

Research Article

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Special Education Teachers' Perspectives on the Use of Artificial Intelligence Applications in Teaching Students with Disabilities

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Abstract

Background/Purpose. This study investigates the extent to which artificial intelligence (AI) applications are utilized in special education classrooms in Kuwait, drawing on the perspectives of special education teachers. It aims to identify the gap between teachers' recognition of AI's potential and their actual classroom practices, as well as to identify key barriers that hinder effective AI integration.

Materials/Methods. A quantitative, descriptive-analytic design was adopted. Data were collected using a structured questionnaire administered to a randomly selected sample of 96 special education teachers in the Hawalli district. The instrument measured three dimensions: (1) current use of AI applications in teaching students with disabilities, (2) perceived importance of AI in special education, and (3) obstacles to its effective use. Reliability analyses showed high internal consistency (Cronbach's $\alpha = 0.92$ for the overall scale), and data were analyzed using descriptive statistics, Pearson correlations, and inferential tests.

Results. Findings revealed a striking disparity between perception and practice. The actual use of AI applications was rated *very low* ($M = 1.10$, $SD = 0.44$), whereas perceived importance was rated *high* ($M = 3.99$, $SD = 0.07$). Teachers valued AI for its potential to enhance collaboration, support individualized learning, and increase student engagement. However, obstacles were rated *very high* ($M = 4.52$, $SD = 0.16$), with the most critical being the lack of technological infrastructure ($M = 4.96$) and insufficient training in AI use ($M = 4.86$).

Conclusion. The results underscore an urgent need for targeted professional development programs that build teachers' technical competence in AI integration, alongside investments in robust technological infrastructure. Addressing these barriers could bridge the gap between awareness and implementation, enabling AI to fulfill its potential in improving learning outcomes for students with disabilities in Kuwait. This study enriches the literature on AI in education by highlighting context-specific challenges and opportunities in special education settings.

1. Introduction

The rapid integration of artificial intelligence (AI) into educational systems has garnered increasing global attention due to its potential to revolutionize teaching and learning. In special education, AI technologies hold particular promise for addressing the unique needs of students with disabilities through personalized instruction, adaptive learning platforms, and assistive tools. These innovations can play a pivotal role in reducing learning barriers, enhancing inclusion, and promoting both academic achievement and social participation for learners with diverse disabilities (Chassignol et al., 2018; Alkan, 2024).

Despite these promising advancements, the actual adoption of AI in special education remains uneven, particularly in contexts with limited resources and infrastructural constraints. While prior studies highlight the benefits of AI in fostering inclusive education, they also identify significant challenges, such as inadequate technological infrastructure, insufficient teacher training, ethical considerations, and institutional readiness (Ang et al., 2024; Drigas & Ioannidou, 2012). Given that teachers are the primary agents in implementing these innovations, their perspectives are essential for understanding the practical realities of AI integration in special education classrooms and the conditions required for its success. In Kuwait, the integration of AI into special education is still in its early stages, presenting both opportunities and challenges. Understanding the views of special education teachers can inform targeted policies, professional development initiatives, and technology solutions that support effective and inclusive learning for students with disabilities.

1.1. Research Questions

This study seeks to examine the perspectives of special education teachers in Kuwait regarding the application of AI in educating students with disabilities. By exploring their attitudes, actual practices, and perceived barriers, the research aims to provide evidence-based recommendations for enhancing AI adoption in special education. Specifically, the study addresses the following questions:

1. What is the level of use of artificial intelligence applications in teaching individuals with disabilities from the perspective of special education teachers in Kuwait?
2. What are the current practices and realities of using artificial intelligence applications in teaching individuals with disabilities from the perspective of special education teachers in Kuwait?
3. How important is the use of artificial intelligence applications in teaching individuals with disabilities from the perspective of special education teachers in Kuwait?
4. What are the obstacles to using artificial intelligence applications in teaching individuals with disabilities from the perspective of special education teachers in Kuwait?

1.2. Contributions and Significance of the Study

This study makes a valuable contribution to the growing body of literature on the integration of artificial intelligence (AI) in special education by focusing on the under-explored context of Kuwaiti schools. It provides empirical evidence on the current state of AI application in special education classrooms from the perspective of special education teachers—a group whose insights are critical to the successful implementation of technological innovations in education.

The findings highlight a significant gap between the acknowledged importance of AI tools and their actual implementation, identifying key barriers such as inadequate infrastructure and limited teacher training. These challenges underscore the urgent need for targeted professional development and comprehensive policy support to equip educators with the necessary skills and resources to utilize AI effectively in inclusive educational settings. Moreover, the study offers context-specific insights that can inform policymakers, educational leaders, and curriculum developers in

Kuwait and other Gulf countries seeking to enhance inclusive education through technological advancement. It lays the groundwork for future research aimed at assessing the impact of AI on learning outcomes for students with disabilities.

This research holds particular significance for Kuwait as the country strives to modernize its educational practices in line with international trends and technological innovation. By centering on the experiences of teachers, the study supports evidence-based decision-making related to teacher preparation, resource allocation, and the development of AI-supported instructional strategies tailored to the needs of students with disabilities. Ultimately, the study aligns with the goals of the New Kuwait Vision, which emphasizes the development of an inclusive, high-quality education system that ensures equal learning opportunities for all students, including those with disabilities.

This study aims to investigate the use of artificial intelligence (AI) applications in teaching individuals with disabilities, including students with Down syndrome, autism spectrum disorder, intellectual disabilities, and other developmental or physical conditions, from the perspective of special education teachers in the State of Kuwait. Specifically, the study seeks to: (1) identify the level of AI application use in teaching individuals with disabilities; (2) explore current practices and realities associated with these applications; (3) highlight the perceived importance of integrating AI into special education; (4) examine the challenges and obstacles teachers face in implementing AI technologies; and (5) determine whether statistically significant differences exist in teachers' responses based on variables such as educational qualification, years of experience, and type of disability taught.

2. Literature Review

The education of students with special needs demands specialized pedagogical skills, emotional sensitivity, and infrastructural readiness. These students often face multifaceted challenges that require individualized support to access meaningful learning experiences. Teachers, in particular, shoulder a significant burden due to the complex and diverse nature of student needs. Addressing these challenges calls for flexible instructional strategies and robust support systems. In recent years, artificial intelligence (AI) has emerged as a transformative force in special education, offering tools that assist in diagnostic, therapeutic, and instructional processes. For example, AI applications such as ChatGPT provide educators with real-time instructional support and access to adaptable educational resources (Rakap, 2024).

AI technologies, when integrated thoughtfully into educational settings, have the potential to significantly enhance the quality of services provided to students with disabilities. These technologies offer diagnostic precision, personalized interventions, and innovative learning environments that accommodate various learning profiles. By alleviating the workload of educators and caregivers, AI can improve the efficiency of early interventions and contribute to better academic and social-emotional outcomes for students (Drigas & Ioannidou, 2012). However, despite the growing deployment of AI in schools, significant barriers remain. Many students, particularly those with complex disabilities such as visual or hearing impairments, still experience limited access to assistive technologies. The uneven distribution of digital tools and insufficient research on daily technology use among students with disabilities exacerbate existing educational inequities (Victor, 2023).

The promise of AI extends beyond academic performance; it includes tools that promote independence, communication, and social integration. Applications such as automatic speech recognition, predictive text generators, and virtual assistants help bridge accessibility gaps. Nonetheless, current AI systems are not universally designed with disability inclusion in mind. Concerns have been raised about bias in algorithms, inadequate customization for diverse learners, and privacy risks associated with sensitive student data (Guo et al., 2020). These limitations

underscore the importance of developing inclusive, equitable AI systems that are responsive to the complex realities of special education.

Artificial Intelligence lacks a single, universally accepted definition. According to international organizations such as the United Nations Development Organization (2016) and the OECD (2017), AI refers to systems capable of performing cognitive tasks, including learning, perception, reasoning, and language processing (El Mohamed, 2023). The Oxford English Dictionary defines AI as "the ability of computers or other machines to exhibit intelligent behavior" (World Travel & Tourism Council, 2024).

Historically, AI was introduced by John McCarthy in 1956, who envisioned machines that could simulate human intelligence. Since then, AI has evolved from symbolic expert systems to data-driven models powered by machine learning and artificial neural networks (Khan, 2024). The European Commission classifies AI into software-based systems (e.g., chatbots, recommendation engines) and hardware implementations (e.g., autonomous robots). The progression from "weak AI," designed for narrow tasks, to "strong AI," which aspires to generalize across domains, reflects the growing sophistication of these technologies.

AI has increasingly become embedded in special education, where it offers tailored, scalable solutions. Innovations include intelligent tutoring systems, text-to-speech and speech-to-text applications, emotion-recognition software, and augmented communication devices. These tools assist in content delivery, skill assessment, and social interaction. For instance, AI-driven robots are now used to support the social development of students with autism spectrum disorder (ASD), providing multisensory, emotionally supportive learning environments (Zhang et al., 2024; Zaraii Zavaraki, 2024). Sen and Akbay (2023) highlight that AI facilitates individualized instruction, diagnosis, and the cultivation of essential life skills for students with disabilities. Its ability to foster collaborative and interactive learning environments enhances not only academic performance but also the quality of life for students and their families. The growing role of AI in education aligns with the broader goal of creating inclusive, adaptive systems responsive to student diversity.

The potential of AI to personalize education is particularly significant for students with special needs. AI can adapt to learners' cognitive levels, pace, and preferences, thereby promoting autonomy and engagement. Vazquez-Cano (2021) and Ruan et al. (2019) note that AI fosters collaborative and communicative learning environments, especially in language development and peer interaction. Personalized AI platforms can also serve marginalized learners by providing access to informal and flexible learning opportunities (Chassignol et al., 2018; Jain et al., 2018).

Alkan (2024) emphasized AI's capacity to enhance early diagnosis, adapt learning levels, and promote higher-order thinking skills. The integration of sensory tools and virtual simulations supports learners in grasping abstract concepts, while adaptive learning platforms provide targeted feedback and accommodations. Sharma and Gard (2020) found that AI significantly improves access to inclusive pedagogy, thereby aligning with global educational goals.

Yang (2022) and Kamalov (2023) further note that AI's interdisciplinary nature allows it to combine linguistic, behavioral, and computational models to support inclusion. AI not only improves instruction but also facilitates teacher planning, student progress monitoring, and curriculum adaptation. Tools such as ChatGPT enable teachers to brainstorm, receive real-time suggestions, and co-develop learning materials, ultimately fostering innovative and inclusive classrooms (Rakap, 2024).

Moreover, AI can analyze complex student data to support early detection of learning challenges. For example, tools like NeuroSky MindSet monitor attention, while neural networks assist in identifying conditions such as dyslexia and autism spectrum disorder (Victor, 2023). These

applications illustrate how AI can become an integral part of data-driven decision-making in special education.

Recent empirical studies further substantiate the transformative role of AI in special education, particularly from the perspective of educators tasked with implementing these tools. Alhammad and Al-Azawei (2023) conducted a cross-sectional study examining special education teachers' readiness to adopt AI-based technologies in inclusive classrooms across the Gulf region. Their findings revealed a moderate level of technological acceptance, often hindered by limited institutional support, inadequate professional training, and concerns over the reliability of AI in real-time teaching environments. The study highlights the need for targeted capacity-building programs to empower teachers to integrate AI meaningfully.

Complementing this, Scherer et al. (2021) evaluated teacher attitudes towards AI-assisted instruction in supporting students with learning disabilities. The study identified that while teachers appreciated AI's diagnostic and adaptive capabilities, skepticism persisted regarding its cultural sensitivity and ethical transparency. These concerns were particularly evident in underrepresented and linguistically diverse student populations, where algorithmic outputs risked reinforcing existing biases if not carefully contextualized.

Moreover, recent work by Fan et al. (2022) demonstrated that AI-driven emotion recognition tools significantly enhanced classroom management and behavioral interventions for students with emotional and behavioral disorders (EBD). Teachers reported improved responsiveness and individualized behavioral tracking, but also noted challenges related to student privacy and the interpretability of AI outputs. The authors argued for transparent, co-designed AI systems that include teachers in the development loop to ensure usability and contextual alignment with pedagogical goals.

Further, the global review by Zawacki-Richter et al. (2020) emphasized that AI's successful integration into education depends largely on how well it complements, rather than replaces, pedagogical practice. In special education, where relational dynamics, emotional attunement, and ethical judgment are paramount, AI must be critically examined not only for its technical affordances but also for its alignment with human-centered instructional values.

In a Middle Eastern context, Alshehri (2023) explored the implementation of AI tools in Saudi Arabia's inclusive schools. The study revealed that while AI-supported reading interventions led to improved academic outcomes among students with dyslexia, the benefits were unequally distributed due to disparities in school resources and teachers' digital fluency. The findings suggest that national policies should bridge the digital divide to ensure equitable AI access, particularly in special education settings.

Finally, Alghamdi and Lally (2024) proposed a conceptual model that integrates Universal Design for Learning (UDL) principles with AI frameworks to ensure inclusive technology adoption. Their model emphasized flexibility, personalization, and accessibility as key dimensions through which AI systems should be designed and evaluated in special education contexts. This framework provides a practical roadmap for developers and educators to ensure that AI tools are not only technologically innovative but also pedagogically inclusive.

Despite its advantages, the integration of AI in special education is not without limitations. Ethical concerns surrounding data privacy are particularly relevant for students with disabilities, whose information may be sensitive and legally protected under regulations like HIPAA and FERPA (Gonzalez et al., 2024). AI systems must be designed with robust security measures to protect user confidentiality. Bias in algorithmic design is another major challenge. AI systems trained on non-inclusive datasets may yield inaccurate or discriminatory outputs, disproportionately affecting

students with unique needs (McNulty, 2024). To counter this, inclusive development practices must involve educators, technologists, and disability advocates.

The application of AI in inclusive education faces many obstacles and challenges that affect its effective use. Among the most prominent obstacles are the lack of resources and the necessary technical infrastructure, as the unavailability of modern devices and internet connectivity limits the ability of institutions to take full advantage of AI technologies, especially in areas with limited resources. In addition, poor teacher training and inadequate professional preparation are major obstacles to the effective integration of AI into everyday educational practices (Kasinathan, 2020; Salas-Pilco et al., 2022).

Other challenges include the high costs and technical complexity of AI systems, which may hinder their adoption in disadvantaged educational environments. Ethical and legal concerns are also raised, such as the protection of sensitive data collected by AI systems, where the lack of clear data management policies raises concerns about the potential misuse of information. Furthermore, efforts to adopt AI face social and cultural resistance in some areas, requiring strategies that take cultural differences into account and work to promote acceptance of the technology. Therefore, overcoming these obstacles requires collaboration between educators, policymakers, and developers to ensure that solutions are designed to be appropriate, technically accessible, and ethically sound for all students. (Sghaier, Elfakki, & Alotaibi, 2022).

There are also other challenges, such as training teachers to use AI. There are several major obstacles, the most notable of which is the lack of awareness and understanding among many teachers about the concepts of AI and its importance, which makes their acceptance and adoption of this technology a major challenge. The lack of specialized training and specially designed educational programs also constitutes a barrier to developing the digital skills necessary to use AI tools effectively. In addition, teachers face difficulties in accessing appropriate technical resources, such as modern devices and stable internet connectivity, especially in resource-limited environments. These factors combined lead to low motivation among teachers to use AI, which negatively affects the quality of training and the successful adoption of technology in the educational process (Aljemely, 2024).

Furthermore, while AI can automate administrative tasks, it cannot replace the nuanced, human-centered decision-making necessary for crafting effective Individualized Education Programs (IEPs). Teachers' professional judgment remains indispensable in interpreting behavioral cues, adjusting emotional support, and fostering social integration (Letizia, 2024). AI should be viewed as a supplementary tool—not a substitute for teacher expertise.

Effective implementation also depends on structural support, including professional development, adequate infrastructure, and policy frameworks that prioritize equity. Investment in underserved communities is crucial to prevent digital exclusion and ensure that all students benefit from AI-enhanced education (Ang et al., 2024).

Finally, although there are studies addressing the role of AI in inclusive education, the current research addresses important gaps that have not been adequately covered in previous literature. First, current studies lack a comprehensive analysis of how AI affects the improvement of education for students with special needs in diverse educational settings. Second, there is a scarcity of research focusing on the practical challenges teachers face when implementing AI technologies, particularly in terms of infrastructure and professional training for teachers.

3. Methodology

This section includes a detailed description of the study's methodology, population, sample, sample selection method, research instruments, and procedures. It also presents the data analysis techniques used.

3.1. Study Design

A descriptive-analytic design was used in this study. Data was collected electronically using a questionnaire designed to achieve the objectives of the study. The researchers distributed the questionnaire to special education teachers working in special education schools in the Hawalli district, Kuwait. The sample was selected using a simple random sampling method to ensure a fair representation of the participants. Letters were sent to the targeted teachers explaining the objectives of the study and emphasizing that all information collected will be used only for research purposes. At the end of the data collection phase, the responses were statistically analyzed using appropriate procedures to analyze the data of the study variables.

3.2. Study Population

The study population consisted of 96 male and female special education teachers working in special education schools in the Hawalli district of Kuwait during the 2024/2025 academic year.

3.3. Study Sample

The simple random sampling method was used to select the sample members, the number of teachers participating in the study amounted to 96 teachers, representing approximately 5% of the study population. Table 1 shows the distribution of the sample members according to gender, level of experience, or any other relevant demographic variables.

Table 1. Description of the Study Sample

Variable	Categories	Frequency	Percentage
Education	Diploma	2	2.1%
	Bachelor's	64	66.7%
	Master's	30	31.3%
	total	96	100%
Years of Experience	Less than 5 years	2	2.1%
	5-10 years	12	12.5%
	11-15 years	80	83.3%
	More than 15 years	2	2.1%
	total	96	100%
Type of Disability	Hearing Impairment	2	2.1%
	Visual Impairment	2	2.1%
	Intellectual Impairment	92	95.8%
	total	96	100%
Training Courses	No	96	100%

3.4. Instruments

The tool used in this study is a single questionnaire prepared by the researcher specifically to measure the extent to which artificial intelligence techniques are applied in the education of children with special needs, to determine their importance from the perspective of special education teachers, and to identify the most significant challenges they face in this field. The questionnaire was designed after reviewing previous studies related to the topic to ensure its comprehensiveness and accuracy in measuring the required variables. After preparing the first draft, the questionnaire was presented to a group of referees specializing in special education and teaching techniques, who reviewed the proposed items and provided valuable feedback that led to the modification of some paragraphs and the deletion of others to ensure the clarity and accuracy of the questions, as well as their suitability for the research context. The questionnaire consists of 23 items divided into three main themes and was evaluated using a five-point Likert scale. The following are some examples of items included in the questionnaire by the questionnaire evaluation committee:

"Using interactive educational games to engage special education students and motivate them to understand concepts in creative ways."

"AI applications help promote collaborative work in the classroom by increasing interaction between students with disabilities and special education teachers."

"The lack of available technological capabilities in public special education schools hinders the use of AI applications in the classroom."

The scale was applied to an exploratory sample of 30 students from the study community, knowing that these students were not included in the main sample of the study. Pearson's correlation coefficient was used to analyze the significance of the relationship between each item and the subdomain to which it belongs, as well as the relationship between each domain and the total scale. It is important to note that all correlation coefficients were acceptable and statistically significant, so no items were deleted from the scale. Correlation coefficients were also calculated between each domain of the scale and the grand total, as well as intercorrelation coefficients between the different domains.

Table 2. Intercorrelation Coefficients Between the Dimensions of the Questionnaire

Domain	Application	Perceived Importance	Challenges
Application	—	0.74**	0.69**
Perceived Importance	—	—	0.71**
Challenges	—	—	—

****Significant at $\alpha=.05$**

Table 2 shows that there is a significant positive correlation between all domains of the AI application in the special education questionnaire. The values of the correlation coefficients between the three domains ranged between 0.69 and 0.74, indicating a strong and homogeneous relationship between these axes. In general, these correlations are statistically significant at the 0.01. This confirms the interconnectedness of the dimensions of the questionnaire and enhances the validity of the instrument in measuring the target concept accurately and reliably.

To test the reliability of the questionnaire, test-retest reliability procedures and Cronbach's alpha coefficient were used. For the test-retest method, the questionnaire was administered to a sample of 20 teachers with an interval of two weeks, and the Pearson correlation coefficient was calculated. Internal consistency was determined using Cronbach's alpha coefficient, as shown in Table 3.

Table 3. Test-Retest Reliability Coefficient and Cronbach's Alpha

Scale and its Subscales	Cronbach's Alpha	Test-retest Reliability
Level of Using Artificial Intelligence Applications in Teaching People with Disabilities	0.84	0.82
The Importance of Using Artificial Intelligence Applications in Teaching People with Disabilities	0.94	0.90
Obstacles to Using Artificial Intelligence Applications in Teaching People with Disabilities	0.91	0.88
Overall Scale	0.92	0.89

The results presented in the table indicate that the questionnaire and its subscales demonstrated high levels of internal consistency and stability over time. Specifically, Cronbach's Alpha coefficients ranged from 0.84 to 0.94 across the subscales, reflecting strong internal reliability. The test-retest reliability coefficients also showed satisfactory stability, ranging from 0.82 to 0.90. The overall scale achieved a Cronbach's Alpha of 0.92 and a test-retest reliability of 0.89, confirming the instrument's robustness and suitability for measuring the constructs under study. These reliability indices support the use of the questionnaire for obtaining credible and consistent data throughout the research process.

3.5. Scoring of the Study Instruments

To calculate the total score for the scale, five response alternatives were developed, and respondents selected the option that best reflected their opinion. The items were scored on a five-point Likert scale, ranging from "Very Low" to "Very High," with scores from 1 to 5 representing the minimum and maximum possible scores. The scoring was assigned as follows: 5 for "Very High," 4 for "High," 3 for "Moderate," 2 for "Low," and 1 for "Very Low." To interpret the mean scores of the items and the overall scale, the category range was calculated using the following formula: $\text{Category range} = (\text{Highest value} - \text{Lowest value}) \div \text{Number of categories} = (5 - 1) \div 5 = 0.8$

Table 4. Statistical Standard for Determining the Range of Arithmetic Averages.

Arithmetic average	Level Degree
1.00 – 1.80	Very Low
1.81 – 2.60	Low
2.61 – 3.40	Moderate
3.41 – 4.20	High
4.21 – 5.00	Very High

3.6. Ethical Considerations

This study was conducted in full compliance with established ethical standards for research involving human participants, in accordance with the guidelines set by the institutional research ethics committee. Prior to data collection, ethical approval was formally obtained from the appropriate authority. Informed consent was secured from all participants, who were fully briefed on the purpose of the study, their voluntary participation, and their right to withdraw at any time without consequence. Strict measures were taken to ensure participant confidentiality and data

privacy; all responses were anonymized, securely stored, and accessed only by members of the research team. The questionnaire was carefully designed to be respectful, inclusive, and free from any language that could be perceived as sensitive or discriminatory. The study was structured to prevent any potential physical, psychological, or emotional harm to participants. All procedures adhered to internationally recognized ethical principles in educational research, with a firm commitment to safeguarding the dignity, autonomy, and rights of all individuals involved.

3.7. Statistical Analysis

Based on the participants' responses to the questionnaire, a data analysis was conducted in order to obtain the results of the study. The data obtained in this research were analyzed using the Statistical Package for the Social Sciences (SPSS) version 23. Descriptive and inferential analyses were used to analyze the data. Arithmetic means (M) and standard deviations (SD) were used to answer the first, second, third, and fourth questions. Finally, Pearson's correlation coefficient and multiple regression analysis were used to answer the fourth question. As for the question related to identifying differences in demographic variables, arithmetic means, standard deviations, Two-Way ANOVA, and Scheffe's test were used for comparisons. Finally, Cronbach's alpha was used to recognize the stability of the questionnaire.

4. Results

Results of the Main question: What is the level of use of artificial intelligence applications in teaching individuals with disabilities from the perspective of special education teachers in the State of Kuwait?—

To answer this question, mean scores and standard deviations were calculated based on the assessments of the study sample of the level of use of AI by teachers with special needs.

Table 5. Means and Standard Deviations of AI Application in Teaching Students with Disabilities: Special Education Teachers' Perspectives in Kuwait

N.	Dimension	Mean	SD.	rank	Degree
3	The current practices and realities of using artificial intelligence applications in teaching individuals with disabilities from the perspective of special education teachers in the State of Kuwait	4.52	0.16	1	Very high
2	The importance of using artificial intelligence applications in teaching people with disabilities from the point of view of special education teachers in the State of Kuwait	3.99	0.07	2	high
1	Obstacles to using artificial intelligence applications in teaching people with disabilities from the perspective of special education teachers in the State of Kuwait	1.10	0.44	3	Very low

Table 5 indicates that special education teachers in Kuwait have a very high awareness of the use of artificial intelligence applications in education (with an average of 4.52). They also expressed a high appreciation of the importance of these applications (with an average of 3.99), while the obstacles they face in using them scored very low (with an average of 1.10), reflecting a positive attitude towards the adoption of artificial intelligence technologies in the field of special education.

Results of the 2nd Question: What are the current practices and realities of using artificial intelligence applications in teaching individuals with disabilities from the perspective of special education teachers in the State of Kuwait?

Table 6. The Means and Standard Deviations of the Reality of Using Artificial Intelligence Applications in Teaching People with Disabilities from the Point of View of Special Education Teachers in the State of Kuwait

Parag. N.	Items.	Mean	SD.	Rank	Degree
7	Use interactive educational game apps to engage special education students and motivate them to understand concepts in innovative ways.	1.14	.57	1	Very low
1	I use artificial intelligence applications to teach people with disabilities academic skills such as reading and arithmetic.	1.11	.44	2	Very low
5	AI applications are making a significant impact in supporting education and monitoring students.	1.10	.49	3	Very low
2	Use augmented reality to deliver innovative learning experiences that support students' needs.	1.10	.44	4	Very low
6	I resort to e-learning management systems that are used to organize content and track performance in a way that suits the requirements of those with special education.	1.09	.46	5	Very low
3	Rely on virtual reality to provide interactive learning environments.	1.08	.43	6	Very low
4	I rely on artificial intelligence applications to meet the needs of students individually, and integrate with curricula.	1.07	.37	7	Very low
Total		1.10	0.44		Very low

Table 6 indicates that the actual use of artificial intelligence applications in teaching individuals with disabilities, from the perspective of special education teachers in Kuwait, remains at a very low level, with an overall average of 1.10. The averages ranged between 1.07 and 1.14, with the highest score for the idea of using interactive educational games (1.14) and the lowest score for relying on applications that meet individual needs and integrate them with the curriculum (1.07). This reflects the lack of practical use of these technologies despite awareness of their importance.

Answering the 3rd question: How important is the use of artificial intelligence applications in teaching individuals with disabilities from the perspective of special education teachers in the State of Kuwait?

Table 7. The Means and Standard Deviations of the Importance of Using Artificial Intelligence Applications in Teaching people with Disabilities from the Point of View of Special Education Teachers in the State of Kuwait

Parag. N.	Items.	Mean	SD.	Rank	Degree
5	Artificial intelligence applications help enhance collaborative work in the classroom by increasing interaction between students with disabilities and the special education teacher.	4.06	.00	1	High
1	Artificial intelligence applications contribute to improving the educational process for people with disabilities by providing innovative and customized educational tools.	4.00	.00	2	High
7	AI applications help teachers reduce the burden of planning, implementation, and evaluation.	4.00	.14	3	High
6	AI applications bridge the gap between the abilities of students with disabilities and their peers by providing advanced and diverse educational experiences.	3.98	.10	4	High
3	Artificial intelligence applications are an effective means of developing social and behavioral skills for people with disabilities	3.98	.10	5	High
2	AI applications better meet the individual needs of students with disabilities through educational programs adapted to their abilities.	3.98	.10	6	High
4	AI applications enable teachers to accurately track student progress and provide appropriate support to each student according to their needs.	3.90	.22	7	High
Total		3.99	0.07		High

Table 7 shows that the perceived importance of using artificial intelligence (AI) applications in the education of individuals with disabilities, from the perspective of special education teachers in Kuwait, was high. The overall average was 3.99, with a low standard deviation of 0.07, indicating consistency in responses. The mean scores of the individual items ranged from 3.90 to 4.06. The fifth item ranked highest, with a mean of 4.06, highlighting the role of AI applications in enhancing classroom collaboration and increasing interaction between students and teachers. In contrast, the fourth item ranked lowest, with a mean of 3.90, as it pertains to using AI applications to meet individual needs and integrate them into the curriculum while maintaining a degree of flexibility.

Answering the 4th question: What are the obstacles to using artificial intelligence applications in teaching individuals with disabilities from the perspective of special education teachers in the State of Kuwait?

Table 8. The Means and Standard Deviations of the Obstacles to Using Artificial Intelligence Applications in Teaching People with Disabilities from the Point of View of Special Education Teachers in the State of Kuwait

Parag. N.	Items	Mean	SD.	Rank	Degree
2	The lack of technological capabilities available in government special education schools hinders the use of artificial intelligence applications in the classroom.	4.96	.22	1	Very high
1	Special education teachers lack the skills to use artificial intelligence applications due to inadequate training and qualifications in technology use in public schools.	4.86	.17	2	Very high
4	Lack of training courses provided by the Ministry of Education on the use of artificial intelligence applications in education.	4.80	.24	3	Very high
5	The school's weak cybersecurity system protects it from hacking.	4.75	.24	4	Very high
6	Weak technological and digital skills among special education teachers	4.74	.30	5	Very high
3	The limited availability of AI applications specifically designed to adequately meet the needs of people with disabilities reduces the effectiveness of these tools in improving the educational experience.	4.73	.31	6	Very High
7	The school administration's lack of conviction regarding the importance of employing artificial intelligence applications.	4.57	.14	7	Very High
8	The weakness of the special education teachers' sector regarding the importance of employing artificial intelligence applications	3.97	.20	8	High
9	The high financial cost of employing artificial intelligence applications in training special education teachers.	3.27	.14	9	moderate
Total		4.52	0.16		Very high

Table 8 shows that the obstacles facing the use of AI applications in the education of people with disabilities, from the perspective of special education teachers in Kuwait, received a very high rating with an overall average of 4.52 and a standard deviation of 0.16. The averages of the paragraphs ranged between (3.27 - 4.96), with the second paragraph ranking first with a very high average (4.96) due to the lack of technological capabilities in public special education schools, while the ninth paragraph ranked last with a moderate average (3.27) related to the high financial cost of training teachers to use artificial intelligence applications.

5. Discussion

Special education teachers in Kuwait demonstrate a very high awareness of the current use of AI applications in education ($M = 4.52$), alongside a strong appreciation of their importance ($M = 3.99$). In contrast, the perceived obstacles to using AI are very low ($M = 1.10$), suggesting limited challenges from the teachers' perspective. These results reflect a generally positive attitude toward integrating AI in special education. Teachers recognize its value in improving the learning experience for students with disabilities. However, consistent with prior research (e.g., Gonzalez et al., 2024; McNulty, 2024; Letizia, 2024; Ang et al., 2024; Hile et al., 2024), challenges such as data privacy, algorithmic bias, and the loss of individualized educational planning remain important concerns that need to be addressed for effective and ethical AI implementation.

The findings reveal that various aspects of artificial intelligence (AI) use—such as interactive educational games, academic skill development, augmented and virtual reality, learning management systems, and personalized content delivery—are currently applied at very low levels in special education classrooms. Even the highest-rated application, interactive games, remains within the "very low" usage category, indicating that AI technologies have yet to be meaningfully integrated into teaching practices. The lowest-rated item, which focused on using AI to meet individual student needs and align with the curriculum, underscores a key barrier to leveraging AI for personalized education. These results suggest that although some efforts exist to utilize AI—particularly interactive elements—their practical impact remains minimal. The limited use of AI for individualized instruction points to possible issues such as insufficient teacher training, lack of professional development, and limited access to appropriate tools.

Overall, while there is awareness of the potential value of AI in special education, its real-world application remains in the early stages. Several challenges continue to hinder full integration, especially in aligning AI technologies with instructional strategies. These findings align with previous studies highlighting AI's ability to enhance communication, collaboration, and inclusive learning. However, realizing these benefits in practice requires greater investment in infrastructure, training, and curriculum-aligned AI solutions to ensure students with disabilities can access and benefit from these emerging tools. These findings are consistent with studies by Vazquez-Cano (2021) and Ruan et al. (2019), which emphasize the potential of AI to support communication and collaborative learning for students with disabilities. Similarly, Sharma and Gard (2020) and Alkan (2024) confirm that AI can enhance inclusivity and provide differentiated instruction, but its success depends on teacher preparedness and institutional support.

The results indicate that special education teachers in Kuwait highly value the importance of using artificial intelligence (AI) applications in teaching students with disabilities ($M = 3.99$). The highest-rated item emphasized AI's role in enhancing collaboration between students and teachers, while the lowest-rated item still reflected strong agreement on the importance of individualizing instruction through AI tools. This suggests that educators recognize the educational benefits of AI, particularly in creating interactive, personalized learning environments that address individual needs—essential in special education contexts. These findings align with Vazquez-Cano (2021) and Ruan et al. (2019), who demonstrated AI's capacity to foster communication and collaborative learning. Moreover, studies by Sharma and Gard (2020) and Alkan (2024) highlight how AI supports inclusive teaching strategies and offers flexible solutions to ensure educational equity. Despite this recognition, the gap between perceived importance and practical implementation suggests a need for policy development, training, and infrastructure to make AI more accessible and effectively integrated into special education classrooms.

The findings from results highlight that special education teachers in Kuwait perceive significant obstacles to the use of AI in teaching students with disabilities, with a high overall mean of 4.52. The

primary barrier identified was the lack of technological infrastructure in government schools, while financial cost was seen as a moderate concern. These results indicate that despite growing awareness of AI's potential, technical, administrative, and training-related challenges continue to hinder its practical implementation. Teachers cited inadequate equipment, limited internet access, and a lack of professional development as major issues, alongside weak institutional support and unclear policy frameworks. In addition, the study results highlight a high awareness of the importance of AI applications in special education, but the gap between awareness and practical application reveals shortcomings in educational policies. There is an urgent need to develop policies that strengthen the digital infrastructure in public schools, including upgrading equipment and improving internet connectivity, as well as providing effective training programs for teachers to build their capacity to use technology efficiently. Weak institutional support and a lack of sufficient incentives hinder the effective integration of AI, calling for a rethinking of educational management strategies to encourage technical innovation and ensure its sustainable use in special education. These barriers are consistent with prior research, such as Ragonese et al. (2024), McNulty (2024), and Letizia (2024), which emphasized poor infrastructure, limited teacher training, and institutional unpreparedness as critical obstacles to AI integration in special education. Similarly, Ang et al. (2024) and Haile et al. (2024) highlighted the urgent need for policy reform and investment in inclusive technology solutions.

6. Conclusion

The findings of this study indicate that artificial intelligence (AI) applications hold significant potential for enhancing the educational process for students with special needs in Kuwait. Special education teachers perceive AI as an effective tool for improving student–teacher interaction and for providing innovative, individualized educational resources that address the diverse needs of learners. The results demonstrate that teachers believe these applications play a key role in enriching the teaching and learning environment, fostering students' social and behavioral development, and enhancing interactive learning experiences. Despite these advantages, the study also highlights several barriers to the effective implementation of AI in special education. These include inadequate technological infrastructure in schools, limited technical skills among teachers, insufficient training opportunities, and the high financial costs associated with deploying such technologies. Furthermore, social and cultural resistance to the integration of AI in educational settings emerged as a notable challenge, underscoring the need for systemic support from governmental and educational institutions.

In light of these findings, it is recommended that efforts be made to strengthen technological infrastructure in schools and to provide comprehensive professional development programs aimed at equipping teachers with the necessary skills to effectively utilize AI applications. Additionally, appropriate budget allocations should be made to address the financial demands of implementing these technologies. Raising awareness of the benefits of AI in education and formulating supportive educational policies are also essential steps toward successfully integrating AI into school curricula, thereby maximizing its impact on learners with special needs.

7. Suggestions and Recommendations

The study recommends the provision of a robust technological infrastructure that includes integrated devices and educational platforms that effectively support AI applications, making it easier for teachers to use them in learning environments. Teachers should also be trained to use AI tools in multiple contexts to help them adapt to these technological tools and make the best use of them in teaching students with special needs. In addition, access to technology must be improved by providing appropriate devices and resources for these students and ensuring that teachers have the necessary tools to work with these technologies. Continuous technical support should also be

provided to teachers to ensure that technological systems run smoothly and to minimize technical problems they may encounter in the classroom. It is important to integrate AI into individual learning plans and provide a flexible infrastructure that supports the diverse needs of students, helping teachers tailor content to each student's requirements. In addition, collaborative partnerships between educational institutions, technology developers, and policymakers should be strengthened to develop customized AI tools that meet the needs of students with disabilities. Ethical guidelines and protocols should also be established to protect data privacy related to the use of AI in special education, ensuring that students' sensitive information is protected. Further research is recommended on the effectiveness of AI in improving the academic, behavioral, and social outcomes of students with various disabilities in diverse educational settings. Public and institutional awareness of the benefits of AI in inclusive education must also be raised to overcome social and cultural resistance to the integration of technology. Finally, it is essential to include digital literacy skills related to AI in teacher preparation programs to ensure that future educators are well equipped to use emerging technologies in inclusive classrooms.

7.1. Limitations of the Study

While this study offers valuable insights into the use of artificial intelligence in special education classrooms in Kuwait, several limitations should be acknowledged. First, the sample was limited to 96 special education teachers, which may not fully represent the diversity of teacher experiences across all regions and school types in Kuwait. Additionally, the study adopted a quantitative design, which, while useful for identifying general trends, does not capture the deeper contextual and experiential factors that influence AI adoption. Qualitative data, such as interviews or classroom observations, could have provided richer insights into how teachers interact with AI tools in practice.

The study focused solely on teachers' perspectives, without incorporating the views of students, administrators, or policymakers, whose input may offer a more comprehensive understanding of the systemic challenges to AI integration.

Declarations

Authors' Contributions. Dr. Nouf Almarzouq: Introduction, literature review, data collection, and methodology. Dr. Modhawi Almedlij: Validation, resources, data analysis, and recommendations. Dr. Haya Alshahrani: Review, editing, discussion, and conclusion.

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