Understanding the Usage of Artificial Intelligence Applications by Kuwaiti Teachers with Disabled Students

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Abstract:

This research paper aims to explore and understand the usage of artificial intelligence (AI) applications by Kuwaiti teachers in the context of working with disabled students. The study seeks to investigate the extent to which Kuwaiti teachers utilize AI tools and technologies in their teaching practices for disabled students, examine their perceptions of AI's effectiveness and benefits, and identify potential challenges and ethical considerations associated with AI implementation. The research employs a mixed-methods approach, combining surveys and interviews to gather data from a sample of Kuwaiti teachers who work with disabled students. The findings of this study will contribute to enhancing our understanding of the role of AI in special education and provide insights for policymakers, educators, and technology developers to support the effective integration of AI applications in inclusive educational settings.

Keywords: Artificial Intelligence, Disabled students, Inclusive Education, Educational Technology & Inclusive educational settings.

I. Introduction and Problem Statement

In recent years, the integration of Artificial Intelligence (AI) applications in various fields has gained significant attention, including the field of education. AI has the potential to revolutionize teaching and learning practices, particularly in the context of working with students with disabilities. Kuwait, like many other countries, strives to provide inclusive education opportunities for students with disabilities, ensuring equal access and quality education. Understanding the usage of AI applications by Kuwaiti teachers in working with disabled

students is crucial for enhancing educational practices and promoting inclusive learning environments.

Artificial intelligence (AI) has emerged as a transformative technology with the potential to revolutionize various fields, including education. AI applications have shown promise in improving teaching and learning practices, particularly in the context of working with students with disabilities. Kuwait, like many other countries, is committed to providing inclusive education opportunities for students with disabilities, ensuring equal access and quality education for all.

AI technologies encompass a range of applications that can support teachers in catering to the diverse needs of disabled students. Intelligent tutoring systems, adaptive learning platforms, and assistive technologies are examples of AI tools that can enhance the learning experience and provide personalized support for students with disabilities (Alenezi & Al-Hunaiyyan, 2020). These technologies can adapt to individual learning styles, provide real-time feedback, and offer tailored interventions, thereby promoting inclusive learning environments and improving learning outcomes for disabled students.

However, the utilization of AI applications by Kuwaiti teachers in working with disabled students remains relatively unexplored. The extent to which teachers in Kuwait integrate AI tools and technologies into their teaching practices for disabled students is not well understood. This knowledge gap hinders the effective implementation of AI in special education and limits the opportunities for leveraging AI's potential to support disabled students.

Moreover, the perceptions of Kuwaiti teachers regarding the effectiveness and benefits of AI applications in supporting disabled students have not been extensively studied.

Understanding the teachers' perspectives is essential for assessing their acceptance and readiness to adopt AI technologies. It can also shed light on potential barriers or concerns that may hinder the effective utilization of AI tools in special education settings.

Additionally, the integration of AI in the special education context presents unique challenges and ethical considerations. Issues related to data privacy, algorithmic bias, fairness, and the need for specialized training and support for teachers may arise (Alenezi & Al-Hunaiyyan, 2020). Addressing these challenges and ethical considerations is crucial to ensure responsible and equitable implementation of AI applications in Kuwaiti classrooms, while also safeguarding the rights and well-being of disabled students.

Therefore, there is a pressing need to investigate the usage of AI applications by Kuwaiti teachers working with disabled students, examine teachers' perceptions of AI effectiveness and benefits, and identify potential challenges and ethical considerations associated with AI integration. This research will contribute to enhancing educational practices, promoting inclusive learning environments, and guiding policymakers, educators, and technology developers in effectively harnessing the benefits of AI in special education settings in Kuwait.

Problem Statement:

Despite the potential benefits of artificial intelligence (AI) applications in education, there is a lack of understanding regarding the extent to which Kuwaiti teachers utilize AI tools and technologies in their teaching practices for disabled students. This knowledge gap hinders the effective integration of AI in special education and the promotion of inclusive learning environments in Kuwait. Without comprehensive insights into

the usage of AI applications by Kuwaiti teachers, it becomes challenging to harness the full potential of AI to support disabled students and address their specific learning needs.

In summary, the research problem focuses on understanding the usage of artificial intelligence (AI) applications by Kuwaiti teachers in special education classrooms with disabled students. The research aims to address various aspects related to the implementation of AI tools, their impact on student learning outcomes, teacher preparedness, and training needs, ethical considerations and data privacy, access and equity issues, teacher-student collaboration, as well as the sustainability and long-term impact of AI applications. By investigating these areas, the research aims to provide insights into the challenges, benefits, and implications of using AI in special education settings in Kuwait, ultimately facilitating the development of effective strategies and policies for the integration of AI tools to support disabled students' education.

Aim and Objectives

The main goal of this research is to explore the usage of Artificial Intelligence (AI) applications by Kuwaiti teachers in their work with disabled students. This goal encompasses exploring the extent of AI utilization, investigating teachers' perceptions of AI effectiveness and benefits, and identifying potential challenges and ethical considerations associated with AI integration in the special education context.

Objectives of the Research:

The objectives of the research are to:

1. Explore the current trends and patterns in the usages of Artificial Inelegance (AI) in education.
2. Assess the level of Kuwaiti teachers' knowledge of Artificial Intelligence applications with students with learning difficulties.

3. Explore the level of Kuwaiti teachers' usage of Artificial Intelligence applications with students with learning difficulties.

4. Explore the difficulties of teachers' use of Artificial Intelligence applications with students with learning difficulties.

5. Detect the differences in the reality of teachers' use of Artificial Intelligence applications with students with learning difficulties according to their years of experience and their gender.

6. Generate recommendations for the development of effective strategies, policies, and guidelines to optimize the integration of AI tools in special education settings in Kuwait.

Research Questions

The main question addressed by this research is: What is the usage of artificial intelligence applications by Kuwaiti teachers working with disabled students?

Sub-Research Questions are stated as follows:

Based on the research objectives provided, here are some research questions that can be explored:

1. What are the current trends and patterns in the usage of AI in education?

2. What knowledge do teachers know about AI applications with students with learning disabilities?

3. What is the level of teachers' use of AI applications with students with learning disabilities?

4. Are there any statistically significant differences in the reality of teachers' use of artificial intelligence applications with students with learning difficulties according to the gender of the teacher"?

5. Are there any statistical differences in the reality of teachers' use of Artificial Intelligence applications with students with learning disabilities according to their years of "experience"?

6. Are there any statistically significant differences in the reality of teachers' use of Artificial Intelligence Applications with students with learning difficulties according to the gender "male, female"?

Significance of the Study

The significance of the study on understanding the usage of Artificial Intelligence (AI) applications by Kuwaiti teachers with disabled students lies in its potential to contribute valuable insights to the field of inclusive education and AI integration.

1. Enhancing Inclusive Education: By exploring how AI applications are utilized by Kuwaiti teachers to support disabled students, the study can provide valuable information on the effectiveness and impact of AI tools in promoting inclusive education. It can shed light on the potential benefits and challenges of AI integration, ultimately leading to improved teaching practices and better learning outcomes for disabled students.

2. Informing Policy and Decision-Making: The findings of the study can inform policymakers, educational institutions, and relevant stakeholders in Kuwait about the current state of AI adoption in inclusive education. This information can guide the development of policies, guidelines, and support mechanisms to facilitate the effective and responsible integration of AI applications in classrooms, ensuring equal educational opportunities for disabled students.

3. Identifying Training and Professional Development Needs: Understanding the level of awareness, knowledge, and skills of Kuwaiti teachers regarding AI applications can inform the design and implementation of targeted training and

professional development programs. This can help bridge any existing gaps and empower teachers to effectively utilize AI tools to meet the diverse needs of disabled students.

4. Addressing Ethical Considerations: The study can shed light on the ethical considerations and concerns related to the use of AI applications for disabled students. This can facilitate discussions and strategies to address issues such as data privacy, algorithmic bias, and fairness, ensuring that AI integration is carried out responsibly and ethically.

5. Promoting Collaboration and Knowledge Sharing: By exploring Kuwaiti teachers' collaboration and sharing of best practices in utilizing AI applications, the study can foster a community of practice and encourage the exchange of ideas and experiences. This can contribute to the collective knowledge and expertise in AI integration, leading to continuous improvement and innovation in teaching practices for disabled students.

Overall, this study holds significance in advancing the understanding of AI applications in the context of inclusive education in Kuwait. Its findings can inform educational policies, teacher training programs, and the development of supportive frameworks that enhance the educational experiences and outcomes for disabled students.

II. Literature Review

The integration of artificial intelligence (AI) applications in education has gained significant attention in recent years. AI tools and technologies offer unique opportunities to support teaching and learning practices, particularly in the context of working with disabled students. This literature review aims to provide a comprehensive overview of existing studies focusing on the usage of AI applications by teachers in their work with

disabled students. It explores the extent of AI utilization, examines teachers' perceptions, and identifies challenges and ethical considerations associated with AI integration.

U.S. Department of Education, Office of Educational Technology (2023) mentioned that; many priorities for improvements to teaching and learning are unmet. Educators seek technology-enhanced approaches addressing these priorities that would be safe, effective, and scalable. Naturally, educators wonder if the rapid advances in technology in everyday life could help. Like all of us, educators use AI-powered services in their everyday lives, such as voice assistants in their homes; tools that can correct grammar, complete sentences, and write essays; and automated trip planning on their phones.

Huang, Zou, Gary, and Xie (2023) reviewed 516 papers published between 2000 and 2019, focusing on how AI was integrated into language education. Findings revealed that the frequency of studies on AI-enhanced language education increased over the period. The USA and Arizona State University were the most active countries and institutions, respectively. The 10 most popular topics were: (1) automated writing evaluation; (2) intelligent tutoring systems (ITS) for reading and writing; (3) automated error detection; (4) computer-mediated communication; (5) personalized systems for language learning; (6) natural language and vocabulary learning; (7) web resources and web-based systems for language learning; (8) ITS for writing in English for specific purposes; (9) intelligent tutoring and assessment systems for pronunciation and speech training; and (10) affective states and emotions. The results also indicated that AI was frequently used to assist students in learning writing, reading, vocabulary, grammar, speaking, and listening. Natural language processing, automated speech recognition, and learner profiling were commonly applied to

develop automated writing evaluation, personalized learning, and intelligent tutoring systems.

Crescenzi-Lanna (2023) presented a systematic literature review of artificial intelligence (AI) - supported teaching and learning in early childhood. The focus is on human-machine cooperation in education. International evidence and associated problems with the reciprocal contributions of humans and machines are presented and discussed, as well as future horizons regarding AI research in early education. Also, the ethical implications of applying machine learning, deep learning, and learning analytics in early childhood education are considered. The method adopted has five steps: identification of the research, evaluation, and selection of the literature, data extraction, synthesis, and results. The results show that AI applications still present limitations in terms of the challenges encountered in early childhood education and data privacy and protection policies.

In recent years, artificial intelligence (AI) has brought new ways of improving instruction and learning in online higher education. However, there is a lack of literature reviews that focus on the functions, effects, and implications of applying AI in the online higher education context. To fill these gaps, Ouyang, Zheng, and Jiao (2022) conducted a systematic review to provide an overview of empirical research on the applications of AI in online higher education. According to the screening criteria, out of the 434 initially identified articles for the period between 2011 and 2020, 32 articles are included in the final synthesis. Results found that: (1) the functions of AI applications in online higher education include prediction of learning status, performance or satisfaction, resource recommendation, automatic assessment, and improvement of learning experience;

(2) traditional AI technologies are commonly adopted while more advanced techniques (e.g., genetic algorithm, deep learning) are rarely used yet; and (3) effects generated by AI applications include a high quality of AI-enabled prediction with multiple input variables, a high quality of AI-enabled recommendations based on student characteristics, an improvement of student's academic performance, and an improvement of online engagement and participation.

Usage of AI Applications by Kuwaiti Teachers:

Several studies have examined the extent of AI utilization by Kuwaiti teachers in special education settings. Alenezi and Al-Hunaiyyan (2020) found that while there is a growing interest in AI, its actual implementation among Kuwaiti teachers remains limited. Intelligent tutoring systems, adaptive learning platforms, and assistive technologies were among the commonly used AI tools. However, the adoption rate varied depending on factors such as teachers' technological readiness and access to resources.

Perceptions of Kuwaiti Teachers towards AI:

Understanding the perceptions of Kuwaiti teachers regarding AI effectiveness and benefits is crucial for successful integration. Almulla and Al-Saggaf (2019) conducted a study exploring teachers' attitudes towards AI in education. The findings revealed that Kuwaiti teachers generally had positive perceptions of AI, recognizing its potential to enhance teaching practices and improve learning outcomes for disabled students. However, concerns related to the complexity of AI technologies and the need for training and support were also identified.

Challenges and Ethical Considerations:

The integration of AI in the special education context presents unique challenges and ethical considerations. Alenezi and Al-Hunaiyyan (2020) highlighted potential challenges, including issues of data privacy, algorithmic bias, fairness, and

the need for specialized training. Ensuring the responsible and equitable implementation of AI applications in Kuwaiti classrooms requires addressing these challenges and addressing ethical concerns related to student privacy and data security.

III. Artificial Intelligence in Education

The term AI, coined in the 1950s, refers to the simulation of human intelligence by machines. It covers an ever-changing set of capabilities as new technologies are developed. Defining AI is not easy; in fact, there is no generally accepted definition of the concept. Numerous different ones are used, and this can easily lead to confusion. In its broadest definition, AI is equated with algorithms. However, this is not an especially useful approach for our analysis. Algorithms predate AI and have been widely used outside this field. The term 'algorithm' is derived from the name of the ninth-century Persian mathematician Mohammed ibn Musa al-Kharizmi and refers to a specific instruction for solving a problem or performing a calculation (Haroon, Corien & Erik, 2023). Technologies that come under the umbrella of AI include machine learning and deep learning.

Artificial Intelligence (AI) has made significant advancements in various fields, including education. In the context of education, AI refers to the use of intelligent systems, algorithms, and technologies to support and enhance teaching and learning processes. AI in education encompasses a range of applications, such as intelligent tutoring systems, adaptive learning platforms, educational chatbots, and data analytics for personalized learning.

One prominent area of AI in education is the development of intelligent tutoring systems (ITS). These systems use AI techniques to provide personalized and adaptive instruction to students. They analyze individual student performance and

provide tailored feedback and guidance, mimicking the role of a human tutor. Cognitive tutors, a type of ITS, have been widely studied and applied in various domains, including mathematics, science, and language learning. They are designed to model and respond to students' cognitive processes, helping them acquire knowledge and skills more effectively.

AI in education also includes adaptive learning platforms that use machine learning algorithms to dynamically adjust the content and pace of instruction based on individual student needs and progress. These platforms offer personalized learning experiences by identifying students' strengths and weaknesses and providing targeted learning materials. They can adapt to different learning styles, preferences, and skill levels, promoting student engagement and achievement.

Furthermore, AI technologies, such as natural language processing and machine learning, have been employed in the development of educational chatbots. These chatbots can interact with students, answer their questions, and conversationally provide support. They offer immediate feedback, explanations, and resources, assisting students in their learning process.

The integration of AI in education has the potential to improve learning outcomes, enhance student engagement, and provide personalized learning experiences. However, challenges and ethical considerations, such as data privacy, algorithmic bias, and the need for teacher training, must be carefully addressed to ensure responsible and effective implementation.

Jantakun, Jantakun, and Jantakoon (2021) published a research paper that aims to 1) Develop a common framework for artificial intelligence in higher education (AAI-HE model) and 2) Assess the AAI-HE model. The research process is divided into two stages: 1) Develop an AAI-HE model, and 2) Assessment of the model. The sample consists of five experts chosen through

purposive sampling. The research result shows that 1) the AAI-HE model consists of seven key components which are 1.1) User Interactive Components and Technology of AI, 1.2) Components and Technology of AI, 1.3) Roles for Artificial Intelligence in Education 1.4) Machine Learning and Deep Learning 1.5) DSS Modules 1.6) Applications of Artificial Intelligence in Education, and 1.7) AI to enhance campus efficiencies, and 2) The result of the assessment of the AAI-HE model is rated as absolutely appropriate overall.

In 2021, Feng and Law reviewed 1830 research articles on artificial intelligence in education (AIED), to provide a holistic picture of the knowledge evolution in this interdisciplinary research field from 2010 to 2019. A novel three-step approach in the analysis of the keyword co-occurrence networks (KCN) is proposed to identify the knowledge structure, knowledge clusters, and trending keywords within AIED over time. The results revealed considerable research diversity in the AIED field, centering around two sustained themes: intelligent tutoring systems (2010-19) and massive open online courses (since 2014). The focal educational concerns reflected in AIED research are: (1) online learning; (2) game-based learning; (3) collaborative learning; (4) assessment; (5) affect; (6) engagement; and (7) learning design.

Artificial intelligence is the driving force of change focusing on the needs and demands of the student. Tapalova and Zhiyenbayeva (2022) explored Artificial Intelligence in Education (AIEd) for building personalized learning systems for students. They investigated and proposed a framework for AIEd: social networking sites and chatbots, expert systems for education, intelligent mentors and agents, machine learning, personalized educational systems, and virtual educational

environments. The scholars experimented in educational establishments using artificial intelligence in the curriculum. They surveyed 184 second-year students of the Institute of Pedagogy and Psychology at the Abay Kazakh National Pedagogical University and the Kuban State Technological University to collect the data. The research identified key advantages to creating personalized learning pathways such as access to training in 24/7 mode, training in virtual contexts, adaptation of educational content to the personal needs of students, real-time and regular feedback, improvements in the educational process, and mental stimulations. The proposed education paradigm reflects the increasing role of artificial intelligence in socio-economic life, the social and ethical concerns artificial intelligence may pose to humanity, and its role in the digitalization of education.

AI Applications for Disabled Students

Artificial Intelligence (AI) applications have the potential to revolutionize education and provide significant support for disabled students. By leveraging AI technologies, educators can create inclusive learning environments and offer personalized assistance to meet the diverse needs of disabled students. AI applications for disabled students encompass a wide range of tools and technologies that aim to enhance accessibility, promote engagement, and facilitate academic progress.

Assistive Technologies: Assistive technologies play a crucial role in supporting disabled students in their educational pursuits. AI-powered assistive technologies, such as screen readers, speech recognition systems, and alternative input devices, enable students with visual, hearing, or motor impairments to access educational content and interact with digital resources. These technologies leverage AI algorithms to

interpret and respond to user input, making the learning experience more accessible and inclusive.

Assistive technology can benefit students with disabilities in terms of independence and performance. Yet more research is needed regarding the usage of assistive technology. Using the National Longitudinal Transition Study 2012 database, Bouck and Long (2021) explored the reported use regarding assistive technology by secondary students with disabilities. Overall, the authors found low rates of assistive technology reported use among students with disabilities aggregated, although there were large ranges across disability categories (e.g., 14.5%-74.0% for use of assistive technology). The disability category had a statistically significant relationship with reported assistive technology use for secondary students.

Students with chronic and complex medical conditions often require assistive technologies to accommodate both physical and cognitive needs. Carey and his colleges (2023) examined literature that suggests that special education students with a history of cancer are unlikely to gain access to assistive technology, despite clearly demonstrated needs. They discussed assistive technology literature to determine research-supported steps schools can take to increase and improve access to assistive technology for students with chronic and complex medical conditions.

Intelligent Tutoring Systems: Intelligent Tutoring Systems (ITS) utilize AI techniques to provide individualized instruction and support to students with disabilities. These systems adapt to the unique learning needs of each student, offering personalized feedback, guidance, and remediation. By analyzing student performance and understanding their strengths and weaknesses,

ITS can tailor instructional content and pacing, thereby improving learning outcomes for disabled students.

Thapliyal and his colleagues (2022) presented the ontological design and implementation of the differentiated learning environment in the domain model of an intelligent tutoring system for children with specific learning disabilities. Their model addresses the learner`s need for differentiated instruction in a preferential learning environment, it helps to identify the most affected learning domains and related multiple-criteria's which affects the learners. The learning resources and problem diagnosis questionnaires are organized and used with various learning strategies to create various learning environments such as case-based learning environments, game-based learning environments, practice-based learning environments, and visual-based learning environments. The pilot test result showed that the proposed model enables an ITS to improve the implementation of appropriate learning strategies with high accuracy and sensitivity for both learning and non-learning-disabled users.

Wang, Li, Huang, Pan, and Lajoie (2023) examined students' cognitive load in micro-level SRL behaviors and explored how cognitive load affected metacognitive judgments and SRL performance. Thirty-four medical students solved two diagnostic tasks of varying complexity (i.e., simple and complex) in BioWorld, an intelligent tutoring system designed to promote clinical reasoning skills. The results demonstrated that students experienced significantly different cognitive loads during different SRL behaviors as they solved the complex task. Moreover, students' cognitive load during the "Orientation" and "Evaluation" behavior significantly increased as task complexity increased. Furthermore, the linear mixed-effects model (LMM) indicated that students' cognitive load in the "Orientation" and

"Monitoring" behaviors negatively predicted confidence ratings but did not affect diagnostic performance.

Adaptive Learning Platforms: AI-driven adaptive learning platforms employ machine learning algorithms to dynamically adjust the learning materials and activities based on students' progress and performance. These platforms can identify areas where students may need additional support or challenge, ensuring that disabled students receive tailored content and adaptive interventions. Adaptive learning platforms promote self-paced learning and provide real-time feedback, fostering independent learning and confidence among disabled students.

Adaptive learning is a computerized learning environment in which software evaluates how well students learn course content. Students read textual materials, view videos, and listen to audio files. The software then creates an individualized learning path for the student based on how well they perform in quizzes embedded in their lessons. As such, adaptive learning is well suited for the student-centered or "flipped" classroom. In addition, textbook prices are causing students to look for alternatives and textbook publishers to shift towards digital learning materials, including adaptive learning platforms. Luzius (2020) examined the advantages of adaptive learning platforms and how they are effective tools for presenting course content and evaluating students' understanding of their lessons. It also discusses examples of adaptive learning platforms on the market. Nkomo and Daniel (2021) explored how students engage with lecture recordings and the extent to which access to these resources contributes to their learning. They administered self-reported measures (questionnaire) to undergraduate and postgraduate students (n=660) who had access to lecture recordings. The questionnaire items included both closed-ended

and open-ended questions. The quantitative data was summarized using descriptive statistics. Most respondents regarded lecture recordings as supplementary learning resources, not a replacement for lectures. They stated that the availability of lecture recordings did not influence their decisions to attend lectures. Further, some respondents reported that they used lecture recordings to prepare for exams, to revise, and to compare with the notes they took in class.

Natural Language Processing and Communication Tools: AI technologies, including natural language processing (NLP) and communication tools, can greatly benefit students with speech and language impairments. NLP algorithms enable speech recognition, text-to-speech conversion, and language comprehension, facilitating communication between disabled students and their peers or teachers. AI-powered communication tools can assist students in expressing their thoughts, participating in classroom discussions, and engaging in collaborative activities, promoting inclusive interactions and social integration.

Sreemathy, Turuk, Kulkarni, and Khurana (2023) published a paper that presents a method for automatic recognition of two-handed signs of Indian Sign Language (ISL). The three phases of this work include preprocessing, feature extraction, and classification. We trained a BPN with Histogram Oriented Gradient (HOG) features. The trained model is used for testing the real time gestures. The overall accuracy achieved was 89.5% with 5184 input features and 50 hidden neurons. A deep learning approach was also implemented using AlexNet, GoogleNet, VGG-16, and VGG-19 which gave accuracies of 99.11%, 95.84%, 98.42%, and 99.11% respectively. MATLAB is used as the simulation platform. The proposed technology is used as a teaching assistant for specially abled persons and has

demonstrated an increase in the cognitive ability of 60-70% in children.

One of the important components in second language (L2) development is to produce clause-level units of form-meaning pairings or argument structure constructions. Based on the usage-based constructionist approach that language development entails an ability to use more diverse, more complex, and less frequent constructions, Hwang and Kim (2023) tested whether constructional diversity and complexity predict L2 learners' writing proficiency. Using a natural language processing tool called the Constructional Diversity Analyzer (CDA), they analyzed 3,284 essays produced by college EFL students in terms of the proportion of individual constructions and their diversity. Results from regression analyses showed that constructional diversity reliably predicted learner proficiency: essays with higher scores contained more diverse constructions. The authors also found that less frequent and more complex constructions made a stronger contribution to predicting written proficiency levels.

Virtual Reality and Augmented Reality: Virtual reality (VR) and augmented reality (AR) technologies offer immersive and interactive learning experiences for disabled students. These technologies can create virtual environments where students can engage in simulated activities, explore inaccessible locations, or practice real-life scenarios. VR and AR applications provide a multi-sensory learning experience, allowing disabled students to visualize complex concepts, enhance spatial awareness, and develop practical skills.

Rau, Zheng, and Guo (2021) investigated "immersive reading," which occurs when individuals read text while in a virtual reality (VR) or augmented reality (AR) environment. In

Experiment 1, 64 participants read text passages and answered multiple-choice questions in VR and AR head-mounted displays (HMDs) compared with doing the same task on liquid crystal display (LCD). In Experiment 2, 31 participants performed the same reading tasks but with two VR HMDs of different display quality. Compared with reading on LCD as the baseline, participants reading in VR and AR HMDs got 82% (VR) and 88% (AR) of the information accurately. Participants tended to respond more accurately and faster, though not statistically significant, with the VR HMD of higher pixel density in the speed-reading task. The authors observed the speed and accuracy of reading in VR and AR environments, compared with the reading speed and accuracy on an LCD monitor.

Augmented reality, one of the applications used in education, can meet students' needs in the learning process. Especially in science lessons, augmented reality enables students to understand the nature of science. It is important to have teachers who can apply technology to learning environments effectively and efficiently. Atalay (2022) prepared a structured interview form to collect preservice teachers' experiences in creating augmented reality products and determine their opinions on using this science teaching application. The interviews were analyzed using the descriptive analysis technique. As a result, preservice teachers stated that both science lessons and other lessons should include the augmented reality application; the application draws attention to the subject as it is fun, interesting, and intriguing, thus providing meaningful learning. Preservice teachers stated that they would benefit from augmented reality applications in their professional lives, and augmented reality will be effective in science teaching.

In conclusion, AI applications have the potential to transform education for disabled students by providing

personalized support, enhancing accessibility, and fostering inclusive learning environments. Assistive technologies, intelligent tutoring systems, adaptive learning platforms, natural language processing tools, and virtual reality applications are just a few examples of how AI can positively impact disabled students' educational journey. By harnessing the power of AI, educators, and researchers can continue to explore innovative solutions that address the diverse needs and empower disabled students to thrive academically and bey

IV. Benefits and Challenges of AI in Special Education

Benefits of AI in Special Education:

1) Personalized Learning: AI applications can provide personalized learning experiences tailored to the individual needs and learning styles of students with disabilities. By analyzing student data and performance, AI algorithms can adapt instructional content, pacing, and difficulty level to optimize learning outcomes.

2) Accessibility: AI technologies can enhance accessibility by providing alternative modes of communication, such as speech recognition and text-to-speech conversion, for students with communication or sensory impairments. AI-powered assistive technologies can also make educational materials more accessible by converting text into braille or providing real-time captions.

3) Individualized Support: Intelligent Tutoring Systems (ITS) equipped with AI can deliver individualized support and feedback to students. ITS can identify areas where students are struggling and provide targeted interventions, helping them overcome challenges and make progress at their own pace.

4) Data-Driven Decision Making: AI tools can analyze large volumes of data to identify patterns and trends in student performance, behavior, and engagement. Educators can leverage this information to make data-driven decisions, adapt instructional strategies, and implement targeted interventions for students with disabilities.

5) Enhanced Engagement and Motivation: AI applications, such as gamified learning platforms and virtual reality simulations, can enhance engagement and motivation among students with disabilities. These interactive and immersive experiences make learning more enjoyable and promote active participation.

Challenges of AI in Special Education:

1) Ethical Considerations: The use of AI in special education raises ethical concerns related to data privacy, security, and algorithmic bias. Safeguarding students' personal information and ensuring the fairness and impartiality of AI algorithms are critical considerations.

2) Lack of Human Interaction: While AI applications can offer personalized support, they cannot fully replace human interaction and the expertise of special education teachers. Maintaining a balance between AI-driven interventions and human guidance is essential to provide holistic support to students.

3) Implementation and Adoption: Integrating AI technologies into special education settings may require significant investments in infrastructure, training, and technical support. Ensuring smooth implementation and widespread adoption can be a challenge for educational institutions.

4) Generalizability and Adaptability: AI models and algorithms may not always generalize well to diverse populations of students with disabilities. Customization and adaptation of

AI tools to specific disability profiles and cultural contexts are necessary to ensure effectiveness and inclusivity.

5) Continual Updates and Maintenance: AI technologies are rapidly evolving, and regular updates and maintenance are required to keep the systems up-to-date and address emerging challenges. Educational institutions need to allocate resources for ongoing support and maintenance of AI applications.

6) Addressing these challenges and considering ethical implications is crucial to harnessing the full potential of AI in special education and ensuring that it effectively supports the diverse needs of students with disabilities.

Ethical Considerations in Using Artificial Intelligence (AI) in the context of special education

When using Artificial Intelligence (AI) in the context of special education and disabled students, several ethical considerations should be taken into account:

1) Data Privacy and Security: AI applications often involve the collection and analysis of sensitive student data. It is essential to prioritize data privacy and implement stringent security measures to protect this information from unauthorized access, breaches, or misuse. Adhering to relevant data protection regulations and obtaining informed consent from guardians or students, where applicable, is crucial.

2) Algorithmic Bias and Fairness: AI algorithms can inadvertently perpetuate bias and discrimination, leading to unequal treatment of disabled students. It is important to ensure that the data used to train AI models is diverse, representative, and free from bias. Regular monitoring and auditing of AI systems can help identify and address any potential bias or unfair outcomes.

3) Informed Consent and Autonomy: Involving disabled students and their guardians in decision-making processes related to the use of AI is essential. Obtaining informed consent and respecting the autonomy of students and their families allows them to make informed choices about their participation in AI-driven interventions and the use of their data.

4) Transparency and Explain ability: AI systems used in special education should be transparent and provide explanations for their decisions and recommendations. Students and educators should be able to understand how AI algorithms work and the factors that contribute to the outcomes. Transparent AI systems can help build trust and facilitate dialogue between students, educators, and AI technologies.

5) Equitable Access and Inclusivity: It is crucial to ensure that AI applications in special education do not create or exacerbate disparities in access to resources or opportunities. Efforts should be made to provide equitable access to AI technologies and support, particularly for students from marginalized or underserved communities. Inclusive design principles should be followed to ensure that AI applications cater to the diverse needs and abilities of disabled students.

6) Human Interaction and Support: While AI can provide valuable support, it should not replace human interaction and the expertise of special education professionals. Maintaining a balance between AI-driven interventions and human guidance is important to provide holistic support and address the social-emotional and relational needs of disabled students.

7) Continuous Evaluation and Accountability: Regular evaluation and monitoring of AI systems in special education are necessary to assess their effectiveness, identify potential

risks or unintended consequences, and make necessary adjustments. Being accountable for the ethical use of AI requires ongoing assessment and improvement of the technology, as well as responsiveness to feedback and concerns from stakeholders.

This literature review highlights the need for further research and exploration of the usage of AI applications by Kuwaiti teachers with disabled students. While there is growing interest and recognition of the potential benefits of AI, its integration in practice remains limited. Kuwaiti teachers' perceptions of AI are generally positive, but concerns and challenges related to implementation and ethical considerations need to be addressed. Future research should focus on providing support and training to teachers, addressing ethical concerns, and promoting the effective utilization of AI tools to enhance inclusive educational practices for disabled students in Kuwait.

V. Methodology

To investigate the usage of Artificial Intelligence (AI) applications by Kuwaiti teachers with disabled students, a research study can employ a mixed-methods approach that combines quantitative and qualitative data collection and analysis methods.

In this research, a descriptive research method was utilized. Deceptive research is a research method that aims to describe and document the characteristics, behaviors, or phenomena of a particular population or situation. It focuses on providing an accurate and comprehensive portrayal of the subject of study without attempting to establish causal relationships or make predictions. This type of research is often used to gather preliminary or foundational information, explore new areas of inquiry, or gain a better understanding of a specific topic.

A survey based on a questionnaire administered to a sample of Kuwaiti teachers who teach disabled students was used to gather data on their usage of AI applications. The questions were focused on gathering information about the types of AI applications used, frequency of usage, and perceived benefits and challenges.

Research Design

The research design of the present study is Cross-Sectional Design. A cross-sectional design involves collecting data from a sample of participants at a specific point in time. This design allows for a snapshot of the current usage of AI applications and provides a comprehensive overview of the subject of study.

Surveys based on questionnaires was used to collect data on the types of AI applications used, frequency of usage, and teachers' perceptions. The data collected was analyzed using descriptive statistics to summarize the findings.

Participants

Research population

The target population in this research is composed of all teachers who teach Kuwaiti students with learning disabilities affiliated with Kuwait learning difficulties schools and integration classes enrolled in primary schools in the State of Kuwait during the second semester of the academic year 2022/2023.

Research Sample

The research sample consisted of (165) male and female teachers of students with learning difficulties, affiliated to schools and classes of learning difficulties in Al-Marjla Primary School in the State of Kuwait.Table (1) shows the distribution of teachers according to number, age, and years of experience.

Table 1:

Sample distribution according to age and years of experience

		age	Years of Experience
Frequency	From	23	1
	To	57	31
Sum		١٦٥	١٦٥
Average		37.95	11.19
Standard Deviation		8.07	7.08

The sample of teachers was also distributed according to the gender of the teacher, as shown in Table 2.

Table 2:

Teachers' distribution according to teacher gender (male, female)

Gender	Size	%
Male	117	70.9
Female	48	29.1
Sum	165	100.0

Instrumentation

The research tool consisted of a measure of the reality of teachers' use of AI Artificial Intelligence Applications for teaching students with learning difficulties, and the following is an explanation of these tools.

The scale aims to assess the reality of teachers' use of Artificial Intelligence applications for teaching students with learning difficulties in the primary stage, as estimated by teachers, and the scale has been prepared according to the following steps:

The authors reviewed the literature, scales, and questionnaires related to the subject of the study, such as studies that dealt with the use of Artificial Intelligence with students with learning difficulties, the effectiveness of artificial

intelligence techniques in identifying cases of learning difficulties, and the evaluation of models based on artificial intelligence applications in helping people with dyslexia (Wu et al., 2006; Nanni& Lumini, 2008; Rajapakse et al., 2018).

Based on the reviewed literature; the items of the scale were formulated, which in its initial form consisted of (37) statements. The scale was presented to a group of judges consisting of (7) specialists in special education and learning difficulties, psychology, measurement and evaluation, and senior teachers of students with learning difficulties, to judge the validity of the phrases for the scale, the extent of good formulation of the phrases, and the extent to which the phrase belongs to the dimension under which it falls.

The judge comity's observations were taken, and some phrases were deleted and added to some dimensions of the instrument. The scale after judgment and revision consisted of (27) statements distributed on the following dimensions:

a) The level of teachers' knowledge of artificial intelligence applications: It consists of (9) statements.
b) The level of teachers' practice of artificial intelligence applications: It consists of (9) statements, and
c) Difficulties of teachers' use of artificial intelligence applications: It consists of (9) phrases.

The items /indicators were designed using the Likert 5-point scale, which included the following degrees of use: (5) Strongly Agree, (4) Agree, (3) Neutral, (2) Disagree, and (1) Strongly Disagree. In computing the judgment score, the measure of the difference between the highest value of the scale (5) and the lowest value of the scale (1) was divided by five levels, i.e., the degree of cutting [(5-1)/5 = 0.8].

Computing the scale validity and reliability

The validity and stability of the scale were computed on an exploratory sample consisting of (44) teachers of students with learning difficulties. Table (3) shows the characteristics of the sample of validity and reliability.

Table 3

Characteristics of the sample of validity and reliability in terms of years of experience and age

	Range in years		Average	Standard deviation
	Who is it	into		
Years of Experience	١	٢٦	10.30	6.63
lifetime	26.00	53.00	37.31	7.22
Sex	males ٩	females ٣٥		

It is clear from Table 3 that. the sample of validity and reliability consists of (35) females and (9) males, and their years of experience ranged from one year to 26 years, with an average of 10.30, and a standard deviation of 6.63, while their ages ranged from 26 to 53 years with an arithmetic mean of 37.31, and a standard deviation of 7.22.

Calculation of the scale stability:

The stability of the was calculated by computing Cronbach alpha stability coefficient and the half-fractionation coefficient, as shown in Table 4.

Table 4

Calculation of Alpha Stability Coefficient and the half-segmentation of the dimensions and the total degree of the scale.

Dimension	Alpha coefficient	Half Hash
Level of teachers' knowledge of AI applications	.822	.781
The level of teachers' use of AI	.779	.771

applications		
Difficulties with teachers using AI applications	.929	.936
The scale as a whole	.811	.892

Data Collection

The data collection process was carried out according to the following stages:

1. An official letter was extracted from the Department of Learning Difficulties and Developmental Disabilities, College of Graduate Studies, Arabian Gulf University, addressed to the Ministry of Education in the State of Kuwait, to facilitate conducting field application in general education schools and classes for the integration of students with learning difficulties.

2. After obtaining approval from the Research Department of the Ministry of Education in Kuwait on the application of the standards, official letters were given to facilitate the task addressed to schools.

3. The schools were directed to visit them, to learn about the nature of the sample, explain the nature of the research and the nature of the scale, discuss the items of the scale, and explain the method of application to them.

4. The questionnaire was developed on the Google Form and the researcher sent the link to the parameters to answer the items of the metrics.

5. The questionnaire was compiled after being answered from the parameters, and appropriate statistical analyses were performed on them to extract the search results.

Data Analysis

To answer the questions of the study, the collected data was entered and analyzed by computer, using the statistical package SPSS and the following statistical processing:

1. Frequency distribution and percentages.
2. Arithmetic averages and standard deviations.
3. T-test to indicate the differences between the averages of the associated samples.

VII. Results

This section presents the research results of the statistical analysis to answer the research questions, and then interpret those results in the light of the theoretical framework and previous studies, and they will be presented and discussed in the order of the questions.

Results related to question 1:

Question 1 states: "What are the current trends and patterns in the usages of Artificial Inelegance (AI) in education?

There were several notable trends and patterns in the usage of AI in education. Here are some surmised current trends and patterns. Table 6 summaries these trends and patterns:

Table 6

Current trends and patterns in the usage of Artificial Inelegance in education

#	*Current trends and patterns*	Description
1.	Continued Emphasis on Personalized Learning	Personalized learning remains a prominent trend in education. AI is being used to develop intelligent systems that can adapt educational content, pace, and delivery methods to meet the individual needs of students. This approach aims to enhance engagement, comprehension, and overall learning outcomes.
2.	Expansion of Adaptive Learning Technologies	Adaptive learning technologies, empowered by AI, are growing in popularity. These systems use data analytics and machine learning algorithms to tailor educational experiences to each student's abilities and progress. By

		dynamically adjusting content and providing targeted interventions, adaptive learning technologies strive to optimize learning efficiency and effectiveness.
3.	Integration of AI-powered Learning Analytics	Learning analytics, which involves the collection and analysis of educational data, are becoming more sophisticated with AI. Institutions are leveraging AI algorithms to gain valuable insights from data, such as identifying patterns of student performance, predicting academic risks, and personalizing interventions based on data-driven feedback.
4.	Increasing Adoption of Intelligent Tutoring Systems	Intelligent tutoring systems are being widely adopted in education. These systems use AI to provide personalized tutoring experiences, offering real-time feedback, guidance, and support to students. By simulating one-on-one interactions with human tutors, intelligent tutoring systems aim to enhance learning outcomes and bridge knowledge gaps.
5.	Enhanced Natural Language Processing (NLP) Applications	NLP is advancing in the education sector, enabling technologies such as automated essay grading, language translation, and language tutoring. AI-powered NLP tools are being developed to assess and provide feedback on students' written work, facilitate multilingual communication, and support language learning.
6.	Upsurge in AI-powered Virtual Assistants and Chatbots	AI-based virtual assistants and chatbots are being deployed in educational settings to provide instant support to students and educators. These AI assistants can address frequently asked questions, offer guidance on course selection, assist with administrative tasks, and provide 24/7 access to information and resources.
7.	Focus on Ethical AI Usage	With the increasing integration of AI in education, ethical considerations have gained

		prominence. There is a growing emphasis on ensuring data privacy, mitigating algorithmic bias, and addressing concerns related to equity, accessibility, and transparency in the use of AI technologies.

Results related to question 2:

Question 2 states: "What knowledge do teachers know about AI applications with students with learning disabilities?

The means averages and standard deviations of the research sample responses were collected on all statements after the scale administration, and Table 7 shows these results:

Table 7

Arithmetic means, standard deviations, for the response of the sample on the scale statements after teachers know the applications of artificial intelligence

#	Phrases	Mean	S D	Phrase order	Level It depends Arithmetic mean
1	I have enough information about artificial intelligence applications	3.28	.889	٢	medium
2	Attended lectures or workshops on AI applications	2.85	1.172	٨	medium
3	I can explain to others about the applications of artificial intelligence for students with learning disabilities	2.96	1.090	٥	medium
4	I have information about the applications of artificial intelligence in the educational process	3.18	1.099	٤	medium
5	I keep up with topics that are interested in artificial intelligence applications	3.25	1.172	٣	medium
6	Well-trained in artificial	2.90	1.159	٦	medium

	intelligence applications				
7	Trained on the applications of artificial intelligence in the educational process	2.90	1.196	٦	medium
8	Always look for AI applications for students with learning disabilities	3.30	1.144	١	medium
	Total Grade	٣.٠٨	0.98		medium

Table 7 shows the arithmetic means and standard deviations of the research sample's response on the scale statements, in which the total average of the dimension came at the average level, reaching (M=3.08) with a standard deviation of (SD=0.98). The results showed that the statement " I always search for Artificial Intelligence applications for students with learning difficulties" came in first place with an arithmetic mean of (M=3.30) and a standard deviation of (SD=1.14), followed respectively by the phrase "I have enough information about artificial intelligence applications", with a mean of (3.28) and a standard deviation (.889), and the statement "I keep up constantly on topics that are interested in artificial intelligence applications" came in 3rd rank, with an arithmetic mean of (M=3.25) and a standard deviation (SD=1.17), and in last ranking came the statement " I attended lectures and workshops on Artificial Intelligence applications" with an arithmetic mean (M=2.85) and a standard deviation of (SD=1.17).

The results of the first research question indicated that the overall score of the dimension came at an average level. This is because although teachers' knowledge of Artificial Intelligence applications in education varies from school to school, they realize the importance of using technologies in the field of teaching and education, it is possible that some teachers are familiar with artificial intelligence applications in education and actively use them in their classrooms, while others may have limited knowledge of this technology. This result is supported by

Al-Shaibani (2004) who confirmed that teachers and supervisors of students with learning disabilities gave importance to Great for training teachers in educational technologies. This result is also consistent with the results of the study of (Al-Ghamdi and Al-Farani, 2020) who reported the importance of using educational applications for AI, a degree of (strongly agree) by special education teachers.

Results related to question 3:

Question 3: "What is the level of teachers' use of AI applications with students with learning disabilities?

As for the level of teachers' use of artificial intelligence applications with students with learning difficulties, the arithmetic means and standard deviations of the responses of the research sample were extracted, on all statements after the level of teachers' use of artificial intelligence applications, Table 8 shows these results.

Table 8

Arithmetic Means, standard deviations, of the research sample's response to statements after the level of teachers' use of artificial intelligence applications

Statement #	Phrases:	Mean	SD	Statement Order Based on Mean	Judge
1	I use Artificial Intelligence applications in the education and teaching process	3.10	1.045	٥	medium
2	I use Artificial Intelligence applications to communicate with parents	2.86	1.087	٧	medium
3	I use Artificial Intelligence applications to assess the level of performance of students with learning disabilities	2.90	1.066	٦	medium

4	I try to arouse students' motivation by using Artificial Intelligence applications	3.21	1.123	٤	medium
5	I use Artificial Intelligence applications to attract the attention of students with learning disabilities in the teaching and teaching process	3.24	1.100	٢	medium
6	I am looking to develop the use of Artificial Intelligence applications in teaching students with learning disabilities	3.23	1.102	٣	medium
7	My use of Artificial Intelligence applications allows to improve the teaching skills of students with learning disabilities	3.38	1.079	١	medium
	Total Grade	٣.١٣	0.96		medium

The previous table shows the means and standard deviations of the response of the research sample on the statements concerted to the level of teachers' use of artificial intelligence applications dimension, where the total mean of the dimension came at an average level, (M=3.13) with a standard deviation of (SD=0.96). The results showed that the statement "My use of Artificial Intelligence applications allows me to improve the teaching skills of students with learning difficulties" came in first place with a mean (M=3.38) and a standard deviation (SD=1.07), followed by the statement "I use Artificial Intelligence applications" to attract the attention of students with learning difficulties during the teaching and learning process", where the arithmetic mean of this phrase was (M=3.24) and a standard deviation (SD=1.10), and the third rank came to the statement "I am looking for the development of the use of Artificial Intelligence applications in teaching students with learning difficulties" with an arithmetic mean (M=3.23) and a standard

deviation (SD=1.102), while the phrase "I use artificial intelligence applications in communicating with parents" came in last rank, with an arithmetic mean of this phrase (M=2.86), and a standard deviation of (SD=1.08).

As it is explained teachers of students with learning disabilities are always looking forward to using Artificial Intelligence applications for their students, as Artificial Intelligence applications can help teachers in teaching students with learning difficulties in many ways. Also, these applications provide educational materials that can be customized to the individual needs of each student. Analyze students' data to determine the aspects that they need to improve, and provide customized educational recommendations, and it is AI applications can analyze the teaching methods used by teachers and make recommendations to improve these methods. AI applications can also be used to analyze pupils' data and identify factors that affect their learning, such as instructional styles, level of motivation, and attention. In different areas, identify their strengths and weaknesses. Saadallah and Shatouh (2019) mentioned that: teachers can use this information to identify topics that students need to improve.

This result can also be explained because of the use of artificial intelligence accomplishes several benefits in the field of education, as Hussein (2012) indicated that Artificial Intelligence applications work at a fixed scientific and advisory level without fluctuation and that they process non-digital symbolic data through analysis and logical comparison processes, and that they work to simulate humans intellectually and methodically, and are interested in raising new ideas that lead to innovation and immortalize the human experience, as well as providing more

than one copy of the system and compensating for the presence of Number.

Results related to question 4:

Question 4 states: "What are the difficulties of teachers using AI applications with students with learning disabilities"?

To answer the question, the arithmetic means and standard deviations of the research sample response to statements of the third dimension are calculated concerning the difficulties of teachers' usage of artificial intelligence applications, and Table 9 shows these results.

Table 9

Arithmetic Means, and Standard Deviations, for the response of the research sample to statements after the difficulties of teachers' use of artificial intelligence applications

#	Statement	Mean	SD	Statement order based on Mean	Judge
1	I suffer from a lack of training programs to facilitate and prepare teachers to deal with artificial intelligence applications	3.10	1.043	١	medium
2	I have no skill in using artificial intelligence applications with students with learning disabilities	2.65	1.075	٦	medium
3	As a teacher, I am satisfied with traditional methods of teaching students with learning disabilities	2.41	1.110	٨	medium
4	It is difficult to use artificial intelligence applications in the teaching process due to the lack of experience of students with learning difficulties	2.85	1.061	٣	medium
5	As a beginner, I find it difficult to create an interactive learning environment using artificial	2.65	1.080	٦	medium

	intelligence applications with students with learning disabilities				
6	I find it difficult to provoke students with learning disabilities by using some artificial intelligence applications	2.71	1.142	٥	medium
7	I have financial difficulty in obtaining some programs for artificial intelligence applications with students with learning disabilities	2.89	1.179	٢	medium
8	Using AI applications requires me to work hard to create interaction between students with learning disabilities.	2.85	1.061	٣	medium
	Total Grade	**3.80**	**0.92**		**medium**

The previous table shows the Means and Standard Deviations of the response of the research sample on the Statement related to the difficulties of teachers' usages of Artificial Intelligence applications dimension, where the total average of the dimension came at the average level of(M=3.80) with a standard deviation of (SD=0.92), and the results showed that in the rank came the statement "I suffer from a lack of training programs to facilitate and prepare teachers to deal with artificial intelligence applications", with an arithmetic mean (M=3.10) and a standard deviation (SD=1.4), followed by the statement "I have difficulty material in order to obtain some programs for artificial intelligence applications with students with learning difficulties", where the arithmetic mean of this statement (M=2.89) and a standard deviation (SD=1.79), and came in the third rank the statement "The use of artificial intelligence applications requires me a great effort to create interaction between students with learning difficulties", with an

arithmetic mean of (M=2.85), and a standard deviation (SD=1.06), and in lowest rank came the phrase "I am satisfied as a teacher with traditional methods of teaching students with learning difficulties", where the value of the average mean of (M=2.41) with a standard deviation of (SD=1.11).

The results of the 4th question indicated that the statement "I suffer from the lack of training programs to facilitate and prepare teachers to deal with Artificial Intelligence applications", and the statement "I face financial difficulty in order to obtain some programs for Artificial Intelligence applications for students with learning difficulties", and the statement "The use of artificial intelligence applications require me a great effort to create interaction between students with learning difficulties, the highest ranking came among the distance statements, due to the fact that the field of artificial intelligence One of the modern fields that are being talked about now and teachers of students with learning difficulties and about how to employ them in the educational field, in general and in the field of special education in particular, so the cost of using them in this field is high, and the programs used with people with special needs and people with learning difficulties are still in the process of development, which makes it difficult for the teacher to find training courses interested in these applications with students with learning difficulties, even if it is found, he finds it difficult to manage Its material cost due to its high cost and the modernity of the programs and applications used in this field, and this is confirmed by the results of the study of Al-Ghamdi and Al-Farani (2020), which showed that special education teachers see difficulties in using educational applications of artificial intelligence in their field of work.

Results related to question 5:

Question 5 states: "Are there any statistically significant differences in the reality of teachers' use of Artificial Intelligence applications with students with learning disabilities according to their years of experience"?

To answer this question, the years of experience of the teacher of students with learning difficulties were divided into three categories, namely: from 1 – 9 years, from 10 – 19 years, and from 20 years and more. This classification was done depending on the distribution of the research sample on the different years of experience, and to ensure that the number in each category of the study group converges years of experience, and the arithmetic means and standard deviations have been computed, for each of these categories, and Table 10 shows these data.

Table 10

Means and Standard Deviations of the teachers of students with learning disabilities scores on the reality scale of teachers' use of artificial intelligence applications with students with learning disabilities according to years of experience

Groups / Year of Experience	Data	Frequency	Mean	SD
1-9 Years	Teachers' knowledge of AI applications	69	25.37	7.90
	The level of teachers' uses of AI applications	69	22.84	6.53
	Difficulties with teachers using AI applications	69	22.55	7.09
10 – 19 years	Teachers' knowledge of AI applications	65	22.50	7.73
	The level of teachers' use of AI applications	65	19.89	6.93

	Difficulties with teachers using AI applications	65	22.10	6.97
20 and above	Teachers' knowledge of AI applications	31	27.38	7.20
	The level of teachers' use of AI applications	31	24.16	5.55
	Difficulties with teachers using AI applications	31	21.19	6.83

To computer the significance of the differences between teachers of students with learning difficulties, on the scale of the reality of teachers' use of Artificial Intelligence applications with students with learning difficulties, according to their years of experience, One- Way ANOVA analysis was calculated between the three groups, as shown in Table 11.

Table 11

The results of the analysis of single variance indicate differences on the reality scale of teachers' use of artificial intelligence applications with students with learning difficulties according to their years of experience

Dimensions	Contrast	Total ranks	Degree of freedom	Average ranks	P value	Significance level
Teachers' knowledge of AI applications	Between groups	566.899	٢	283.450	4.762	.010
	Inside groups	9641.804				
	Total	10208.703				
The level of teachers' use of AI applications	Between groups	481.441	٢	240.721	5.650	.004
	Inside groups	6901.686				
	Total	7383.127				
Difficulties with teachers using AI applications	Between groups	39.418	٢	19.709	.402	.669
	Inside groups	7938.157				
	Total	7977.576				

It is clear from the previous table that there are statistically significant differences between teachers of students with learning difficulties, on the scale of the reality of teachers' use of artificial intelligence applications with students with learning difficulties, according to their years of experience, both in the dimension of teachers' knowledge of artificial intelligence applications, and after the level of teachers' use of artificial intelligence applications, where the differences were significant at the level of significance 0.01, while there were no differences between them on the distance of teachers' use of artificial intelligence applications.

To calculate the trend of differences between the three groups, in the dimension of teachers' knowledge of Artificial Intelligence applications, and the diminution of the level of teachers' use of Artificial Intelligence applications, the Schiffefe test for dimensional comparisons between the three groups was calculated, and Table 12 shows these results.

Table 12

The results of the Scheffe test for binary dimensional analyses to detect the significance of the differences between the arithmetic averages of the scores of teachers of students with learning difficulties after teachers' knowledge of artificial intelligence applications, and the level of teachers' use of artificial intelligence applications, according to the teacher's years of experience

	Years of Experience Categories		The difference between the two averages	Standard error	Significance level
Teachers' knowledge of AI applications	٩ – ١	١٩ - ١٠	2.86	1.33	.102
		20 and above	-2.01	1.66	.485
	١٩ - ١٠	٩ -١	-2.86	1.33	.102
		20 and above	-4.87*	1.68	.017
	20 and above	٩ - ١	2.01	1.66	.485
		١٩ - ١٠	4.87*	1.68	.017
The level of	٩ – ١	١٩ - ١٠	2.94*	1.12	.035

teachers' use of AI applications					
		20 and above	-1.3	1.41	.646
	١٩ – ١٠	٩ -١	-2.94*	1.12	.035
		20 and above	-4.26*	1.42	.013
	20 and above	٩ - ١	1.32	1.41	.646
		١٩ - ١٠	4.26*	1.42	.013

The results showed that concerning the dimension of teachers' knowledge of artificial intelligence applications, data analysis revealed that there are statistically significant differences between teachers with years of experience of 20 years and more, and those with years of experience of 10-19 years, in favor of those with experience of 20 and more. While there were no statistically significant differences between teachers who had 1-9 years, and between the 10-19 years category and the 20-year older.

The results also indicated that there were statistically significant differences between teachers with 1-9 years of experience and teachers with 10-19 years of experience, in favor of those with 1-9 years of experience. The results also showed that there were statistically significant differences between teachers with 10-19 years of experience, and those with years of experience of 20 and above, in favor of those with years of experience of 1-9 years.

These results suggest that the higher the level of experience of the teacher, the better they will be at knowledge of AI applications, while the less experience they have, the higher their level of use of AI applications. This is explained by the fact that teachers with the highest level of experience have accumulated knowledge of old and new teaching methods as well.

The Ministry, public and private education departments, and school administrations in the State of Kuwait prepare training courses and organize workshops that provide teachers with information and knowledge about educational technology and

artificial intelligence, and that the more experience the teacher has, the more training courses and workshops he will receive, and the more he will receive the necessary training, and they will be familiar with the latest technology and tools available, and more develop their skills and improve their academic performance using modern technology, and thus his information increases from different methods of teaching, And modern methods in dealing with students with learning difficulties. In addition, they are excited to leverage modern technology to improve the learning experience of these students.

Where educational institutions are working on the use of artificial intelligence with individuals with learning difficulties, to benefit them greatly, and because it plays an important role in their private and social lives and many levels, and it also works in the early and rapid detection of learning difficulties of all kinds, developmental and academic, in addition to the possibility of recording educational content and returning it many times to consolidate understanding and comprehension, as well as achieving the principle of learning pleasure for people with learning difficulties (Yahyaoui, 2019).

As for the use of artificial intelligence applications, teachers with few years of experience are naturally less old than those with more years of experience, and those with fewer years of experience are the most skilled in using modern technology, as they are more familiar with the development of technology, and more use of modern technologies in general. Therefore, they are better at using artificial intelligence applications, unlike the knowledge and information they have about these applications, compared to older teachers with more years of experience.

Results related to question 6:

To answer the 6th research question, which states: "Are there any statistical differences in the reality of teachers' use of artificial intelligence applications with students with learning difficulties according to the gender of the teacher"?

To answer this question, the teachers of students with learning difficulties were divided into males and females, and then the means and standard deviations of their responses on the study scale were calculated, for each of these categories. To test the significance of the differences between teachers of students with learning difficulties, on the scale of the reality of teachers' use of artificial intelligence applications with students with learning difficulties, according to the gender of the teacher, an independent sample t-Test was calculated between the two groups, as shown in the following table:

Table 14

Independent Sample t-Test to test the differences between teachers of students with learning difficulties, on the scale of the reality of teachers' use of artificial intelligence applications with students with learning difficulties

Dimensions	Groups	Number	Mean	Stand. Deviation	Value of t	DF	Sign. level
Level of teachers' knowledge of AI applications	Males	١١٧	25.39	6.95	1.972	163	.050
	Females	٤٨	22.75	9.62			
The level of teachers' use of AI applications	Males	١١٧	23. 00	5.70	3.302	163	.001
	Females	٤٨	19.31	8.18			
Difficulties with teachers using AI applications	Males	١١٧	22.01	6.76	-.299	163	.766

The results in the previous table indicate that for the teachers' knowledge dimension of AI applications, the mean of the males was (M=25.39, SD= 6.95), while the mean of females was (M= 22.75, SD=9.62). As for the dimension of the level of teachers' use of artificial intelligence applications, the males (M=23.00, SD= 5.70), while the females (M=19.31, SD=8.18), while for the dimension of difficulties in teachers' use of artificial intelligence applications, the males (M=22.01, SD= 6.76), while the females (M= 22.37, SD=7.52).

It is clear from the previous table that there are statistically significant differences between teachers of students with learning difficulties, on the scale of the reality of teachers' use of artificial intelligence applications with students with learning difficulties, according to the gender of the teacher, both in the dimension of teachers' knowledge of artificial intelligence applications, and the level of teachers' use of artificial intelligence applications. These differences were significant at the level of significance α=0.05, and α=0.01, where the differences were in favor of male teachers. While there were no differences on the difficulties of teachers' use of artificial intelligence applications related to teacher gender (male, female).

These results indicated that male teachers are more knowledgeable and use AI applications in the field of learning difficulties, compared to female teachers, while the two groups are equal (face the same difficulties) related to applying artificial intelligence techniques in the field of learning difficulties. The differences between males and females in the knowledge and use of AI applications in the field of learning disabilities can be explained by looking at several factors, including:

These differences between males and females in the knowledge and uses of AI applications in the field of learning disabilities can be explained by looking at several factors, including:

- Educational Opportunities: The educational opportunities available to males and females can affect their knowledge and use of AI applications in the field of learning disabilities. Males may receive more opportunities to learn computer technologies and artificial intelligence, and this can lead to differences in knowledge and use between the two species.

- Personal attention: Males may be more interested in computer technologies and artificial intelligence in general, and this can lead to improved knowledge and use of AI applications in the field of learning disabilities.

- Support and Training: Males may receive more support and training in the use of technology and artificial intelligence, and this can lead to differences in knowledge and use between the two species. This aspect can be improved by providing appropriate support and training for females to enhance their knowledge and use of AI applications in the field of learning difficulties, especially since males receive more family support than females in the field of computer technologies and artificial intelligence. Parents may encourage males to take an interest in and learn technology, while they may consider it inappropriate for females.

- Cultural and social factors: The role that gender plays in society and attitudes may affect the extent to which males and females are interested in computer technologies and artificial intelligence in general, and this can lead to differences in knowledge and use.

This result is consistent with the results of Al-Yamahi's study (2023), whose results resulted in the fact that the reality of using educational applications of artificial intelligence for people with special needs from the point of view of teachers came to an agreeable degree, and after the use of educational applications for augmented reality technologies for people with disabilities, it occupied the highest dimension in the degree of its achievement, followed by after the use of educational applications for augmented reality technologies, then after the educational applications of smart education systems, and finally after the use of educational applications for virtual reality technologies for people with disabilities. It also agrees with the results of the study of Moses (2023), whose results showed that attention can be developed in students with gifted learning difficulties using an artificial intelligence program.

The results also indicated that there are no significant differences between the two types in the difficulties of using artificial intelligence applications with students with learning difficulties, and this can be explained by the fact that the capabilities available in schools are limited, resulting in difficulties in applying these applications for both sexes, as the use of artificial intelligence techniques needs the school or educational administration to train and prepare teachers of both types, and a digital infrastructure is needed through which the use of artificial intelligence techniques and applications is available, which are obstacles that do not It faces a certain category of teachers, and indeed both male and female types.

This is consistent with the results of the study of Al-Shaibani (2004), which showed that teachers and supervisors of students with learning disabilities indicated that the learning difficulties programs in the schools of the Ministry of Education in the State

of Kuwait lack educational technologies and that there is a very severe deficiency in the use of these technologies, as a result of the difficulties of their application, as well as the results of a study.

While it differs with the study of Al-Matrudi and Al-Rubaian (2022), the results indicated that there were statistically significant differences in teachers' responses to the challenges of distance education facing students with learning difficulties in the primary stage due to the gender difference, and the differences were in favor of males.

Recommendations

Based on these results, the following recommendations are formulated:

1. Developing a course on artificial intelligence in teacher education programs, especially at the primary level.
2. Steering awareness brochures on artificial intelligence applications with students with learning difficulties.
3. Organizing training courses and workshops for teachers of students with learning disabilities to train them on the use of artificial intelligence with their students with learning difficulties.
4. Organizing workshops for parents of students with learning disabilities to train them on the use of artificial intelligence applications with their children.
5. Intensifying school and educational activities that help increase the use of artificial intelligence with students with learning difficulties.

Proposed Research

1. A study of the factors associated with the use of artificial intelligence by teachers with students with learning difficulties.

2. The effectiveness of an AI-based program to address academic learning difficulties among students with learning difficulties.

3. The effect of a program to train teachers of students with learning disabilities on the use of artificial intelligence applications with their students.

4. Differences between a traditional program and an AI-based program to reduce hyperactivity in students with learning disabilities.

5. Differences in the use of artificial intelligence applications between public schools and private schools for students with learning difficulties.

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