The Degree of User of Digital Learning Technologies by Learning Disabilities Teachers in Teaching their Students in the Southern Region of the Kingdom of Saudi Arabia

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***Abstract*—The purpose of this study is to examine the extent to which Digital Learning Technologies (DLTs) are employed by teachers of students with learning disabilities, based on their own perceptions. Furthermore, the study investigates whether significant differences exist in the use of these technologies according to demographic variables, including gender, academic qualifications, years of professional experience, and geographical region. A descriptive survey design was adopted to achieve the objectives of the study. The study sample consisted of 117 male and female teachers of students with learning disabilities in public elementary schools in the southern regions of the Kingdom of Saudi Arabia (Najran, Jazan, Asir), and an electronic questionnaire was used to collect data. The results show that the study sample's estimates of the degree of use of DLTs by teachers of students with learning disabilities in teaching their students are moderate. Furthermore, there are statistically significant differences in the study sample's estimates regarding the degree of use of DLTs by teachers of students with learning disabilities in teaching their students, attributed to gender in favor of females, years of experience in favor of the level of 10 years and above, and academic qualification in favor of the postgraduate level. However, no statistically significant differences are found attributable to region. The study recommends designing specialized and intensive training programs aimed at enhancing the skills and competencies of teachers of students with learning disabilities in using DLTs.**

***Keywords*—learning technologies, digital learning, digital learning tools, digital learning applications, learning disabilities teachers, teaching**

I. Introduction

Learning disabilities are considered one of the most ambiguous educational problems, sometimes referred to as a "hidden disability" due to their unclear features, various types, and differing levels of severity. Diagnosing them requires multiple tests, and treating them involves diverse and modern methods [1]. As students with learning disabilities differ from their peers without such disabilities in their characteristics, ways of thinking, learning, and processing of information, they require assistance from service providers to overcome these challenges [2]. Therefore, the importance of using digital learning and its technologies becomes evident, as they may play a crucial role in helping these students complete their schoolwork, solve some of their educational problems, facilitate social communication, and ease their academic integration into general education schools. Additionally, digital learning may have an effective impact on improving the educational process, raising academic achievement, and equipping them with various skills, including digital skills [3].

Digital learning refers to an educational approach that incorporates technology to enhance the teaching and learning process. It encompasses a broad spectrum of methods and strategies, including but not limited to gamification, blended learning, the use of classroom technologies, electronic textbooks, learning analytics, learning objects, mobile learning, personalized learning, online or e-learning, Open Educational Resources (OER), technology-enhanced instruction, as well as virtual and augmented reality applications [3].

Digital learning represents an integrated educational system based on the use of information and communication technology interactively through computers in various ways with the aim of delivering information to students. It allows them to contribute to knowledge production and participate in its dissemination and distribution [4]. The importance of using digital learning lies in increasing teachers' awareness toward developing their knowledge and expertise and staying updated with new developments, innovations, or global conferences in their field of specialization to keep pace with the constant advancements in this fast-paced era [5]. When used appropriately, digital learning enhances students' various skills in general, especially the technological, technical, and digital skills they need to face the future [6]. Accordingly, the importance of technologies used in digital learning is evident in their major role in improving the teaching and learning process by providing creative and innovative teaching and collaboration methods, encouraging creativity, and making learning more interactive. These technologies allow students to play a proactive role in their learning, while teachers act as guides. In addition, digital tools and technologies facilitate content creation, collaboration, and personalized learning experiences, making the educational environment more engaging, enjoyable, appealing, and effective for students of varying abilities, levels, and characteristics [7].

Digital Learning Technologies (DLTs) have become essential in modern education, particularly in enhancing accessibility, engagement, and teaching effectiveness. The Unified Theory of Acceptance and Use of Technology (UTAUT) provides a comprehensive framework for analyzing the factors influencing teachers' adoption of DLTs [8]. The model identifies four key concepts: performance expectancy, effort expectancy, social influence, and facilitating conditions.

Performance expectancy the belief that DLTs enhance teaching effectiveness a powerful motivator for adoption, particularly in diverse classrooms [9]. Effort expectancy, or perceived ease of use, is critical to reducing resistance,

particularly among teachers with limited digital experience [10]. Social influence, such as peer and leadership support, significantly influences behavioral intention, particularly in collectivist cultures [11]. Facilitating conditions, including access to infrastructure, training, and administrative support, play a vital role in the sustainability of technology use [12].

Moreover, moderating variables, such as gender, experience, and volunteering, influence adoption behaviors. Thus, UTAUT provides a nuanced perspective to interpret the varying responses among teachers and supports the development of targeted strategies to promote technology integration. Applying UTAUT in educational research helps ensure that distributed ledger technologies are included and even meaningfully integrated into educational practices.

DLTs play a pivotal role in special education, providing innovative, tailored solutions to address the unique challenges faced by students with learning disabilities. They enable educational content to be redesigned to be more engaging and accessible, facilitate easier access to information, and support active learning through practical application and experimentation, ultimately enhancing students' academic outcomes and independence [13].

In special education, the multiple advantages of DLTs become evident in raising the level of students with learning disabilities. Their role lies in offering creative and innovative solutions to the learning problems these students face, contributing to the redesigning and restructuring of educational content in an engaging and appealing manner that aligns with the nature of their difficulties and characteristics. These technologies also help them access information easily and smoothly, and provide opportunities for application, practice, hands-on training, and experimentation through various educational practices [13]. Additionally, they support the delivery of educational services aimed at stimulating their cognitive and intellectual abilities and preparing them to avoid psychological or educational issues, allowing them to integrate into the school environment and their surrounding community, and become active and productive individuals [14].

In general, when DLTs are integrated with the instructional strategies used by teachers in general and by special education teachers in particular, they significantly and valuably contribute to improving the learning and teaching of students with learning disabilities [14]. Additionally, they help create a positive and supportive learning environment. DLTs also enhance the learning processes within educational programs for students with learning disabilities by promoting active engagement and effective participation in learning and teaching, as well as encouraging active interaction within educational groups [15].

It can be said that DLTs play an important and effective role in many educational situations by helping students with learning disabilities overcome the challenges they face, while also developing their academic, developmental, and technical skills [16]. Furthermore, Al-Awaly and Al-Asiri [17] indicate that the use of DLTs by special education teachers positively affects students with learning disabilities psychologically by reducing tension, anxiety, and emotional reactions caused by fear of academic failure—achieved through entertaining digital programs and games. According to Al-Husseini [18], DLTs play a major role in enhancing the self-concept of students with learning disabilities by providing them with immediate feedback, which increases their motivation to learn and helps them achieve the greatest possible number of educational goals. These technologies also aid in teaching desirable behavioral patterns and overcoming low abstract thinking ability by offering appropriate sensory experiences, as well as allowing for the repetition of experiences, thereby fostering positive and direct interaction among students.

In light of the growing global focus on individuals with disabilities, including those with learning disabilities, numerous challenges have arisen in their education and training. These challenges have placed substantial demands on special education teachers, particularly regarding their professional preparation and ongoing development. Educators are now required to acquire the necessary methods, strategies, and tools to effectively respond to rapid advancements in technology, digital resources, and e-learning platforms. This is essential to address the diverse needs and individual differences of students with disabilities and to enhance their educational outcomes [17].

Special education teachers are expected to engage with this group of students through a comprehensive understanding of their psychological, emotional, social, and academic profiles, including their behaviors, needs, preferences, and interests. They are responsible for employing appropriate methods, strategies, techniques, and activities that are tailored to the students' developmental levels and individual circumstances [19]. Consequently, it has become essential for special education teachers in general—and teachers of students with learning disabilities in particular—to demonstrate the capacity for innovation and continuous improvement in their instructional methods and strategies. They are required to incorporate emerging developments in the field of education to better serve students with disabilities. Moreover, they must possess both technical and pedagogical competencies, as well as relevant prior experience, to effectively navigate and integrate Information and Communication Technologies (ICT) within traditional educational frameworks [20].

Therefore, a teacher's ability to utilize digital technological innovations and remain current with ongoing scientific and technological advancements in the instructional process plays a crucial role in effectively conveying information to students. This competence also contributes to equipping learners with valuable skills and experiences that foster their active participation and engagement in the learning environment [21].

In this regard, Qaraqish *et al.* [22] indicated that special education teachers demonstrated a high awareness of the use of educational technology in teaching students with special needs. Statistically significant differences were also observed based on academic qualifications, with teachers with advanced degrees demonstrating greater awareness compared to those with less qualifications. Al-Rifa'i *et al*. [23] revealed that teachers had a moderate level of utilizing digital learning resources. Al-Rubian [24] showed that the reality of using educational technologies in classrooms for students with learning disabilities was moderate, and there were statistically significant differences in the use of educational technologies in classrooms for students with learning

disabilities, attributed to the variable of gender, favoring females.

Al-Sarihi and Al-Harithi [13] reported that the use of modern educational technologies by teachers instructing students with learning disabilities was high. Their findings also indicated that there were no statistically significant differences in the participants' evaluations of teachers' use of educational technology in resource rooms based on gender. Hamadeh [25] indicated that the level of digital education use by middle school teachers in Kuwait was moderate. Also, there were statistically significant differences in the responses of the study sample regarding the level of digital education use by middle school teachers in Kuwait, attributed to the academic qualification variable, favoring those with educational qualifications, while no statistical differences were found for gender and region variables. Al-Awaly and Al-Asiri [17] ound that the use of digital educational technologies by teachers of students with learning disabilities in mathematics instruction was at a moderate level. Additionally, their study reported no statistically significant differences in the extent of technology use based on gender, academic qualifications, or years of teaching experience. Al-Kalbi [26] indicated that the degree of use of digital learning objects by secondary school female teachers was high.

Based on the above, the researcher believes, from the standpoint that education is a fundamental right for all students, regardless of their characteristics and levels, as guaranteed by all international laws and conventions, and the necessity for special education teachers, particularly those teaching students with learning disabilities, to keep pace with the rapid digital technological developments in education, especially in the education of students with learning disabilities, the idea of conducting this study emerged. This study represents a dedicated effort to investigate the extent to which teachers of students with learning disabilities utilize DLTs in their instructional practices. The aim is to inform the provision of optimal services and resources for educating students with learning disabilities in the southern region of Saudi Arabia, thereby contributing to the enhancement of their academic and developmental outcomes.

A. Statement of the Problem

The problem of the study emerged from the current technological and digital development that has extended to various human fields, including education. The Saudi Arabian government has emphasized the importance of digital development and investment in the education sector to serve its progress and global competitiveness [13]. Due to the necessity of keeping up with this digital development in the Saudi education system, particularly in the education of students with disabilities, including those with learning disabilities, it has become imperative for special education teachers to keep pace with this digital development, which will achieve the maximum benefit in teaching and learning for students with learning disabilities [17]. In this context, many international scientific conferences have recommended the importance of digital learning and digital transformation in the field of education, stressing the significance of integrating digital technologies with all their techniques and programs into the educational process to keep up with the accelerating knowledge explosion, and to develop students' skills in general and their digital technological skills in particular. These include the Fourth International Conference on the Future of Digital Education in the Arab World, held in Jeddah, Saudi Arabia, in 2023; the Inclusive Education Conference in the Context of Digital Transformation, held at Yarmouk University in Jordan in 2023; and the International Conference on Digital Transformation in Education titled "The Path Towards Sustainable Development Goal 4," held in India in 2023. This is in addition to previous studies [23] which highlighted the effectiveness of educational technologies, DLTs, and their programs in consolidating students' cognitive structures, developing their various skills, and improving their academic achievement and abilities. These technologies have proven particularly impactful in promoting personalized learning, supporting differentiated instruction, and fostering student engagement. However, despite these promising outcomes, there remains a notable gap in the empirical investigation of how DLTs are utilized by teachers of students with Learning Disabilities (LD), especially in inclusive educational settings.

While prior research has extensively examined the general integration of digital tools in mainstream classrooms, limited attention has been given to how special education teachers perceive, adopt, and apply these technologies to address the specific needs of learners with LD [10]. Moreover, few studies have focused on the contextual factors such as teacher training, resource availability, and institutional support that shape the effective use of these tools within the unique pedagogical demands of special education.

Therefore, this study addresses a critical gap by focusing specifically on the degree of use of DLTs among teachers of students with learning disabilities. It aims to explore not only the extent of usage but also the underlying challenges and support needs. By doing so, the study contributes original insights that can inform the design of targeted training programs, technology policies, and inclusive teaching practices—thus positioning itself as a meaningful addition to the existing body of knowledge in the field of special and inclusive education. The study sought to address the following questions:

1) To what extent do teachers of students with learning disabilities utilize DLTs in their instructional practices, based on their own perspectives?
2) Are there statistically significant differences at the 0.05 significance level (α) in the perceptions of the study participants regarding the use of DLTs by teachers of students with learning disabilities, attributable to variables such as gender, academic qualification, years of experience, and region?

B. Significance of the Study

The findings of this study are expected to make a meaningful contribution to the existing body of research on the utilization of DLTs by teachers of students with learning disabilities. Furthermore, the study aims to enrich theoretical knowledge and the global literature by offering a conceptual framework regarding the extent of digital technology integration in resource rooms for students with learning disabilities. Additionally, it is anticipated that the results will raise awareness among policymakers, educators, school

administrators, and service centers about the critical role of DLTs in enhancing the academic and technical skills of students with learning disabilities. This awareness could lead to the development of targeted improvement plans, strategies, and recommendations designed to advance special education teaching practices through the effective use of digital technologies. Finally, educational authorities in the Kingdom of Saudi Arabia are expected to benefit from the insights provided by this study, which will offer valuable feedback and a deeper understanding of current practices in digital learning technology adoption among teachers of students with learning disabilities. This will enable them to set appropriate standards for training special education teachers in the use of DLTs in teaching students with learning disabilities through field education courses, educational technology courses, and specialized professional development programs, supporting teacher training programs with activities and instructions on the use of DLTs. Finally, school directors, educational supervisors, and teachers could also benefit from the results and recommendations of this study in developing procedures, mechanisms, and strategies to improve the quality of digital learning technology usage in teaching students with learning disabilities in the future.

C. Delimitations of the Study

The results of the current study can be generalized within the scope of the following limitations:

- Subject: This study concentrated on investigating the utilization of DLTs by teachers of students with learning disabilities.
- Population: The research sample was confined to special education teachers working with students with learning disabilities in public elementary schools.
- Time: The study was conducted during the second semester of the 2024/2025 academic year.
- Place: The study took place in public elementary schools in the southern regions of the Kingdom of Saudi Arabia (Najran, Jazan, Asir).

II. Materials and Methods

This study employed the descriptive survey method, deemed most appropriate given the study's objective of assessing the extent to which teachers of students with learning disabilities utilize DLTs.

A. Population and Sample of the Study

The study population consisted of teachers of students with learning disabilities in public elementary schools in the southern regions of Saudi Arabia (Najran, Jazan, Asir) during the second semester of the 2024/2025 academic year. The estimated number of these teachers was approximately 150, based on the official statistics from the educational administrations of the regions. The sample was selected using simple random sampling. The study tool (the DLTs Usage Questionnaire) was created electronically via a Google Drive link and distributed using social media platforms (WhatsApp) to all teachers of students with learning disabilities in public elementary schools in the southern regions of Saudi Arabia. A total of 117 teachers responded to the questionnaire. The sample size was determined using Krejcie and Morgan's [27] sample size table, and the sample was distributed according to the study variables (gender, academic qualification, years of experience, region). The following Table 1 provides details.

Table 1. Frequencies and percentages of the study sample by variables

Variables	Categories	Frequency	Percentage (%)
Gender	Male	62	53.0
	Female	55	47.0
Years of Experience	Less than 10 years	52	44.4
	10 years or more	65	55.6
Academic Qualification	Bachelor's Degree	83	70.9
	Postgraduate Studies	34	29.1
Region	Najran	33	28.2
	Jazan	27	23.1
	Asir	57	48.7
Total		117	100.0

B. Tool of the Study

To create an instrument for measuring the extent of digital learning technology usage among teachers of students with learning disabilities, the tool was constructed based on validated scales from prior research focusing on digital learning, associated technologies, and educational programs [17, 22, 28]. The primary objective was to evaluate the extent to which teachers of students with learning disabilities employ DLTs in their instructional practices. The preliminary version of the measurement tool comprised 16 items designed to capture this usage within educational settings. The survey instrument was administered in Arabic, the native language of the participants, to ensure clarity and cultural relevance. Linguistic and contextual adaptations were made to enhance comprehension, including simplifying technical terminology and aligning examples with the local educational environment. The benchmark used in the study by Hamadneh and KhairEddeen [29] was applied to refine the tool. The scale assigned values as follows: (5, 4, 3, 2, 1) corresponding to the responses "Strongly Agree," "Agree," "Neutral," "Disagree," and "Strongly Disagree." The scale was calculated using the following equation:

(Highest scale value (5) − Lowest scale value (1)) / Number of required categories (3) = (5 − 1) / 3 = 1.33

Therefore, each category was assigned a value increment of 1.33 to determine the interpretation of the scores, which are as follows:

- From 1.00–2.33: Low usage
- From 2.34–3.67: Moderate usage
- From 3.68–5.00: High usage

This approach allowed for categorizing the overall usage level of DLTs by teachers in their instructional practices.

1) Content validity

To ensure the content validity of the study instrument (the Digital Learning Technology Usage Questionnaire), the initial version was reviewed by a panel of ten expert judges. The experts were purposefully selected based on their academic specialization, holding doctoral degrees and having extensive experience in one or more of the following fields: educational technology, special education, and educational measurement and evaluation. These fields were deemed directly relevant to the conceptual and methodological foundations of the instrument.

The judges were asked to evaluate each item in terms of its relevance to the construct being measured, the clarity and appropriateness of the language used, and the overall

alignment of the tool with the study's objectives. Based on their feedback, and in cases where 80% of the reviewers recommended modifications, specific items were revised—primarily through rewording for clarity and cultural-linguistic alignment. As a result of this expert review process, the final version of the questionnaire consisted of 16 refined items, ready for field administration.

2) Construct validity

To assess the construct validity of the study tool, correlation coefficients between individual items and the total score were calculated using a pilot sample of 25 teachers of students with learning disabilities. The results are shown in Table 2.

Table 2. Correlation coefficients between each item and the total score of the study tool

Item Number	Correlation Coefficient	Item Number	Correlation Coefficient	Item Number	Correlation Coefficient
1	0.56**	7	0.62**	13	0.57**
2	0.73**	8	0.61**	14	0.61**
3	0.65**	9	0.59**	15	0.51**
4	0.65**	10	0.73**	16	0.77**
5	0.83**	11	0.70**		
6	0.79**	12	0.72**		

Note: *at the 0.05 level, **at the 0.01 level.

As shown in Table 2, the correlation coefficients between the individual items and the total score ranged from 0.51 to 0.83, indicating that all correlation coefficients were statistically significant and acceptable. Therefore, none of the items were removed, confirming the construct validity of the tool.

3) Reliability

The study instrument items were carefully developed to align with the four core components of the Unified Theory of Acceptance and Use of Technology (UTAUT): performance expectancy, effort expectancy, social influence, and facilitating conditions [8]. Each item was designed to reflect one of these dimensions in the context of teachers of students with learning disabilities' use of digital learning technology. To ensure the reliability of the instrument, two methods were used. First, test-retest reliability was assessed by administering the instrument to a pilot sample of 25 teachers of students with learning disabilities (outside the main sample), with a two-week interval between applications. The resulting Pearson correlation coefficient was 0.87, indicating strong temporal stability. Second, internal consistency was checked using Cronbach's alpha, which yielded a coefficient of 0.82, reflecting good internal reliability. These results confirm that the instrument consistently measures the intended theoretical dimensions and is suitable for use in the current study.

III. Result

A. Research Question 1: To What Extent do Teachers of Students with Learning Disabilities Utilize DLTs in Their Instructional Practices, Based on Their Own Perspectives?

To address this question, the means, standard deviations, and mean ranks regarding the extent of digital learning technology use by teachers of students with learning disabilities, based on their perspectives, were calculated. The results are presented in Table 3.

Table 3. Means, standard deviations, and mean ranks of teachers' perceived use of DLTs in instruction for students with learning disabilities

No.	Item	Mean	Standard Deviation	Mean Rank	Degree
8	I use the smart board in teaching students with learning disabilities	3.32	0.98	1	Medium
15	I create private groups on social media as a tool to communicate with students with learning disabilities	3.26	0.94	2	Medium
13	I host learning sessions for students in shared spaces, allowing leaders to exchange ideas informally	3.25	1.07	3	Medium
7	I teach lessons via distance learning	3.15	0.99	4	Medium
1	I use educational videos to teach students with learning disabilities	2.97	1.03	5	Medium
9	I use e-books to enrich the topics of the individual training program	2.95	0.99	6	Medium
14	I create an internal social network to enhance communication among my students	2.90	0.99	7	Medium
10	I use digital educational applications and their tools to design homework for students	2.74	1.04	8	Medium
12	I use live virtual sessions to increase dialogue among my students	2.74	1.03	8	Medium
6	I use simulation programs (via video) in teaching my students	2.68	1.08	10	Medium
5	I use social media such as WhatsApp and Telegram to receive homework from students	2.64	1.15	11	Medium
16	I create online aids to support the education of students with learning disabilities	2.60	0.98	12	Medium
11	I use educational applications in teaching my students, such as Make it, Doodle Math's	2.59	1.09	13	Medium
2	I use smart devices in teaching students with learning disabilities, such as iPads and smartphones	2.57	1.05	14	Medium
4	I use digital educational games to teach my students	2.52	1.06	15	Medium
3	I use the data show device to present lessons	2.41	1.00	16	Medium
	Total Score	2.83	0.76		Medium

Table 3 indicates that, according to teachers' self-reports, the average degree of digital learning technology usage in instructing students with learning disabilities was 2.83, with a standard deviation of 0.76, reflecting a moderate level of utilization. The table also reveals that item number 8, "I use the smart board in teaching students with learning disabilities," ranked first with the highest mean of 3.32 and a standard deviation of 0.98, indicating a moderate level of usage. Item number 15, "I create private groups on social media as a tool to communicate with students with learning disabilities," ranked second with a mean of 3.26 and a standard deviation of 0.94, also reflecting a moderate degree. Ranked third was item number 13, "I host learning sessions for students in

shared spaces, allowing leaders to exchange ideas informally," with a mean of 3.25 and a standard deviation of 1.07, indicating a medium level of use. Conversely, item number 3, "I use the data show device to present lessons," ranked last, exhibiting the lowest mean of 2.41 and a standard deviation of 1.00, corresponding to a moderate degree of usage.

B. Research Question 2: Are There Statistically Significant Differences at the 0.05 Significance Level (α) in the Perceptions of the Study Participants Regarding the Use of DLTs by Teachers of Students with Learning Disabilities, Attributable to Variables Such as Gender, Academic Qualification, Years of Experience, and Region?

To address this question, the means and standard deviations of digital learning technology usage by teachers of students with learning disabilities were calculated based on the variables of gender, years of experience, academic qualification, and region, according to their perspectives. The results are presented in Table 4.

Table 4. Means and standard deviations of digital learning technology usage by teachers of students with learning disabilities in instruction, categorized by gender, years of experience, academic qualification, and region

Variables	Categories	Mean	Standard Deviation	Count
Gender	Male	2.59	0.715	62
	Female	3.10	0.731	55
Years of Experience	Less than 10 years	2.65	0.777	52
	10 years or more	2.97	0.724	65
Academic Qualification	Bachelor's Degree	2.65	0.747	83
	Postgraduate Studies	3.28	0.603	34
Region	Najran	2.98	0.697	33
	Jazan	2.71	0.754	27
	Asir	2.80	0.799	57

Table 4 shows significant differences in the mean scores and standard deviations of digital learning technology use among teachers of students with learning disabilities, classified by gender, years of experience, academic qualification, and region. The results indicate that female teachers, those with more professional experience, and those with graduate degrees reported higher levels of technology use. These patterns are consistent with the key concepts of the Unified Theory of Acceptance and Use of Technology (UTAUT), particularly performance expectations and facilitating conditions, which emphasize perceived usefulness and access to supportive resources. In contrast, regional differences were small and statistically insignificant, a result likely attributed to the uniform The implementation of national education policies can promote equitable access to digital infrastructure and professional development across all educational districts in Saudi Arabia. A four-way Analysis of Variance (ANOVA) was conducted to examine the statistical significance of differences between the means. The results are presented in Table 5.

Table 5 indicates statistically significant differences at the 0.05 significance level (α) in the degree of digital learning technology usage by teachers of students with learning disabilities, as perceived by the study participants, attributable to the gender variable. These differences favored female teachers, with an F value of 15.547 and a p-value of 0.000. Statistically significant differences were also observed based on years of experience, favoring teachers with 10 years or more of experience, as evidenced by an F value of 6.137 and a p-value of 0.015. Similarly, academic qualification showed significant differences, with postgraduate-qualified teachers demonstrating higher usage, reflected by an F value of 28.696 and a p-value of 0.000. In contrast, no statistically significant differences were found concerning the region variable, with an F value of 2.340 and a p-value of 0.101.

Table 5. Four-way ANOVA for the effect of the study variables on the use of DLTs by teachers of students with learning disabilities in teaching

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F Value	Statistical Significance
Gender	6.349	1	6.349	15.547	0.000
Years of Experience	2.506	1	2.506	6.137	0.015
Academic Qualification	11.719	1	11.719	28.696	0.000
Region	1.911	2	0.955	2.340	0.101
Error	45.329	111	0.408		
Total	67.303	116			

IV. Discussion

From the teachers' perspective, the degree of digital learning technology usage in instructing students with learning disabilities was measured at 2.83, with a standard deviation of 0.76, indicating a moderate level of utilization. This may be attributed to the fact that teachers of students with learning disabilities may recognize the importance of utilizing digital technologies, but this recognition does not always translate into daily practice due to some obstacles. These may include a lack of skills in dealing with digital learning techniques, especially in mastering the essential competencies and skills required for digital learning, managing digital learning systems, and processing digital content. There may also be insufficient training on these techniques, a lack of clear guidelines on how to use digital learning techniques effectively, and inadequate preparation and training opportunities for teachers before service to use digital learning techniques competently. This may be due to the general weakness of teachers in using digital learning and its applications in teaching, and their weakness in using basic skills to deal with digital learning and its applications and techniques [26]. It is possible that teachers of students with learning disabilities have not received sufficient or specialized training in using appropriate digital tools for students with learning disabilities, limiting their actual use.

Additionally, variations in infrastructure and available resources may affect the degree of use, as differences between schools in the availability of devices, internet connectivity, and technical support could influence usage, even if these differences are not statistically significant between educational regions. Moreover, the teaching and administrative burden could be a factor, as teachers of students with learning disabilities often bear additional responsibilities, which may reduce the time and effort they can devote to planning advanced digital lessons or using technology regularly [30]. Furthermore, the variation in individual experiences between teachers, as indicated by the standard deviation (0.76), reflects the existence of disparities in responses from teachers of students with learning disabilities. This suggests that some teachers possess higher competencies and skills in using digital learning techniques, while others have lower competencies, which contributes to the overall moderate mean.

The result agreed with the study by Rifa'i *et al.* [23], which showed a moderate level of digital learning resource use among teachers, and the study by Al-Rubian [24], which indicated that the use of educational technologies in classrooms for students with learning disabilities was moderate. It also agreed with the study by Hamadeh [28], which found that the level of digital education use by middle school teachers in Kuwait was moderate, and the study by Al-Awaly and Al-Asiri [17], which indicated that the use of digital learning techniques in teaching mathematics for students with learning disabilities was moderate. However, it differed from the study by Qaraqish *et al.* [22], which showed that the awareness level of special education teachers in using educational technology to teach students with special needs was high, and the study by Al-Sarihi and Al-Harithi [13], which indicated that the level of teachers' use of modern educational technologies in teaching students with learning disabilities was high, as well as the study by Al-Sarihi and Al-Harithi [13], which showed that the reality of teachers' use of educational technology for students with learning disabilities was high. It also differed from the study by Al-Kalbi [26], which showed that the use of digital learning objects by secondary school female teachers was high.

In addition to the above, it was found that item number 8, which states "I use the smart board in teaching students with learning disabilities," ranked first with the highest mean of 3.32, a standard deviation of 0.98, and a moderate degree. This can be attributed to teachers' recognition that the smart board serves multiple functions beyond the traditional board (such as writing, drawing, and erasing) to more important functions that benefit both the teacher and students with learning disabilities in the teaching and learning process, making education more enjoyable and useful. Additionally, it has a significant role in reducing the harmful dust pollution caused by chalk used on the traditional board, which negatively affects the health of both teachers and students.

Ranked second was item number 15, which states "I create private groups on social media as a tool to communicate with students with learning disabilities," with a mean of 3.26, a standard deviation of 0.94, and a moderate degree. This can be attributed to teachers' understanding that private groups on social media encourage discussions and collaboration among students with learning disabilities and facilitate the sharing of topics between the teacher and students smoothly.

Ranked third was item number 13, which states "I host learning sessions for students in common areas, allowing leaders to exchange ideas informally," with a mean of 3.25, a standard deviation of 1.07, and a moderate degree. This can be attributed to teachers' recognition that such sessions help develop leadership skills in students with learning disabilities and allow them to practice communication and decision-making skills. These skills are important in enabling students to live their lives naturally and adapt well.

On the other hand, item number 3, which states "I use a data show device to present lessons," ranked last with the lowest mean of 2.41, a standard deviation of 1.00, and a moderate degree. This may be attributed to varying teachers' opinions regarding the importance of the data show device in presenting lessons and topics. Some may find that there are more effective technologies than this one.

It was also found that there were statistically significant differences at the significance level $\alpha = 0.05$ in the degree of using DLTs by teachers of students with learning disabilities in teaching their students, according to the perspective of the study sample, which can be attributed to the gender variable. The differences were in favor of females. This may be due to the readiness to adopt modern technologies, as female teachers often demonstrate greater enthusiasm and readiness to use new tools and technologies in teaching, especially those that contribute to improving interaction with students with disabilities. Additionally, there is a focus on details and individualized care, as females, according to some educational interpretations, may be more inclined to provide individual support, making DLTs an ideal means for providing personalized and flexible education that aligns with the needs of each student with learning disabilities.

Furthermore, there is a tendency toward self-development, as female teachers may participate in more training courses and seek to improve their technical skills in education, particularly in areas that enable them to assist students with learning disabilities effectively and creatively. Moreover, there is a high level of motivation toward students with learning disabilities, as some female teachers have stronger emotional and professional motivation to support students in this category, using all available means, including DLTs, to improve their educational level.

This finding aligns with the results of Al-Rubian [24], which reported statistically significant differences in the use of educational technologies in classrooms for students with learning disabilities, favoring female educators. Conversely, this finding contrasts with the results of Al-Sarihi and Al-Harithi [13], which reported no statistically significant differences in the use of educational technology by teachers of students with learning disabilities in resource rooms based on gender. Similarly, the study by Hamadeh [28], found no significant differences in digital learning technology usage among middle school teachers in Kuwait attributable to gender, and Al-Awaly and Al-Asiri [17], also reported no significant gender-based differences in the use of DLTs by teachers of students with learning disabilities in mathematics instruction.

Additionally, statistically significant differences were observed at the 0.05 significance level (α) in the extent of digital learning technology usage by teachers of students with learning disabilities, based on the study participants' perspectives, attributable to the variable of years of experience. These differences favored teachers with ten or more years of experience. This can be attributed to the fact that teachers with more experience have accumulated professional and educational experiences over the years, enabling them to recognize the importance of utilizing technology and techniques in supporting the education and learning of students, especially those with learning disabilities, whose education requires special strategies and flexible teaching methods such as DLTs. Experienced teachers of students with learning disabilities have likely participated in more professional development programs and training courses related to educational technologies, which contributes to enhancing their efficiency in using these tools.

Additionally, their ability to diagnose the needs of students with learning disabilities more accurately contributes to the effective use of DLTs and their appropriate applications and

tools, which help improve the academic performance of these students. This trend reflects an increasing awareness among experienced teachers of the importance of integrating technology into education, not only as a modern tool but as an effective instrument that contributes to achieving individual educational goals for students with learning disabilities and providing a supportive and motivating learning environment. This result differed from the study by Al-Awaly and Al-Asiri [17], which reported no statistically significant differences in the use of DLTs by teachers of students with learning disabilities in mathematics instruction based on years of experience.

In addition to the above, statistically significant differences were found at the significance level ($\alpha = 0.05$) in the degree of using DLTs by teachers of students with learning disabilities in teaching their students, according to the perspective of the study sample, which can be attributed to the variable of academic qualifications. The differences were in favor of those with graduate degrees. This can be explained by the fact that teachers with higher academic qualifications possess a higher level of academic and research competence, which is reflected in their awareness of the importance of integrating modern technologies, including digital technologies, into the educational process, and their ability to utilize them in accordance with the characteristics of students with learning disabilities.

Moreover, graduate academic programs often include advanced courses and skills in the use of educational technology, which helps in developing positive attitudes toward using these technologies in the classroom environment. Additionally, these teachers are typically more eager to keep up with educational and technological developments and strive to implement modern teaching methods that contribute to improving the quality of education and enhancing teaching effectiveness, particularly for students who require specialized and varied support in their learning methods, such as those with learning disabilities. Furthermore, graduate programs typically include training and applied courses that focus on the use of educational technologies and encourage research and experimentation with modern classroom practices, making these teachers more ready to adopt digital learning tools and use them to meet the needs of students with learning disabilities. This reflects a higher level of professional and educational awareness among teachers with graduate qualifications, as well as their ability to use digital resources to achieve individualized education goals effectively.

This result aligns with the study by Qaraqish *et al*. [22], which identified statistically significant differences in special education teachers' awareness of educational technology use when teaching students with special needs, with those holding graduate degrees demonstrating higher levels of awareness. However, it differs from the study by Al-Awaly and Al-Asiri [17], which reported no statistically significant differences in the use of digital educational technologies by teachers of students with learning disabilities in mathematics instruction based on academic qualification.

Furthermore, no statistically significant differences were observed at the 0.05 significance level (α) in the extent of digital learning technology usage by teachers of students with learning disabilities, based on the study participants' perspectives, attributable to the region variable. The researcher believes this result is logical, as all teachers of students with learning disabilities, regardless of their educational regions, work in the same environment with similar conditions and resources. They receive the same opportunities for training and development on using DLTs and work under a unified organizational structure. They teach the same programs, with no difference between one educational region and another, and thus, their perspectives on using DLTs with students with learning disabilities are similar.

This can be explained by the efforts of the Ministry of Education in the Kingdom of Saudi Arabia and the relevant authorities in various educational regions to standardize training opportunities and provide the necessary technical capabilities and infrastructure for digital learning. These efforts help reduce the disparity between educational regions in this regard. Additionally, the unification of educational policies and the implementation of educational and technological plans across all educational regions enhance consistency in how teachers of students with learning disabilities use modern digital technologies, regardless of their geographic locations. This indicates a general awareness and shared interest among all teachers, driven by institutional support, toward effectively integrating technology into education, particularly in teaching students with learning disabilities, who require flexible and supportive learning environments that rely on diverse digital tools and applications.

The findings of this study resonate with international research on digital technology adoption in special education. For instance, similar patterns of higher technology use among experienced and postgraduate teachers were reported in studies from the United States [31] and Australia [32], where performance expectancy and facilitating conditions were key predictors of technology integration success. Likewise, the challenges faced by less experienced teachers and those with lower academic qualifications in adopting digital tools mirror findings from a UK study by Davies and West [33], emphasizing the critical role of targeted professional development and confidence-building initiatives.

Moreover, the minimal regional disparities observed align with findings from Scandinavian countries, such as Norway and Sweden, where comprehensive national policies and investments have contributed to reducing geographic inequities in digital education infrastructure [34]. This highlights the global relevance of policy frameworks that ensure equitable access to technology resources and training, supporting inclusive education goals.

Collectively, these comparative insights affirm the importance of sustained, context-sensitive professional development and robust policy support as universal strategies to enhance digital technology adoption in special education worldwide.

V. Conclusion

This study contributes to the growing body of research on technology integration in inclusive education by highlighting the differential use of DLTs among teachers based on gender, experience, and qualification. Grounded in the UTAUT model, the findings emphasize the importance of

performance expectancy, facilitating conditions, and professional preparation in shaping teachers' technology adoption. The minimal regional disparities further underscore the impact of national digital education policies in Saudi Arabia. Collectively, the study offers clear implications for policy, practice, and research underscoring the need for equity driven, theory-informed strategies to support digital transformation in special education.

In light of the study's findings, several actionable recommendations are proposed. First, it is essential to design specialized and sustained training programs for teachers of students with learning disabilities, focusing on practical skills for integrating DLTs. These programs should include hands-on workshops on adaptive educational software, assistive technologies, and inclusive digital platforms, delivered at least twice annually. Collaboration with universities, teacher training centers, and edtech companies is recommended to ensure relevance and innovation in program design. Second, pre-service teacher education curricula should incorporate modules on digital pedagogy tailored for special education contexts. For in-service teachers, particularly those with limited experience, mentoring programs and digital coaching should be established. To support effective implementation, schools must be equipped with the necessary digital infrastructure, including internet access, interactive whiteboards, tablets, and technical support teams. Furthermore, incentive structures—such as digital innovation awards, participation in national conferences, or micro-credentials—should be introduced to motivate and recognize teachers, especially novice and bachelor-level educators. Teachers should also be integrated into professional digital learning communities, facilitating peer exchange, co-creation of resources, and dissemination of successful practices. Parallel to this, educational researchers are encouraged to conduct practice-based studies on digital learning in special education, with findings used to inform policy and training content.

Despite the valuable insights provided by this study, several limitations should be acknowledged. First, relying on self-reported data from teachers may introduce response bias, potentially affecting the accuracy of reported use of DLTs. Future studies could incorporate classroom observations or usage analyses to triangulate the findings. Second, the sample was limited to specific regions within Saudi Arabia, potentially affecting the generalizability of the findings to other contexts or countries with different educational infrastructures and policies. Expanding the research to include diverse geographic and cultural settings would enhance understanding of contextual influences. Third, this study relied primarily on a cross-sectional design, limiting the ability to infer causality or examine changes over time. Longitudinal studies are recommended to explore how teachers' adoption of technology evolves with experience and training. Future research could also investigate the impact of specific types of digital tools on student learning outcomes in special education, as well as explore the roles of student attitudes and parental involvement in technology integration. In addition, qualitative methods may provide deeper insights into teachers' lived experiences, challenges, and coping strategies when using digital technologies in inclusive classrooms.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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