 2023) with the aim of developing the tool in the form of a questionnaire to identify the degree of application of the principles of UDL by early childhood teachers in

inclusive schools in the capital, Amman, based on the theoretical literature and previous studies on the subject, as the tool consisted of (41) paragraphs distributed over three main areas: (the field of the principle of participation (18 items), the field of the principle of representation (14 items), and the field of the principle of performance and expression (9 paragraphs)). The five-point Likert scale was also adopted: (always (5), often (4), sometimes (3), rarely (2), never (1))

to answer paragraphs.

The Validity of the Study Tool

A. Honesty of the arbitrators

In order to verify the apparent truthfulness of the content of the paragraphs of the study tool, it was presented in its initial form to the group of (8) referees with specialization and experience in the field of special education, measurement and evaluation from the faculty members in Jordanian universities, who number (8) referees. They were asked to express their opinions on the accuracy and correctness of paragraphs in terms of: (clarity of the paragraphs and linguistic formulation, their suitability to measure what they were designed for, the extent to which the paragraphs belong to the field), and to make any observations of addition, modification or deletion of what they deem appropriate on the paragraphs. All the

observations from the arbitrators were taken into account and the proposed amendments were made, which were unanimously agreed upon by (80%) of the arbitrators, as a criterion for the judgment, and the paragraphs that were unamended were retained.

B. Authenticity of the internal construction

In order to verify the validity of the internal construction of the paragraphs of the tool and the extent of its contribution from a statistical point of view, it was applied to a survey sample of (30) teachers from the community and outside the target sample, and Pearson's correlation coefficients were extracted between the paragraphs and the field to which they belong, and their correlation with the total score of the performance, and Table (2) shows the results of this:

Table (2). The correlation coefficients of the paragraphs with the domain to which it belongs and the overall score of the instrument

Scope of the principle of participation			Representation Principle Field			The Field of Performance and Expression		
#	Correlation coefficient with		#	Correlation coefficient with		#	Correlation coefficient with	
	Scope	The tool as a whole		Scope	The tool as a whole		Scope	The tool as a whole
1	0.781**	0.692 **	19	**0.720	**0.636	33	**0.753	**0.632
2	**0.809	**0.688	20	**0.716	**0.617	34	**0.796	**0.654
3	**0.844	**0.687	21	0.773**	0.622 **	35	**0.782	**0.625
4	0.797**	0.699 **	22	0.811**	0.631 **	36	**0.738	**0.613
5	**0.756	**0.655	23	0.792**	0.622 **	37	**0.801	**0.637
6	**0.779	**0.643	24	0.741**	0.656 **	38	**0.799	**0.611
7	**0.728	**0.680	25	0.779**	0.647 **	39	**0.785	**0.608
8	**0.792	**0.630	26	0.763**	0.608 **	40	**0.791	**0.670

9	**0.738	**0.680	27	0.797**	0.663 **	41	**0.781	**0.696
10	**0.778	**0.666	28	0.777**	0.749 **			
11	**0.708	**0.646	29	0.711**	0.628 **			
12	**0.741	**0.647	30	0.758**	0.634 **			
13	**0.744	**0.637	31	0.766**	0.612 **			
14	**0.765	**0.652	32	0.743**	0.654 **			
15	**0.792	**0.611						
16	**0.700	**0.663						
17	**0.763	**0.651						
18	**0.749	**0.604						
Domain link with the tool as a whole =			Domain link with the tool as a whole =			Domain link with the tool as a whole =		
0.912**			0.902**			0.898**		

**** Statistically significant at the significance level ($\alpha=0.01$)**

Table (2) shows that the values of the paragraphs' correlation coefficients with the domain to which it belongs ranged between (0.700 – 0.844), and the values of the paragraphs correlation coefficients with the total score of the instrument ranged between (0.604 – 0.699). All these values were statistically significant at ($0.01=\alpha$). As indicated by the existence of high and statistically significant correlation coefficients between the total score of the domain and the instrument as a whole, the correlation coefficients ranged

between (0.912 – 0.898), and these values were statistically significant at ($0.01=\alpha$), which indicates the existence of a degree of Honesty is the internal construction of the tool.

Stability of the study tool

In order to verify the stability of the study tool, it was applied to the survey sample, and the internal consistency coefficients of the instrument paragraphs were calculated using the Cronbach–Alpha coefficient, and Table (4) shows this.

Table (4). Internal consistency stability coefficients (Cronbach's alpha) Study tool

Domains	Cronbach Alpha	Number of paragraphs
Scope of the principle of participation	0.887	18
Representation Principle Field	0.873	14
The Field of Performance and Expression	0.818	9
The tool as a whole	0.925	41

Table (4) shows the values of the internal consistency stability coefficients using Cronbach's alpha coefficient for the paragraphs

of the study tool, as the stability coefficients on the domains ranged between (0.818-0.887), and the value of the stability coefficient for the

instrument as a whole was (0.925), and these values are good in light of what the previous studies indicated.

Study Variables

The study included the following variables:

The dependent variable, which is: the application of the principles of UDL by early childhood teachers from their point of view.

Independent variables, which are:

gender, and it has two categories: (female, male).

Years of experience, and has categories: (less than 5 years, 5-10 years, more than 10 years).

Academic qualification, including: (Diploma, Bachelor's, Postgraduate Studies).

Study Procedures:

- Addressing the official authorities in the Ministry of Education to obtain the necessary official and technical approvals to participate in the study procedures.
- Compiling and translating theoretical literature and previous studies and employing them for the purposes of study.
- Preparing and codifying the study tool and extracting psychometric characteristics to ensure its validity and consistency.
- The study tool was refereed by presenting it to a group of specialized arbitrators to verify its logical and apparent truthfulness, consisting of (8) professors specialized in counseling, psychology and special education who hold a doctorate degree from the departments of psychology in Jordanian universities in psychological counseling, mental health and special education.
- Collecting demographic information in an organized way and applying the study scale to select the study members and identify the characteristics of the study community.
- Data entry into the computer and processing it using the Social Sciences Statistical Software Package (SPSS), and performing the

necessary statistical analyses represented in the extraction of repeats, percentages, arithmetic averages, and standard deviations.

Statistical processing

To answer the questions of the study, the data were processed using SPSS software, as follows:

- **To answer the first question**, arithmetic averages and standard deviations were extracted.
- **To answer the second question**, a three-way MANOVA test was used between the average responses of the sample on the instrument for the independent variables in the study.
- The Pearson correlation coefficient was used to find the validity of the internal construction. The Cronbach–Alpha equation was also used to verify the stability of the instrument.
- To correct the study tool, the five-point scale was adopted and the following standard values were used: from (1.00-2.33) low score, from (3.67-2.34) medium score, and from (3.68-5.00) high score to evaluate the degree of response of the study sample to the paragraphs of the tool. For the purposes of analyzing the results and judging the values of the arithmetic averages of the paragraphs, the following equation was adopted:

$$1.33 = \frac{1 - 5}{3} = \frac{\text{Minimum number of alternatives} - \text{Maximum number of alternatives}}{\text{Number of levels}}$$

Study Results

The results of the first question: "**To what extent do early childhood teachers apply the principles of Universal Design for Learning from their point of view?**"

To answer the first question, the arithmetic averages and standard deviations, rank and score of the responses of the study subjects about the degree of early childhood teachers' application of the principles of Universal Design for Learning from their point of view were calculated, taking into account the descending order of the domains according to the averages, and Table (5) shows this:

Table (5) Mathematical Averages, Standard Deviations and Rank of Individuals' Responses to Domains The Degree of Early Childhood Teachers' Application of Universal Design for Learning Principles from Their Point of View in Descending Order

Number	Domains	Arithmetic averages	Standard deviations	Rank	Grade
1	Principle of Participation	3.60	0.53	1	Medium
2	The principle of representation	3.28	0.65	3	Medium
3	Principle of Performance and Expression	3.41	0.60	2	Medium
Total arithmetic average		3.45	0.43	Medium	

Table (5) shows that the degree of application of the principles of UDL by early childhood teachers from their point of view as a whole came with a score of (medium) with an arithmetic average of (3.45) and a standard deviation of (0.43). The fields also came in the following order: in the first place was "the field of the principle of participation" with a score of (medium) with an arithmetic average of (3.60) and a standard deviation of (0.53), and in the second place "the field of the principle of

performance and expression" with a score of (medium) with an arithmetic average of (3.41) and a standard deviation of (0.60), followed by the last place "the principle of representation" with a score of (medium) with an arithmetic average of (3.28) and a standard deviation of (0.65). The arithmetic averages, standard deviations, and the score for each of the paragraphs were also calculated, taking into account their descending order according to the arithmetic medians on the field, and Table (6) shows this:

Table (6) Mathematical Averages, Standard Deviations, Ranks and Grades for the Paragraphs of Each Field Arranged in Descending Order According to the Arithmetic Media.

#	Paragraph	Arithmetic Average	Standard deviation	Rank	Grade
3	Motivate students to communicate face-to-face	4.07	0.76	1	High
2	I encourage students to work in small groups	3.90	0.90	2	High
1	I use the lecture as a key tool in teaching	3.79	0.92	3	High

15	Provide a summary of the classroom content	3.78	0.874	High
8	Use a collaborative learning strategy	3.71	0.955	High
9	Give enough time to apply the concepts taught in class	3.69	0.886	High
11	Enhance learning with technology	3.67	0.787	Medium
16	Use repeated ratings	3.62	0.938	Medium
13	Providing Alternative Sources of Educational Content	3.56	0.829	Medium
4	Submit assignments in line with class objectives	3.53	0.7910	Medium
18	Make selections to complete course assignments during class	3.50	0.8011	Medium
14	Student Examples of Assessment Methods	3.49	0.9312	Medium
17	Respect the diversity of students	3.48	0.8213	Medium
6	Help students choose activities that align with their interests	3.47	1.0114	Medium
10	Oldest activities for students	3.46	0.9115	Medium

	through the Internet				
12	Easier communication process with students	3.44	0.92	16	Medium
5	Design study activities that match students' interests	3.37	1.11	17	Medium
7	Allow the student to build a self-monitoring system	3.26	0.95	18	Medium
The Principle of Participation as a Whole		3.60	0.53	Medium	
32	Employ the right tools for learning management	3.51	0.71	1	Medium
19	Present information in a variety of ways	3.49	1.00	2	Medium
20	I present information in different formats (maps, charts...)	3.48	0.91	3	Medium
21	Present class content in multiple ways	3.47	0.92	4	Medium
24	Provide quick feedback on assignments	3.29	0.74	5	Medium
22	Present the lesson summary to the students	3.28	0.83	6	Medium
31	I include copies of the video/audio presentations	3.26	0.84	7	Medium

25	Provide evidence and examples of tasks to include evaluation rules	3.23	0.788	Medium
23	Offer online resources for students to access to support learning	3.22	0.849	Medium
29	Give real-life examples	3.21	0.8910	Medium
28	Highlight important information in class	3.19	0.8911	Medium
27	Use Social Media	3.17	0.8412	Medium
26	Introduce the curriculum and overview of the course content	3.10	0.8413	Medium
30	Provide quick responses to homework	3.09	0.8814	Medium
The field of the principle of representation as a whole		3.28	0.65	Medium
35	Motivate students to use modern technology during class	3.62	0.961	Medium
36	Presenting Demonstration Activities for Students' Learning Outcomes	3.60	0.822	Medium
41	Use tools for conceptual mapping	3.50	0.853	Medium

39	I will clearly touch on the methods of the final evaluation of the course	3.46	0.874	Medium
33	I offer multiple types of multimedia-based tasks	3.36	0.655	Medium
34	Motivate students to self-monitor their behavior	3.35	0.686	Medium
38	I enable the student to select their preferred methods	3.29	0.857	Medium
37	I offer procedures that help students finish their activities	3.27	0.798	Medium
40	Provide students with feedback on their performance	3.25	1.039	Medium
The Principle of Performance and Expression as a Whole		3.41	0.60	Medium

Table (6) shows that the field of the principle of participation as a whole came with a score of (medium), with an arithmetic average of (3.60) and a standard deviation of (0.53), and paragraph (3) came in the highest rank, stating: "Motivate students to communicate face-to-face" with a score of (high), with an average of (4.07), while paragraph (7) came in the last place and stipulates: "Allow the student to build a self-monitoring system" with a score of (medium), with an average of (3.26).

The table also shows that the field of the principle of representation as a whole came with a score of

(medium), with an arithmetic average of (3.28) and a standard deviation of (0.65), and paragraph (32) that states: "I employ the appropriate tools for learning management" came in the highest rank with a score of (medium) and an arithmetic average of (3.51), while paragraph (30) came in the last place, which states: "Provide quick responses to educational assignments" with a score of (medium), with an average of (3.09).

It also shows that the field of performance and expression as a whole came with a score of (medium), with an arithmetic average of (3.41) and a standard deviation of (0.60), and paragraph

(35) that states: "Motivate students to use modern technology during the class" came in the highest rank with a score of (medium) and an arithmetic average of (3.62), while paragraph (40) came in the last place, which states: "I provide students with feedback on their performance" with a score of (medium) and an average of (3.25).

Results of the second question: "**Are there any statistically significant differences at the level of significance ($\alpha=0.05$) in the degree of application of the principles of UDL by early**

childhood teachers from their point of view due to variables (gender, years of experience, educational qualification)?"

To answer the second question, the arithmetic averages and standard deviations of the responses of the study members about the application of the principles of UDL by early childhood teachers according to the variables (**gender, years of experience, educational qualification**) were extracted, and the results show that:

Table (7). Mathematical Averages and Standard Deviations of the Responses of the Study Subjects on the Application of UDL Principles by Early Childhood Teachers According to the Study Variables

Variables	Categories	Statistical	Domains and overall score of the instrument			
			Principle of Participation	The principle of representation	Principle of Performance and Expression	Total Grade
Gender	Male	Arithmetic Average	3.59	3.36	3.45	3.48
		Standard deviation	0.59	0.74	0.61	0.47
	Female	Arithmetic Average	3.60	3.24	3.39	3.43
		Standard deviation	0.50	0.59	0.60	0.40
Years of Experience	Less than 5 years	Arithmetic Average	3.44	2.93	3.36	3.25
		Standard deviation	0.42	0.38	0.42	0.32
	5-10 years	Arithmetic Average	3.49	3.25	3.42	3.39
		Standard deviation	0.58	0.71	0.63	0.46
	More than 10 years	Arithmetic Average	3.85	3.51	3.43	3.64
		Standard	0.40	0.56	0.64	0.33

		deviation				
Educational Qualification	Diploma	Arithmetic Average	3.46	3.32	3.31	3.38
		Standard deviation	0.56	0.57	0.64	0.40
	Bachelor	Arithmetic Average	3.62	3.28	3.45	3.47
		Standard deviation	0.53	0.69	0.57	0.44
	Postgraduate studies	Arithmetic Average	3.63	3.26	3.38	3.45
		Standard deviation	0.51	0.58	0.64	0.41
Total		Arithmetic Average	3.60	3.28	3.41	3.45
		Standard deviation	0.53	0.65	0.60	0.43

Table (7) shows that there are apparent differences between the average estimates of the study members on each of the domains and the total score about the degree of application of the principles of UDL by early childhood teachers

according to the study variables. In order to show the significance of the differences statistically the three-way MANOVA test was used, and Table (8) shows that:

Table (8). Results of Three-Way MANOVA Analysis of Study Members' Estimates on the Degree of Early Childhood Teachers' Application of UDL Principles According to the Study Variables

Source of Variance Variable	Domains/Affiliate	Total Squares	Degrees Freedom	Medium Boxes	F value	Level Significance
Gender Hotelling's $T^2 = .023$ $F = 2.242$, Sig = .084	Principle of Participation	.022	1	.022	.087	.768
	The principle of representation	.951	1	.951	2.463	.118
	Principle of Performance and	.251	1	.251	.688	.408

	Expression					
	Overall Instrument Score	.142	1	.142	.873	.351
Years of Experience	Principle of Participation	8.559	2	4.280	16.726	*.000
Wilks' Lambda = .850 F = 8.252, Sig = .000						
	The principle of representation	11.357	2	5.678	14.701	*.000
	Principle of Performance and Expression	7.159	2	3.579	9.806	*.000
	Overall Instrument Score	5.753	2	2.877	17.624	*.000
Educational Qualification	Principle of Participation	.528	2	.264	1.032	.357
Wilks' Lambda = .959 F = 2.081, Sig = .054						
	The principle of representation	.314	2	.157	.407	.666
	Principle of Performance and Expression	.743	2	.372	1.019	.362
	Overall Instrument Score	.082	2	.041	.251	.778
Error	Principle of Participation	75.225	294	.256		
	The	113.557	294	.386		

	principle of representation					
	Principle of Performance and Expression	107.229	294.365			
	Overall Instrument Score	47.987	294.163			
Adjusted Total	Principle of Participation	84.747	299			
	The principle of representation	125.974	299			
	Principle of Performance and Expression	108.392	299			
	Overall Instrument Score	54.173	299			

It can be seen from Table (8) that there are no statistically significant differences at ($\alpha=0.05$) between the average estimates of the sample members on the domains (the principle of participation, the principle of representation, the principle of performance and expression) attributed to the gender variable, as the value of the test (f) on the domains was (0.087 and 2.463) and the level of significance was greater than (0.05), and these values are considered non-statistically significant at the level of ($0.05=\alpha$). It is also noted that there is no statistically significant difference at ($\alpha=0.05$) between the average estimates of individuals on the total score of the tool. The value of the test (f) on the total score was (0.873) and the significance level was (0.351), and this value is not statistically significant at ($\alpha=0.05$).

It can be seen from the table that there are statistically significant differences at the level of

($\alpha=0.05$) between the average estimates of the sample members on all domains attributed to the years of experience, as the statistical values of the (F) test on the domains ranged between (9.806 and 16.726) with a significance level of less than (0.05), and these values are considered a statistical function at the significance level ($\alpha=0.05$). It also indicates that there are statistically significant differences at ($\alpha=0.05$) between the estimates of the individuals on the total score of the tool, as the test value (f) on the instrument as a whole (17.624) and at the significance level (0.000), and this value is statistically significant at ($0.05=\alpha$). Based on the results of the Scheffe test for post-comparative comparisons, the differences between experience (less than 5 years) and experience (5-10 years) and in favor of experience (5-10 years) came with a higher arithmetic average, and the differences between experience (less than 5 years) and experience (more than 10 years) and in favor of experience

(more than 10 years) came with an average of 10 years. My calculation is higher on all fields and the overall grade.

It is also noted from the table that there are no statistically significant differences at the level of ($\alpha=0.05$) between the average estimates of the sample members on all domains attributed to the variable of educational qualification, as the values of the (f) test on the domains ranged between (0.407 and 1.032) and at a level of significance greater than (0.05), and all these values are not statistically significant at the level of ($0.05=\alpha$). It is also noted that there is no statistically significant difference at ($0.05=\alpha$) between the average estimates of individuals on the total score of the tool, as The value of the (F) test on the total score was (0.251) and the significance level was (0.778), and this value is not statistically significant at ($\alpha=0.05$).

Discussion of the results

First: Discussing the results of the first question, which states: "To what extent do early childhood teachers apply the principles of UDL from their point of view?" The results showed that the degree of application of the principles of UDL by early childhood teachers in inclusive schools in the capital Amman was moderate. The researchers explain this result in light of the transition phase of education in Jordan towards the transition to inclusive education, in line with the Ten-Year Plan for Inclusive Education (2020-2030).

This finding is consistent with the findings of a study (Bonnici, 2022) that indicated that there is a high awareness of the importance of UDL principles, but with practical obstacles to full implementation such as time constraints and curriculum intensity. It also intersects with Vitelli's (2015) study, which described the level of awareness and instruction provided about UDL as still modest in some teacher preparation programs, which calls for intensifying professional development programs.

Second: Discussing the arrangement of the areas of UDL (participation, performance, expression, representation)

The principle of engagement came first and to a high degree in some of its paragraphs, such as "motivating students to communicate face-to-face". This is due to the nature of early childhood, which focuses mainly on social and emotional interaction. This finding is consistent with a study (Bonnici, 2022) that indicated that early childhood teachers are mainly focused on creating an environment in which the child "feels safe and belonged" and fostering peer interaction, which is at the heart of the principle of engagement To learn. The results are also consistent with a study (Dewi et al., 2019) that confirmed that UDL promotes academic and social inclusion within inclusive classrooms. Action & Expression came second, with the results showing that teachers apply strategies as diverse as "using modern technology" to demonstrate learning outcomes. This is consistent with Evmenova's study., (2018) which proved that teachers are able to integrate various tools to give students multiple options to express their understanding. Finally, the principle of representation came in last place and to a moderate degree. This can be explained by the diversification of information presentations (audio-visual, digital) that technical resources and advance planning may be lacking for teachers in public schools. This finding is consistent with the challenges of lack of resources and the difficulty of accessing technology mentioned in a study (Rusconi & Squillaci, 2023) as an obstacle to providing educational content that suits individual differences among students.

Third: Discussion of the second question, which states "Are there any statistically significant differences at the level of significance ($\alpha=0.05$) in the degree of application of the principles of UDL by early childhood teachers from their point of view attributed to variables (gender, years of experience, educational qualification)?" The results showed that there were no statistically significant differences in gender and educational qualification. This indicates that early childhood teachers in Amman, regardless of their gender or qualification, are subject to similar working conditions and receive similar professional

training within the system of the Ministry of Education and public universities. This finding is supported by a study (Craig et al., 2019) that found no statistically significant differences in the effectiveness of training or the level of application of UDL. When comparing special education teachers with general education teachers, they also found no differences based on the stage of study the teacher is studying. A study (Unluol Unal et al., 2022) confirmed that teachers' responses to this framework are similar when they undergo similar training conditions. A study (Rusconi & Squillaci, 2023) where studies proved that everyone is able to benefit from this model and apply it in their practices, regardless of their background and qualifications. As for the variable of years of experience, the results revealed that there were differences in favor of teachers with long experience (more than 10 years). The researchers explain that the cumulative experience in dealing with student diversity within inclusive classrooms contributes to the development of flexible planning skills and understanding of students' needs. This is what a study (Bonnici, 2022) concluded, which emphasized that mastering UDL skills develops with practice and continuous training, and that more experienced teachers may be better able to identify and overcome methodological barriers.

Conclusion

This study sought to provide a realistic picture of the degree to which early childhood teachers applied the principles of Universal Design for Learning (UDL) in inclusive public schools in the capital, Amman, as the results revealed that these principles were applied to a moderate degree. This level indicates that teachers have a good awareness, but they still need to be more empowered to reach better levels. The study recommends taking advantage of the successful training models mentioned in previous studies, such as the Evmenova study. (2018) and a study (Zerbato & Mendes, 2021) where collaborative work-based training is adopted between regular classroom teachers and special education teachers to ensure the improvement of the quality of classroom practices. The "principle of participation" emerged as the strongest applied

area, reflecting teachers' interest in the emotional and motivational aspect of students in early childhood, while the "principle of representation" came in last place, highlighting a gap in diversifying the presentation of educational content to suit children's sensory and cognitive variation. The study also confirmed that long experience (more than 10 years) plays a pivotal role in teachers' ability to adopt the principles of UDL, while gender or educational qualification had no statistically significant impact on these practices. Accordingly, the UDL principle is the ideal umbrella for achieving the goals of the Ten-Year Plan for Inclusive Education in Jordan, by shifting the focus from the learner's deficit to the focus on removing barriers to access to the appropriate curriculum and classroom environment to meet the diverse needs of students in inclusive classrooms.

Determinants of the study and future studies

The results of the study are determined by human limits, as the sample was limited to early childhood teachers in inclusive public schools in the capital Amman during the second semester of the academic year 2025/2026. The extent of the objectivity of the study sample in responding to the paragraphs of the tool, the study relied on a self-assessment scale. Based on the findings of the study, the researchers recommend building professional development programs that focus specifically on the use of strategies that enable students to perform tasks at different levels of support, and empower teachers with the skills to deliver content in a variety of visual, audio, and digital formats. The researchers also recommend conducting studies to assess the impact of the application of the UDL framework on the diverse academic and social learning outcomes of children with disabilities. In addition, conduct qualitative studies that include interviews or classroom observations to deepen understanding of the challenges of the field-facing teachers when applying the principles of UDL. The researchers also recommend the development of a proposed guideline for early childhood educators that includes practical strategies for applying UDL principles in inclusive classrooms in Jordan.

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