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Mathematics Learning Difficulties: Inclusive Solutions through Diagnostic Assessment, Assistive Technology, and Universal Design

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Abstract

This study finds that clinical evaluation, additional technology, and universal design for learning (UDL) collaborate to assist students in learning mathematics effectively within inclusive classrooms. Using a valid and reliable questionnaire, the data was collected from 350 randomly selected teachers using a quantitative and descriptive research design. Conclusions reveal strong consensus about early identity, increased access, and better engagement through these inclusive strategies among teachers. Analysis of data has shown that teachers mostly agreed to use the effectiveness of using the diagnostic equipment (average score of 4.49), auxiliary technologies (average score of 4.31), and UDL practices (average score of 4.26) based on factors such as job title, location, qualification, and experience. These results confirm that the combined use of clinical evaluation, auxiliary technology, and UDL supports academic achievement for students with mathematical learning difficulties. The study underlines the importance of targeted professional training, equitable resource allocation, and inclusive course development to increase the instruction of mathematics in diverse educational contexts.

Keywords: *Mathematics, Learning Difficulties, Inclusive, Diagnostic Assessment, Assistive Technology, Universal Design*

Introduction

Mathematics is often considered one of the most challenging subjects for students with learning difficulties, especially when there is visual loss, lack of attention, neurodevelopmental disorder, and limited access to inclusive educational equipment. These challenges are not only academic but also structural, reflecting limitations in clinical processes, teaching practices and technical support. Traditional assessment ignores the cognitive diversity present in classes, resulting in the incorrect identity or delayed recognition of mathematics learning difficulties (MLD) in students that could otherwise thrive with proper intervention. As Molnar and Csapó (2019) highlight, numerical cognition requires initial and technology-based clinical assessment to identify specific deficits, which enable timely, sealing and targeted instructional support. Such an initial identity is an important component of inclusive education that goes beyond therapeutic efforts and instead focuses on an active educational plan.

Increased integration of auxiliary technology in mathematics education provides unprecedented opportunities to reduce learning obstacles. Tools such as screen readers, touch tools, interactive apps, and AI-operated assessments have shown effectiveness in personalizing and increasing engagement among students with MLD (Shoaib, Fitzpatrick, & Pitt, 2023; Clarke et al., 2025). These technologies, when embedded, can facilitate access to abstract mathematical concepts within the classroom instructions, and the learners can promote freedom. Ali, Aftab, and Chaudhary (2024) argue that subsidiary technologies not only bridge down functional intervals but also empower learners by allowing differential routes for mathematical understanding. In addition, in multilingual and multicultural learning environments, such technologies become unavoidable. Moleco (2018) underlines the role of UDL strategies, facilitated by accessories, in supporting learners who struggle with both linguistic and cognitive challenges in understanding mathematical word problems.

The Universal Design for Learning (UDL) provides a fundamental academic approach to address the variety of mathematical learners. The UDL provides a framework for teachers to offer many means of representation, engagement and expression, including various cognitive profiles and learning preferences (root et al., 2020; Rose et al., 2018). UDL-based mathematics instructions have shown a promise in promoting inclusion, especially when combined with digital innovations and a responsible class environment (Batist, 2019; Lambert, 2024). Research indicates that when learners are offered flexible learning materials from interactive visual models to step-by-step guidance their inspiration and ideological understanding improves significantly (Foli et al., 2023). In addition, recent innovations such as immersive applications and metaverses open new possibilities for experiential learning in mathematics (Jayanduri et al., 2023). These approaches not only support educational consequences but also participate in students' classes with socio-emotional development and distinctive learning difficulties.

Even with these reforms, many education systems still use clinical evaluation, additional technologies and UDL principles, rather than combining them in the same approach. Therefore, this study needs to synthesize these inclusive solutions to better address the versatile nature of learning difficulties in mathematics. The reasoning behind this study comes from increasing research that supports a combined method using clinical evaluation for early identification (Monnar and CSAPO, 2019) along with scaffolding instructions (Hibi, 2024; Ketima Dabi and Negasa Golga, 2024). Hagarawar, Mavaro, and Trains, 2021). While researchers have studied individual components in isolation, there is limited research on their cooperative effects on overall mathematics education. Therefore, the purpose of this study is to check the effectiveness of integrating UDL to create an inclusive and equitable teaching environment for students with clinical evaluation, accessory technology, and math learning difficulties.

Research Objective

The main objective of this study is to examine the integrated effectiveness of diagnostic assessment, assistive technology, and Universal Design for Learning (UDL) in supporting students with mathematics learning difficulties, with a focus on enhancing early identification, accessibility, engagement, and academic achievement within inclusive educational settings.

Literature Review

Mathematics learning difficulties (MLD) create important challenges for students in educational settings, yet recently provide transformative ability for inclusive education in diagnostic assessment, assistive technologies, and the Universal Design for Learning (UDL) framework. Clinical assessment, especially by people based in technology, has shown great promise in the early identification of learning difficulties. Molnar and Csapó (2019) emphasise the importance of technology-based clinical assessment to detect cognitive pioneers of mathematical skills in early learners. By pointing to specific deficits in numerical understanding, such as number emotion or quantity processing, these assessments can indicate targeted interventions that address individual requirements rather than generalised deficits.

Assistant technologies in the mediation of the learning process for students with MLD have emerged as important tools. Ali, Aftab, and Chaudhary (2024) present a differential directive model that includes supportive techniques to support students facing mathematics-related challenges in particularly inclusive classes. Their study suggests that when accessories are chosen carefully and aligned with students' cognitive profiles, they not only increase engagement but also promote independent education. In parallel, Shoaib, Fitzpatrick, and PITT (2023) detect the role of AT in mathematics instructions for visually impaired learners; both technical challenges and potential successes underline the hearing response and touch-inter-based navigation.

Specific applications have also been studied for their influence on learners with arithmetic difficulties. Hibi (2024) indicates how smart apps can develop mathematical concepts in young students through interactive simulation, immediate response, and gamified learning experiences. The benefits of these applications are increased when individual education is integrated into schemes that accommodate diverse teaching styles and cognitive abilities. Meanwhile, root et al.,

The inclusion of assistive technologies also plays an important role in confusing students with visual loss in mathematical learning. Ketima Dabi and Negasa Golga (2024) offer a comprehensive integrated review that promotes autonomy and participation in mathematics classes for screen readers, Braille displays, and adaptive software. Their analysis shows that such techniques not only support material access but also promote a sense of inclusion and identity within the mainstream settings. Similarly, Moleko (2018) emphasises the relevance of UDL-based strategies in multilingual mathematics classes, especially when words teach problems, given that language- and reference-sensitive support are important to linguistically solve the understanding and problem among diverse learners.

Emerging technologies such as metaverses and virtual reality are attracting attention for their ability to aid inclusive mathematics education. Yanduri et al. (2023) argue that such tools can follow the mathematical problems of the real world in an immersive environment and support students with specific learning difficulties, which often offer experienced learning without cognitive overloads associated with traditional methods. It aligns with Rosley, Shahabodin, and Mohammed (2023), who propose an ideological structure to integrate supporting teaching technologies to improve word problems in children with autism. Their findings indicate that visual support and relevant signals improve work engagement and ideological understanding.

Students with severe visual loss also benefit from digital mathematics materials. Klingenburg, Holcasvic, and Augustad (2020) performed a systematic review, showing that digital tools can bridge accessibility intervals when the material is designed with multimodal feedback and user-friendly interfaces. Batist (2019) supports this perspective, stating that the implementation of UDL strategies in inclusive classes promotes equal participation for specific teaching-disabled students, especially when supportive plans and ongoing teacher training are in place.

Technology-prosperous interventions have also been tested in low-resource references. Pitchford et al. (2018) displays that interactive apps can successfully promote basic mathematics among children with special educational needs in Malawi. Their random control tests showed that even simple, low-cost tablet-based programmes can get significant benefits in arithmetic flows and conceptual understanding, especially when audio instructions and visuals are supported by scaffolding. Nunes (2020) confirms the need for such individual outlooks, as mathematical learning is often interrupted by domain-specific and domain-general cognitive loss, requiring targeted directional reactions.

Artificial Intelligence (AI) is now being detected for its role in assessing and adopting learning routes. Clarke et al. (2025) Discuss how AI-run assessments can personalise mathematical work in real time based on learners and offer both challenges and inclusion opportunities. However, environmental factors still mediate the success of subsidiary strategies. Esquivel et al. (2024) highlight that physical layout, school culture, and teacher approaches greatly affect the implementation of AT-based mathematics solutions for physically disabled students.

Lambert (2024) provides a practical guide to reconsider disability in mathematics education through the UDL lens. He argues that the inclusion is not only about connecting access facilities but fundamentally about how mathematics is taught and learned—prioritising many means of engagement, representation, and expression. This feeling is echoed by Huggervarf, Mavaro, and Trains (2021), which emphasises that the systemic role of auxiliary technology in promoting inclusive education should be aligned to ensure permanent changes, keeping in mind policy, training, and community engagement.

The inclusion of numerical instructions also rests on relevant understanding. Curr, Hes, and Heford (2022) provide insight from Ghana, emphasising that inclusive literacy and numerical practices should consider sociological and infrastructural realities. Fritz, Hase, and Rashenon (2019) strengthen this point, stating that cross-cultural research on mathematical learning difficulties reveals the need for reference-specific diagnosis and intervention rather than a one-size-fits-all model.

The universal design in the academic policy is required for the stability of inclusive mathematics instructions. Colker (2021) discusses how legal and policy frameworks can promote UDL principles in class environments, arguing that institutions should give mandates—not only recommended practices. Foli et al. (2023) Such mandates provide an empirical basis, showing that UDL strategies prescribe students positively with ADHD, which offer approximate routines, material distribution, and choice-based learning activities.

Teachers's perceptions are important for the integration of subsidiary technologies. Al-Dabneh and Al-Zaboon (2022) found that teachers significantly affect the quality and range of its implementation in classrooms for students with the inability to learn the AT's efficacy and their own professional ability. It aligns with Rodriguez-Cano et al. (2022), who report that future teachers should not only be equipped with technical skills but also with educational outlines, which are the centre of inclusion and accountability.

Emerging innovations in accessible media also extend to museums, such as informal teaching environments. Materzini et al., Completing this, lareia, bentez, and Frega (2021) underline the importance of integrating large-scale assessments to ensure the same evaluation of mathematics skills among students with visual loss.

Finally, the future of inclusive evaluation lies in alignment with UDL principles. Gulab et al. (2018) argues that assessment should be both accurate and informative for all learners by offering flexible methods of reaction and representation. Such practices maintain academic standards and ensure that all students can display their mathematical ability meaningfully and confidently, regardless of their ability.

Research Methodology

This study used a numbers-based and detailed research method to carefully look into how diagnostic assessment, assistive technology, and Universal Design for Learning (UDL) strategies are used to help students with math learning difficulties. A quantitative approach was chosen to obtain measurable data reflecting teachers' perceptions, practices, and challenges in supporting students with mathematical learning difficulties (MLD). The descriptive aspect allows for comprehensive analysis of the strategies used in current trends, equipment, and inclusive classes, aimed at identifying patterns and correlations within the data collected. This design provided a clear outline to evaluate the effectiveness of inclusive practices in various educational settings.

The target population for this study included school students who are directly associated with students who experience mathematical learning difficulties. These teachers contribute significantly in identifying the challenges of learning, implementing inclusive instructional strategies and integrating subsidiaries in their classrooms. Different types of educational backgrounds and institutions' teachers were included to ensure a representative understanding of how inclusive strategies in the real-world teaching environment are being implemented and believed. The insights of these teachers need to explain that theoretical approaches, such as Universal Design for Learning (UDL) and diagnostic evaluation, translate into practical class applications.

A total of 350 teachers were selected as research samples through a simple random sampling technique. This sampling method was employed to ensure equal opportunities for participation in the population, reduce selection bias and ensure equal opportunity to increase the prevalence of conclusion. The sample size was determined to provide sufficient statistical power for the desired data analysis processes. Teachers were selected from urban and rural educational institutions, which ensured diversity in terms of experience, institutional resources and student demographics, which further enriched the data quality and relevance of the results of the study.

To collect data, a self-developed questionnaire was used as a primary research tool. The questionnaire was designed with previous studies (e.g., root et al., 2020; Menon and CSAPO, 2019) on current literature, UDL, clinical evaluation, and secondary technology. This included both a closed and launch-scale item to measure the perceptions, practices and obstacles faced by the participants. The development process focused on aligning questions with the objectives of the study, ensuring that all three main components – clinical evaluation, auxiliary technology and UDL – were adequately represented.

The validity of the questionnaire was established through expert review. A panel of professionals in the fields of inclusive education and educational psychology reviewed the material for clarity, relevance, and alignment with research objectives. Amendments were made based on their response to improve understanding and material coverage. To determine credibility, a pilot test with 30 teachers was conducted; 30 teachers were not included in the final sample. The results were analyzed using Cronbach's alpha, with a coefficient of 0.84, indicating the internal stability and reliability of the instrument.

Data was collected through both physical distribution and online methods to ensure broader access and convenience for participants. Questionnaire hard copies were distributed individually to schools located in accessible areas, while a Google Form Link was transmitted through emails and social media platforms for teachers in remote or timely settings. This mixed-mode strategy enabled efficient data collection by adjusting the logical and technical boundaries faced by the participants in various contexts.

The data collected was analyzed using both descriptive and inferential statistical techniques with the help of SPSS software. Descriptive figures, including instruments, frequencies, and standard deviations, were used to summarize the reactions of the participants and identify general trends in their use of inclusive strategies. Inferred figures such as T-tests and ANOVA were organized to check the gap of groups based on demographic variables such as inferior figures, teaching experiences, types of school types, and resources. This analytical approach provided both a comprehensive observation and an intensive understanding of how clinical evaluation, auxiliary technology, and UDL affect inclusive mathematics instruction.

Table 1: Demographic Distribution of Respondents

Title	Description	Frequency	Percentage (%)
Gender	Male	119	34.0%
	Female	231	66.0%
		350	100%
Age of Respondents	21-30 Y	12	3.4%
	31-40 Y	123	35.1%
	41-50 Y	173	49.4%
	51-60 Y	42	12.0%
		350	100%
Designation	Senior Teacher	185	52.9%
	Junior Teacher	165	47.1%
		350	100%
Qualification	Master	230	65.7%
	M.Phil.	99	28.3%
	PHD	21	6.0%
		350	100%
Place of Posting	School	187	53.4%
	Center	163	46.6%
		350	100%
Area of Posting	Rural	83	23.7%
	Urban	267	76.3%
		350	100%
Experience	1-5 Y	91	26.0%
	6-10 Y	164	46.9%
	11-15 Y	72	20.6%
	>15 Y	23	6.6%
		350	100%

This table presents the demographic breakdown of the 350 participating teachers. It shows that the majority were female (66%) and within the age group of 41–50 years (49.4%). Most respondents held a master's degree (65.7%), worked as senior teachers (52.9%), and were posted in schools (53.4%) located in urban areas (76.3%). In terms of professional experience, the largest segment had 6–10 years of teaching experience (46.9%). This demographic diversity offers a broad and balanced representation of perspectives for the study's findings on inclusive practices in mathematics education.

Table 2: Teachers' Perceptions on the Effectiveness of Inclusive Strategies in Mathematics Learning

Sr.	Statements of Questions	SA	A	UD	DA	SDA	M	SD
1	Diagnostic assessments help me identify students with mathematics learning difficulties at an early stage.	179 51%	133 38%	26 7%	12 3%	0 0%	4.37	0.77
2	I regularly use diagnostic tools to evaluate the specific math challenges faced by my students.	187 53%	149 43%	14 4%	0 0%	0 0%	4.49	0.58
3	Early identification through diagnostic assessment improves academic outcomes in mathematics.	156 45%	178 51%	16 5%	0 0%	0 0%	4.40	0.58

4	I feel confident in interpreting diagnostic data to tailor my mathematics instruction.	205 59%	122 35%	4 1%	15 4%	4 1%	4.45	0.82
5	Assistive technology enhances the accessibility of mathematical concepts for students with learning difficulties.	126 36%	184 53%	26 7%	14 4%	0 0%	4.21	0.74
6	I integrate technology-based tools (e.g., math apps, screen readers) in teaching students with math-related learning needs.	151 43%	148 42%	37 11%	14 4%	0 0%	4.25	0.80
7	The use of assistive technologies increases students' engagement in math lessons.	157 45%	156 45%	28 8%	5 1%	4 1%	4.31	0.77
8	Students with math learning difficulties show better understanding when assistive tools are used.	132 38%	177 51%	31 9%	6 2%	4 1%	4.22	0.77
9	UDL strategies help me address the diverse needs of learners in my mathematics classroom.	132 38%	173 49%	33 9%	0 0%	12 3%	4.18	0.87
10	I provide multiple means of content representation (e.g., visual, auditory, and hands-on activities) during math instruction.	157 45%	137 39%	29 8%	19 5%	8 2%	4.19	0.96
11	Allowing students to express their mathematical understanding in different formats (e.g., oral, written, visual) enhances learning outcomes.	161 46%	143 41%	32 9%	5 1%	9 3%	4.26	0.88
12	UDL-based teaching promotes active participation of students with mathematics learning difficulties.	134 38%	156 45%	43 12%	14 4%	3 1%	4.15	0.85
13	The combination of diagnostic assessment, assistive technology, and UDL improves the academic performance of students with math learning difficulties.	105 30%	190 54%	32 9%	17 5%	6 2%	4.06	0.86
14	My school provides sufficient training and support to effectively implement inclusive strategies in mathematics.	170 49%	148 42%	21 6%	11 3%	0 0%	4.36	0.74
15	I believe that integrating inclusive tools and strategies benefits all students, not just those with identified learning difficulties.	148 42%	167 48%	24 7%	11 3%	0 0%	4.29	0.73

This table reflects responses to 15 Likert-scale statements aligned with diagnostic assessment, assistive technology, and UDL practices. High mean values (ranging from 4.06 to 4.49) and low standard deviations indicate a strong overall agreement among teachers regarding the importance and effectiveness of these inclusive strategies. Notably, statements on diagnostic tool usage and confidence in data interpretation received the highest agreement, while beliefs about school-level support and combined strategy effectiveness also scored positively. These responses confirm widespread acceptance of inclusive practices and their impact on improving engagement and academic outcomes for students with mathematics learning difficulties.

Table 3: Gender-wise Comparison of Teachers' Perceptions Regarding Inclusive Strategies

Gender	N	Mean	Std. Deviation	df	t	Sig. (2-tailed)
Male	119	64.71	6.80	348	1.06	0.289
Female	231	63.93	6.30			

This table compares male and female teachers' mean responses. The mean score for males (M = 64.71) was slightly higher than that of females (M = 63.93), but the difference was not statistically significant (p = 0.289). This indicates that gender did not play a major role in shaping teachers' perceptions about the use and impact of inclusive educational strategies in mathematics, suggesting a generally consistent understanding and acceptance of such practices across genders.

Table 4: Designation-wise Comparison of Teachers' Perceptions Regarding Inclusive Strategies

Designation	N	Mean	Std. Deviation	df	t	Sig. (2-tailed)
Senior Teacher	185	65.23	5.85	348	3.22	0.001
Junior Teacher	165	63.03	6.95			

The table reveals a statistically significant difference in perceptions based on designation (p = 0.001), with senior teachers (M = 65.23) showing more favorable views toward inclusive strategies compared to junior teachers (M = 63.03). This may reflect the senior teachers' greater exposure to professional development, experience in managing diverse classrooms, or a deeper understanding of diagnostic and technological tools in inclusive education.

Table 5: Area of Posting-wise Comparison of Teachers' Perceptions Regarding Inclusive Strategies

Area of Posting	N	Mean	Std. Deviation	df	t	Sig. (2-tailed)
Rural	83	67.52	6.54	348	5.58	0
Urban	267	63.16	6.11			

A significant difference was observed between rural and urban teachers (p = 0.000). Teachers in rural areas had a higher mean score (M = 67.52) compared to their urban counterparts (M = 63.16), indicating that rural teachers possibly recognize a greater need or impact of inclusive strategies due to infrastructural or resource-related challenges. This highlights geographical disparities in the implementation and appreciation of inclusive educational practices.

Table 6: ANOVA Results for Teachers' Perceptions Based on Age Groups

Age	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1658.99	3	553.00	14.75	0.00
Within Groups	12975.80	346	37.50		
Total	14634.79	349			

The analysis of variance (ANOVA) shows a significant difference among the different age groups (p = 0.00). This suggests that teachers' perceptions of inclusive practices vary with age, potentially due to differing levels of technological familiarity, training exposure, or teaching philosophies across generational cohorts. These findings call for age-specific professional development interventions to harmonize inclusive teaching strategies.

Table 7: ANOVA Results for Teachers' Perceptions Based on Qualification

Qualification	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	927.87	2	463.94	11.75	0.00

Within Groups	13706.92	347	39.50
Total	14634.79	349	

This table shows a significant variation in perceptions based on teachers' qualifications (p = 0.00). Teachers with higher qualifications such as M.Phil. and PhD displayed more favorable attitudes towards the integrated use of diagnostic tools, assistive technologies, and UDL frameworks. The data suggest that advanced academic training contributes to a better understanding and application of inclusive practices in mathematics education.

Table 8: ANOVA Results for Teachers' Perceptions Based on Teaching Experience

Experience	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1100.27	3	366.76	9.38	0.00
Within Groups	13534.52	346	39.12		
Total	14634.79	349			

A significant difference was found in perceptions across experience levels (p = 0.00). Teachers with 6–10 years of experience exhibited more positive attitudes, possibly due to their balanced exposure to both traditional and modern teaching practices. These results emphasize the importance of tailoring professional training based on teachers' experience levels to optimize the implementation of inclusive educational strategies.

Findings

The demographic profile of 350 participating teachers shows a diverse and representative sample of professionals engaged in supporting students with difficulties learning mathematics. Most of the respondents were indicated to be female (66%) and mainly in the 41–50 years age group (49.4%) and possibly mid-career teachers. Most held a master's degree (65.7%) and employed them as senior teachers (52.9%), which suggests a relatively high level of merit and responsibility in their institutions. More than half of schools (53.4%) were posted, and a significant majority were located in urban areas (76.3%), while 46.9% reported 6–10 years of teaching experience—an optimal range for both experience and adaptability for new educational strategies. This increases the reliability of distribution responses, given the diversity of teachers in experience, education, and workplace environment.

Teachers' reactions to Likert-Skele Questionnaires indicate a strong consensus on the effectiveness of integrated inclusive strategies that is, clinical assessment, accessory technologies, and universal design for learning (UDL) addressing the challenges of learning difficulties. The highest agreement was seen on regular use of clinical equipment (meaning = 4.49) and confidence in explaining clinical data (meaning = 4.45), reflecting the centrality of early identity in current teaching practices. Similarly, high medium values were recorded for the role of auxiliary technology in increasing accessibility (meaning = 4.21) and engagement (meaning = 4.31); many teachers confirmed that such equipment improves the ideological understanding of students. Support of UDL strategies is also strong in statements; the teachers agreed to offer several means of material representation and allow students to express their understanding in various formats. These conclusions collectively confirm that the integrated use of these inclusive approaches not only supports learners with difficulties but also promotes wide academic engagement and success.

Further analysis discovered how demographic variables affected the perceptions of inclusive educational strategies. The gender-wise comparison showed no statistically significant difference between male and female teachers (p = 0.289), indicating a uniform understanding and acceptance of inclusive equipment in the penis. However, the designation greatly impressed the perceptions; Senior teachers showed a strong tilt towards inclusive practices (M = 65.23) compared to junior teachers (M = 63.03) with P-Value of 0.001. This can be attributed to their deeper participation in decision-making about their greater risk and direct design for professional development. Similarly, teachers posted in rural areas reported much more positive perceptions (M = 67.52) than urban areas (M = 63.16) (P = 0.000), suggesting that teachers in low-purpose settings recognise more value in inclusive strategies to remove infrastructure and educational boundaries.

Age, qualifications, and teaching experiences also emerged as important factors shaping the attitude of teachers. ANOVA tests detected a statistically significant difference in perceptions in age groups (p = 0.00), drawing on more and more instructional insight or professional maturity to appreciate the inclusive approach with older teachers. The level of qualification also affected the reactions, such as high qualification holders such as MPhil. And PhD degree holders express more alignment with clinical evaluation, auxiliary technology, and benefits of UDL (P = 0.00). This possibility shows how advanced academic training promotes intensive educational awareness and familiarity with inclusive education structures. In addition, teaching experience affects perceptions (P = 0.00); teachers have 6–10 years of experience that shows the highest compromise with the effectiveness of inclusive strategies. This group possibly benefits from the balance of enthusiasm for innovation and practical class experience, making them particularly receptive to contemporary inclusive teaching methods.

The findings of the study display strong support among teachers for diagnostic evaluation, assistive technology, and integration of UDL in addressing mathematics learning difficulties. While a comprehensive agreement was observed in all demographics, some subgroups such as senior teachers, rural teachers, and people with high qualifications and medium teaching experiences showed strong support for inclusive strategies. These conclusions highlight the importance of targeted business development, just resource distribution, and policy interventions when implementing inclusive education models in mathematics that account for demographic factors.

Discussion

The results of this study show that teachers mostly agree on the importance of clinical assessment, helpful technologies, and the overall effectiveness of universal design (UDL) in improving math teaching for students with learning difficulties. Teachers agreed that clinical equipment plays an important role in the initial identification of mathematics learning difficulties, reflecting their consistent use and belief in data interpretation with high-medium scores. It closely aligns with the work of Molnar and Csapó (2019), who highlighted the power of technology-based clinical assessment to indicate cognitive priority of mathematical skill development. Such preliminary identity not only promotes time intervention but also equips teachers with individual instructions that increase educational achievement (Alahmari et al., 2025).

The role of assistive technologies was also very important. Teachers reported that mathematics apps, screen readers, and tools such as touch or auditory interfaces help both access and students to improve connectivity during instructions. These findings are supported by Ali, Aftab, and Chaudhary (2024), whose research shows that integrated differential instructions with supportive technologies lead to high levels of participation and autonomy among students with mathematical challenges. Similarly, offering high compromises with UDL-oriented practices such as many ways of representation and expression confirms that inclusive education is seen not only as support for struggling learners but also as a means of enriching educational experience for all students (Sajjad et al., 2025).

Demographic factors added further depth to the conclusions. Senior teachers, rural teachers, and highly qualified teachers showed a much more favorable attitude towards inclusive strategies. This may arise from direct encounters with their broad professional experience, exposure to training, or under-resourced educational environments, where inclusive methods become a requirement rather than an option. Statistically significant differences based on age, capacity, and teaching experience suggest that professional maturity, educational risk, and classroom familiarity are important promoters in adopting inclusive teaching practices. These variations reflect the requirement of discriminated business development strategies to suit the career stages and backgrounds of teachers (Aftab et al., 2024).

This study provides strong empirical assistance for clinical evaluation, secondary technology and integration of UDL in inclusive mathematics education. These devices collectively increase early identity, access and students' engagement, which are the main elements for improving learning results in mathematics. The alignment of current conclusions with current research (Malanar and Csapó, 2019; Ali et al., 2024) gives importance to their educational importance and emphasizes urgency for systemic implementation. Policies that promote teacher training, infrastructure investment and access to technology are necessary to ensure that these inclusive strategies have been made embedded practices in mainstream classes (Amjad et al., 2025; Bagadood et al., 2025).

Conclusion

The results of this study suggest that using learning (UDL) for clinical evaluation, additional technology and universal design improves teaching and learning for students with learning difficulties simultaneously. The teachers demonstrated a strong consensus on the importance of preliminary identity, access, and engagement, which are effectively addressed by these inclusive strategies. Clinical assessments were particularly valuable to identify specific teaching gaps in an early stage, which enabled the target intervention that improved educational results. Similarly, supportive technologies were recognized to make mathematical material more accessible and attractive, while UDL-based practices were credited to support diverse teaching preferences and promote the environment of inclusive classes. These results align for the purpose of study and underline the practical relevance of integrating these strategies in inclusive mathematics education.

In addition, the discussion showed that demographic factors such as teaching designation, posting field, qualification, age, and experience affect their implementation of teachers' perceptions and inclusive practices. Senior and rural teachers, as well as people with high educational qualifications and medium teaching experiences, showed strong support for the combined use of clinical equipment, auxiliary technology and UDL. This insight suggests judicial development, infrastructure plans and policy-level advocacy to correspond to uninterrupted educational methods for justification and continuous adoption. In the end, this study highlights that a strategically integrated approach is effective in addressing the challenges of students not only with the difficulties of learning mathematics but is also necessary for the manufacture of equitable, inclusive, and high-performing educational settings.

Recommendations

1. Schools should provide regular business development programs to train teachers in effective integration of clinical assessment, assistant technologies and UDL strategies.
2. Educational policy makers should ensure equal distribution of inclusive resources, especially in under-reliance and rural settings.
3. Courses developers should embed inclusive practices in mathematics teaching structure to support various learners from initial grades.

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