



Effects of Artificial Intelligence on educational facility for special needs students

اثر الذكاء الاصطناعي على تسهيل التعليم لطلبة الاحتياجات الخاصة

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1- Introduction

The world and globalization are witnessing technological and digital development day after day, which has had its results on all areas of life, whether personal or lifestyle, education, health, infrastructure, work, trade, governments, companies and more. Digital development, the Internet of Things, and artificial intelligence have invaded the world in a high way, and countries are now competing to embrace digital development and artificial intelligence, which increases the burden on businesses, reduces costs, and increases performance efficiency in a high way, in addition to the speed and effectiveness of communication.

The world has become obsessed with artificial intelligence, which is considered the companion of all areas of life: education, training, health, work, transactions, communication, planning, structuring, infrastructure, corporate functional tasks such as accounting, administrative affairs, marketing, sales, planning, and many more. Artificial intelligence has impacted affected the educational process, both in the teaching process and in the educational methods for learners. People with special needs and disabilities have the opportunities to keep the pace with continuous education and learning through numerous AI apps or webs that have personalized learning experience, customized learning contents and methods, enhanced knowledge and learning accessibility, and enabled educators to gain more time focusing on designing contents and making interaction with students more vital. With all those features difficulty learning became no longer hinderance.

2- AI benefits and negative impact

Artificial Intelligence encompasses a great deal of benefits in various aspect of human life. In contrast, AI expose multiple potential challenges human that require to be considered and

dealt with carefully. Positive impact, for instance, involves customized learning experience according to students' needs, efficiency, resources surplus, greater information accessibility, cost efficiency, sophisticated teaching tools, and special needs education. While challenges of AI adoption, for example, consist of security concerns, high dependence, biases, lack of application, and knowledge.

3- Objectives

The objective of this paper is to discuss the effect of artificial intelligence AI on educational facility for special needs students.

4- Literature

AI reinforced learning journey and made education accessible and in hands of students with sensory, motor, cognitive, and other forms of impairments. Some assistive tools such as speech-to-text, virtual reality, and role playing have revolutionized the special education and resulted in tailored and engaging learning experience for all kinds of impairments (Sharma et al., 2023). Technological advancement, digital technology, and artificial intelligence have accelerated education process to a large extent. It enables people from diverse backgrounds and demographic factors including those with disability or special needs to gain access to a broader range of learning resources and worldwide educational knowledge facilitating self-improvement and enhancement. Indeed, artificial intelligence have transformed the learning process facilitating self-study, independence, effective communication, and tailoring learning content based on student need and ability.

This technological and artificial development highlights and emphasizes the significance of its application in special needs school education. Its great contribution to improving,



accelerating, and bringing the teaching and learning process closer to this category has shifted the global perception of the difficulty of special needs education. Undoubtedly, they deserve and have the right to gain access to educational resources and global knowledge and being learned and educated just like others. AI support teachers in automating administrative work and provide assistive tools to augment self-learning through adaptive learning systems, text to speech technologies, and virtual tutors (Al-Juhani and Al-Shatti, 2024).

AI has altered the learning process for special needs kids by using adaptive learning systems, virtual reality tools, smart tutors, and systems that have improved communication, individualized learning, and information accessibility. Although it allowed teachers to devote more time to developing appropriate coursework for special needs kids. Furthermore, AI systems have automated administrative tasks and relieved teachers of the strain by auto-grading, creating quizzes, providing feedback, and replying to student concerns 24/7.

Educators are optimistic about the potential development of artificial intelligence for the rehabilitation and educational processes. Obviously, a great deal of AI tools has facilitated the learning process for children. For example, student with autism spectrum disorder (ASD) can benefit from numerous AI tools namely Miracle Modus, Avaz, Autism 5 (Alsayed and Alsayed, 2023).

Equally important to mention that artificial intelligence has revolutionized learning education for special needs students through designing adaptive learning, engaging environment, appropriate contents that fit their needs while traditional education failed to meet those needs. For instance, like Khan Academy or Duolingo caters to special needs students by designing educational content match their abilities not to mention virtual tutors provide 24/7 responses to students' inquiries (Al-Azawei et al., 2016). AI-based speech-to-text and text-to-speech enabled students with hearing or visual impairments to get their full opportunity of learning

(Butin et al., 2011). Visually impaired students can indulge autonomously in the educational environment through some AI tools such as OrCam My Eye that converts written text to voice (Miesenberger et al., 2018).

Although, students with speech difficulty can express their thoughts and ideas clearly through some ai-powered tools like augmentative and Alternative Communication (AAC). Natural Language Processing (NLP) tool supports educators to deal appropriately with students having speech and expression issue. Additionally, AI tools gamify educational contents in engaging and motivative ways that are helpful for students suffering from anxiety or attention-related issues. Lack of specialized educators for students with disabilities is an obstacle which has been overcome by some powerful AI-based tools. Google's Socratic provide support and response to inquiries of disabled students as substitution in the absence of specialized educators (Parette & Stoner, 2014). Definitely, virtual tutors removed learning barriers through instant feedback which augments resource gap and cost reduction dramatically (Trewin et al., 2019).

Despite the challenges of embedding AI into educational process in special needs education, its impact and contribution have been emphasized in literature and applied in various parts of the world. Its contribution and impacts involve personalized learning, accessibility, independence and autonomous learning, increased engagement, assistive tools, enhanced communication, and resource allocation.

5- AI based Assistive Tools

There are numerous ai based education assistive tools each serve distinct purposes as demonstrated in the following table:

Category	AI	Purpose	Users	benefits
Visual Assistance	Be My Eyes	Assistive AI for the Visually Impaired	Blind or low-vision individuals.	Connects users with volunteers or company representatives for real-time visual assistance.
	Envision AI		Blind or low-vision individuals.	Reads texts, identifies objects, and recognizes people using AI.
Communication Assistance	Ava AAC	Augmentative and Alternative Communication (AAC)	Non-verbal individuals or those with speech impairments.	Converts text or symbols into speech, enabling communication.
	Speech to Text Tools		Students with limited mobility or speech impairments	Converts spoken words into written text, aiding note-taking and communication
	Text to Speech Tools		Students with reading difficulties or visual impairments	Converts written text into spoken words, making written material more accessible
Cognitive and Emotional Support	Miracle Modus	Emotional Regulation and Learning Support	Individuals with autism or sensory processing disorders	Uses calming visuals and sounds to reduce sensory overload
	Listen at Home		Students with auditory challenges or focus issues	Enhances listening comprehension through tailored auditory exercises

Social and Experiential Learning	Floreo VR	Virtual and Augmented Reality for Interaction	Students with autism or social skill challenges	Provides immersive VR scenarios to practice social skills in a safe, controlled environment
	ClassVR		Students with learning disabilities	Offers VR-based interactive lessons to enhance engagement and understanding
	zSpace		Students with learning disabilities	Offers VR-based interactive lessons to enhance engagement and understanding
Accessibility for the Hearing Impaired	Learn Braille Tools	Assistive AI for Hearing Impairments	Students who are blind or transitioning to braille literacy	Interactive tutorials for learning braille at different skill levels

6- Methodology

This descriptive study seeks to describe the impact of artificial intelligence on educational facilities for children with special needs. The researcher aimed to reinforce this study by conducting a small survey and sending it multiple people in educational organizations.

Respondents were asked nine general questions about the importance to execute and embed artificial intelligence tools into schools in Kuwait and precisely the special needs schools.

This research carried out a small survey that involved 18 participants from different gender, ago, and background. It was sent to numerous people working in schools. Also, it was directed to some PhD students in Stardom University to extract their insights on the subject matter. The gender factor involved 88.2 % male students in contrast to 11.8 % female students. Most of the participants’ ages exceed 40 years, while a few participants ages between 30 and 40. Most of the participants hold MBA, then Bachelor, and PhD. students.



Survey conducted in Arabic language; however, its key points and discussions were written in this paper in English language.

7- Analysis

It was obvious that all participants emphasized the role of embedding the artificial intelligence into the education process and precisely for students with different impairments issues. It was noted that the answers to the survey questions demonstrated a positive image and a great reflection of the perspective and readiness to accompany and embrace the artificial intelligence in the educational field, specifically for students with disabilities. The responses to the nine questions assured that adopting AI in education process will enhance the information accessibilities, quality, and education equality. Majority of the participants agreed that adopting AI will accelerate learning process for special needs students. And they stated that AI will make communication vital between students and educators. They argued that educators will no longer face obstacles in dealing with students with different types of impairments and that through numerous AI tools. Moreover, majority of participants demonstrated that AI will help students access information in areas with weak service. Furthermore, majority of participants mentioned that AI has several positive consequences on educational facility such as mitigating administrative process, providing 24/7 support, helping educators to design suitable contents, and building independent students.

8- Conclusion and suggestion

Ultimately, technological development and artificial intelligence tools will reinforce equality and fairness of accessing information for students with different types of impairments. The positive impact will make learning process smooth for both educators and students. Those students will no longer face any hindrances in accessing and gaining knowledge through



assistive and supportive AI tools. Parents, educators, and students in Kuwait must embrace the artificial intelligence and embed it into their daily routines. Campaigns must raise awareness of the smartness, effects, and consequences of AI on education facility. This will encourage parents, educators and schools push the adoption of AI in the teaching and learning process to cope with the giant technological development.



9- References

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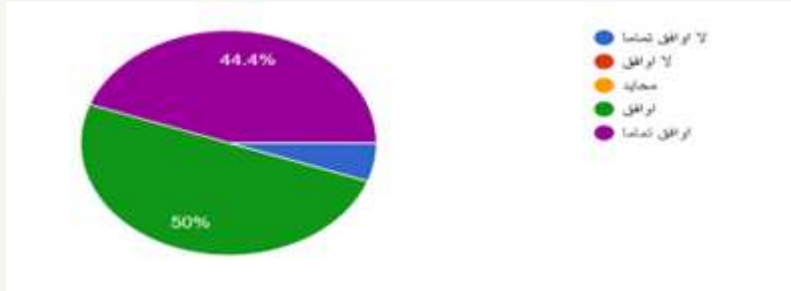
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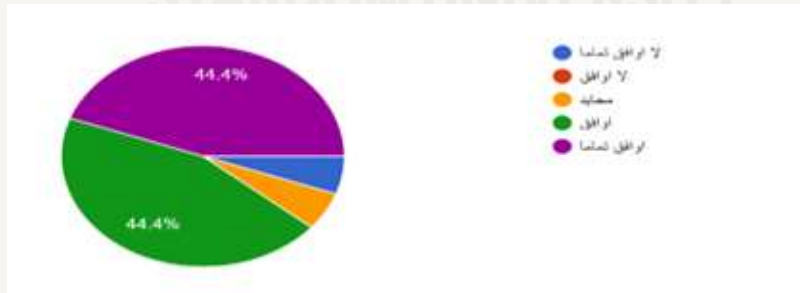
10- Appendix

10.1 Survey Questions and response (Likert questions)

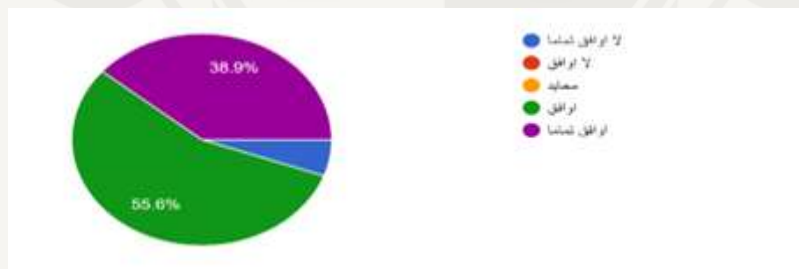
1- اهمية تطبيق ادوات الذكاء الاصطناعي والتكنولوجيا المتقدمة في عملية التعليم في مدارس الكويت؟



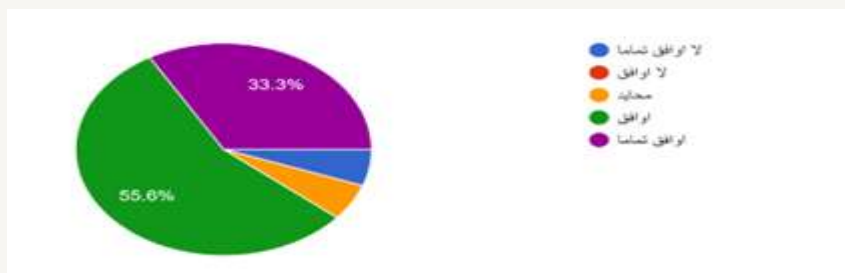
2- فعالية تقنيات الذكاء الاصطناعي المساعدة في تحسين التواصل للأطفال ذوي الإعاقة؟



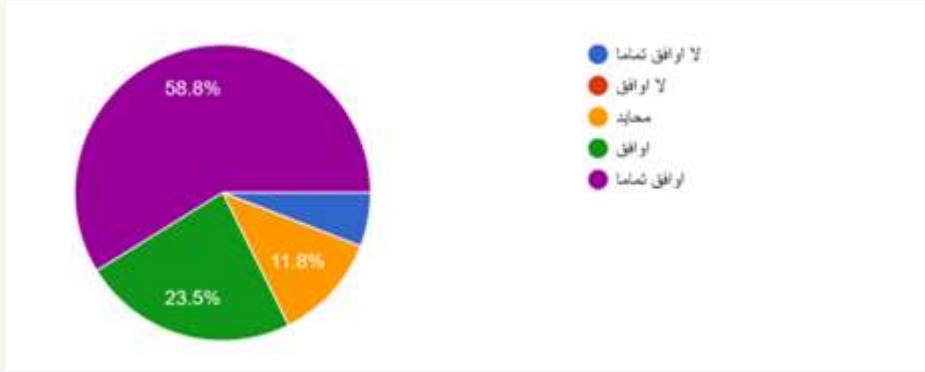
3- الروبوتات وتقنيات الرؤية الحاسوبية يمكن أن تُحسن العلاج الطبيعي والمهارات الحركية؟



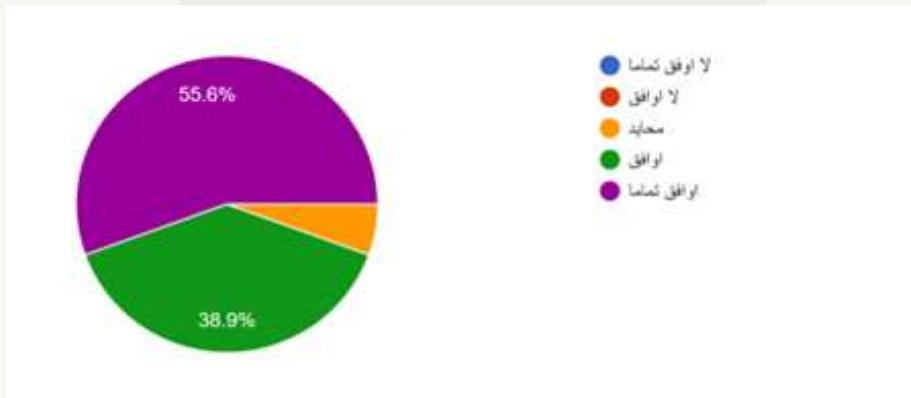
4- أهمية أدوات الذكاء الاصطناعي على التكيف الفوري لدعم تقدم الطلاب في التعلم؟



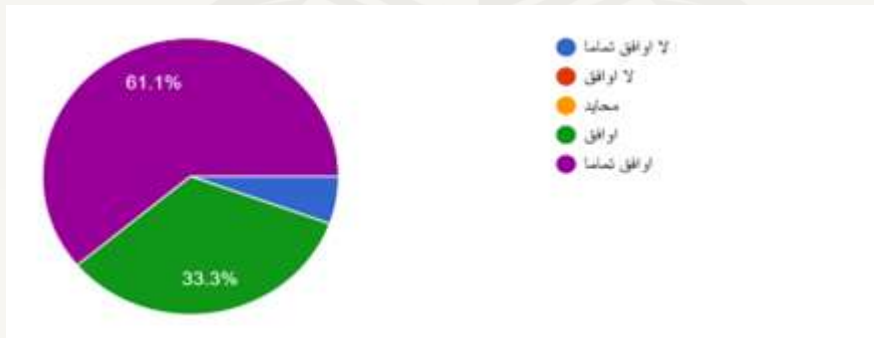
5- موافقتك على أن حلول الذكاء الاصطناعي يمكن أن تقلل الحواجز أمام الطلاب في المناطق الأقل خدمة؟



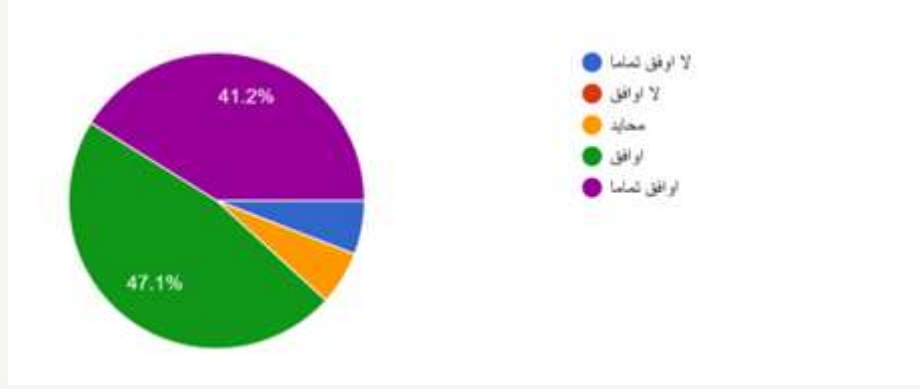
6- فعالية أدوات الذكاء الاصطناعي مثل أجهزة تحويل النص إلى كلام في تسهيل الوصول إلى المواد التعليمية للجميع؟



7- فائدة الذكاء الاصطناعي في أتمتة المهام مثل التصحيح وتتبع تقدم الطلاب؟



8- تحليلات الذكاء الاصطناعي تساعد المعلمين في تخصيص استراتيجيات التدريس بشكل فعال؟



9- تعتقد أن أدوات الذكاء الاصطناعي تعزز الاستقلالية للطلاب الذين يعانون من مشكلات في الحركة؟

