

The importance of artificial intelligence in the field of special education

أهمية الذكاء الاصطناعي في مجال التربية الخاصة

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Abstract:

The use of artificial intelligence in the educational process has become a pressing necessity to ensure the quality of education and improve learning outcomes. Consequently, developing countries are striving to keep pace with this technological advancement by equipping educational institutions with the necessary tools and resources to implement artificial intelligence applications in teaching. This contributes to enhancing learners cognitive development and improving their educational experiences. In addition, specialists in the field of special education have begun to rely on intelligent applications to support assessment, intervention, and rehabilitation processes. Given the importance of this topic, the present study addresses several key aspects, including the concept of artificial intelligence, its characteristics and objectives, and its importance in educational institutions as well as its role in the field of special education.

Keywords: Artificial Intelligence, Special Education

ملخص:

أصبح الاعتماد على تقنيات الذكاء الاصطناعي في العملية التعليمية ضرورة لضمان جودة التعليم وتحسين مخرجات العملية التربوية والتعليمية. وبناءً على ذلك، تسعى الدول النامية إلى مواكبة هذا التطور التكنولوجي من خلال تجهيز المؤسسات التعليمية بالأدوات والموارد اللازمة لتطبيق هذه تقنيات في التدريس. مما يساهم في تطوير النمو المعرفي للمتعلمين وتنمية خبراتهم التعليمية. لذلك يسعى المختصون في مجال التربية الخاصة في استخدام التطبيقات الذكية لدعم عمليات التقويم والتدخل والتأهيل، فنظراً لأهمية هذا الموضوع سنتناول الدراسة الحالية العناصر التالية: مفهوم الذكاء الاصطناعي وخصائصه وأهدافه، وأهميته في المؤسسات التعليمية، ودوره في مجال التربية الخاصة.

كلمات مفتاحية: الذكاء الاصطناعي، التربية الخاصة.

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1. Introduction

Recent technological advancements have led to the emergence of numerous educational and pedagogical applications, which have been further developed through artificial intelligence as a positive contribution to education in general and special education in particular. Artificial intelligence technologies enable special education teachers to use modern tools and advanced applications based on animated, colorful, and interactive audiovisual content. These tools help encourage children with speech and language difficulties to learn vocabulary and improve correct pronunciation. Furthermore, educational videos are used to train children with special needs in essential life skills, such as dressing and brushing teeth, through enjoyable and engaging methods. This approach facilitates faster and easier skill acquisition, as this group of learners is particularly responsive to audiovisual instructional aids. Accordingly, the present study seeks to highlight the importance of these educational applications for children with special needs.

2. Objectives of the study

- Clarifying the concept of Artificial Intelligence
- Identifying the most important characteristics of Artificial Intelligence.
- Objectives of Artificial Intelligence.
- Highlighting the importance of Artificial Intelligence applications in educational institutions in general and in the field of special education in particular.

3. Importance of the study

- The necessity of keeping up with technological advancements in the educational process at special needs centers.
- Introducing the specialized Teacher to the concept of Artificial Intelligence and its relation to the field of education.
- Informing specialists about Artificial Intelligence applications related to the field of special education.
- Training on how to use various Artificial Intelligence Applications to meet the needs of individuals with special needs.

4. The Concept of Artificial Intelligence

Artificial intelligence (AI) is defined as the simulation of human intelligence processes carried out by computers. This process involves learning through the acquisition of information, applying rules for using this information, including reasoning and causal analysis, and employing these rules to reach specific or approximate outcomes. It is a field of study that focuses on simulating human intelligence through computers and replicating

the expertise of specialists across various domains, as well as developing programs to solve problems by processing data and information in non-algorithmic ways. AI is considered a branch of computer science concerned with creating technological systems capable of performing tasks that require human-like intelligence (Hamidan & Al-Hawatmeh, 2024, p. 394).

AI is also defined as the science of designing intelligent machines and programs that can act in ways that mimic human thinking in learning and decision-making. It involves developing systems capable of performing cognitive tasks such as visual perception, speech recognition, decision-making, and language translation. This field is regarded as a modern discipline within computer science, aiming to understand human intelligence mechanisms and implement them programmatically, enabling computers to perform functions that require high-level mental skills such as logical reasoning and inference.

Moreover, AI is described as knowledge-based computer guidance and intelligent applications that perform tasks typically carried out by humans, with enhanced efficiency. It is characterized by the ability of computational technologies and devices to perform tasks associated with human resources, such as recognition, writing, and speech. AI also encompasses digital technologies capable of executing tasks commonly associated with humans, including devices and applications designed to simulate human learning and decision-making, such as phonetics recognition, writing, and language processing (Yaqubi, 2025, p. 88).

Dick noted that, in brief, AI is about enabling computers to perform tasks that humans can better understand. Furthermore, Stewart et al. highlighted that AI consists of a collection of diverse technologies that allow machines to sense, understand, act, and learn at levels of intelligence similar to humans (Al-Shahri & Al-Obaidi, 2022).

5. Characteristics of Artificial Intelligence

- The ability to acquire knowledge and apply it.
- The ability to learn and understand from previous experiences.
- The capacity for thinking and perception.
- Utilizing past experiences and applying them to new situations.
- Using AI to solve problems even in the absence of complete information.
- Handling ambiguous, difficult, and complex situations.
- Responding quickly to new situations and events.
- Creativity in visualization and understanding images.
- Making administrative decisions (Hamidan & Al-Hawatmeh, 2024, p. 395).

Artificial intelligence is characterized by multiple features that have significantly contributed to the advancement of computer programs. It employs methods similar to human problem-solving, possessing the ability to think, perceive, acquire knowledge, and apply it effectively. AI also leverages past experiences and applies them to new situations, using trial and error to explore different possibilities. It responds quickly to new circumstances, handles complex and ambiguous cases even with limited information, and can assess the relative importance of elements within a situation. Furthermore, AI demonstrates capabilities in visualization, creativity, and understanding and organizing visual information, in addition to providing essential information to support administrative decision-making (Yaqubi, 2025, p. 88).

6. Objectives of Artificial Intelligence

- To process higher mental functions that occur within the human mind.
- To facilitate the use of computers and maximize their benefits by leveraging their problem-solving capabilities, thereby enabling changes that support effective and cost-efficient training and learning processes.
- To develop computer programs capable of learning from experiences in order to solve problems.
- To understand the nature of human intelligence in order to create computer programs that simulate intelligent human behavior. This involves the program's ability to address a problem or make a decision for a specific situation by utilizing a variety of previously programmed reasoning processes.
- To design intelligent systems that exhibit the same properties of intelligence observed in human behavior and to solve problems using non-algorithmic symbolic processing (Al-Atel et al., 2021, p. 36).

Objectives of Using Artificial Intelligence in education

- **Grading** : Some companies have developed programs that conduct exercises and tests, determine grades, correct answers, and inform students of their performance in these assessments.
- **Personalization** : Based on each student's performance and skills, some companies provide systems that categorize students' strengths and weaknesses. This allows for tailored lessons aimed at reinforcing strengths and addressing weaknesses in the curriculum, helping teachers accurately determine students' levels and understand their individual learning needs to improve academic success.
- **Curriculum and Teaching Quality** : AI can identify gaps in student understanding through their performance in tests and exercises.

- **Training :** AI enables the development of intelligent training platforms and programs that measure and determine students' learning methods, assess their knowledge, and provide customized exercises based on the assessment.
- **Adaptive Learning :** AI supports notable progress by providing individualized instruction and allows curriculum adjustments based on student needs.
- **Immediate Student Assessment :** Learning programs can evaluate students' skills in real-time, helping improve their academic performance (Al-Ghamdi & Al-Farani, 2020, pp. 60–61).

7. The importance of Artificial Intelligence Applications in educational institutions

- AI develops the technological system and provides valuable information that helps achieve objectives and enhance professional competencies, contributing to the uniqueness and excellence of the institution and its members.
- It increases efficiency, creates new income opportunities, and enhances employee loyalty, quickly becoming a competitive advantage for many institutions and companies by accomplishing more tasks in less time.
- AI supports the delivery of creative solutions provided by educational technology and its tools to the educational system.
- It improves the performance of teachers and school administrators in the educational process.
- AI enhances teaching and assists students in learning through its diverse applications, simulating human mental abilities and cognitive patterns to facilitate human life and enable machines to perform numerous tasks.
- It improves institutional performance and productivity by digitizing tasks previously requiring human effort, while processing large-scale data in ways beyond human capability (Al-Riyami & Al-Sharqawi, 2024, p. 90).
- Sustainable development in education is promoted through its positive use, as AI-based applications operate online between teachers and learners.
- AI helps teachers provide distinctive learning opportunities and resources.
- Applications like ChatGPT assist teachers in personalizing the learning experience for students, increasing its effectiveness.
- AI allows teachers to select appropriate assessment tools for students using available models.

- It facilitates easy communication with students, enhancing the longevity of learning impact.
- AI provides continuous learning by responding to all student inquiries and offering immediate feedback.
- It offers ongoing support and encouragement by recognizing students' efforts and achievements, motivating them to continue learning and developing.
- ChatGPT engages students with interactive and entertaining conversation styles, including storytelling and activities, making learning enjoyable.
- It assists students in correcting spelling and grammar errors and provides continuous suggestions on various writing topics.
- AI supports every step of the writing process, including topic selection, brainstorming, planning, drafting, active participation, and proofreading.
- It significantly enhances collaborative learning by facilitating communication and dialogue among students, encouraging idea exchange, teamwork, and cooperation in problem-solving and task completion.
- ChatGPT serves as an effective tool for creating an interactive educational environment, integrating activities such as games and simulations, capturing attention, and increasing engagement with content.
- AI provides a safe space for students to practice skills and explore ideas without fear of mistakes, improving motivation and learning outcomes.
- It promotes independent learning by offering personalized guidance and feedback to help students better understand concepts (Al-Daaja, 2024, pp. 16–18).

8. The importance of Artificial Intelligence in the field of special education

- AI technologies have contributed to the development of education for deaf students and those with hearing impairments, enhancing their learning experience by removing barriers and transforming abstract concepts into tangible learning experiences (Al-Harshani & Al-Jumai'i, 2025, p. 155).
- Using AI in the classroom increases students' motivation to learn, as teachers have found that modern computers and related technologies can effectively capture students' attention.
- Computers provide numerous distinctive and effective methods and opportunities for teaching and learning, including building practical skills, solving real-world problems, engaging in interactive and exploratory learning, and connecting learners to diverse learning resources.

- AI supports communication beyond the classroom, enabling schools and communities to provide collaborative learning environments that develop higher-order thinking and problem-solving skills. For example, when AI applications are placed in teachers' hands, they can offer effective learning opportunities , intelligent educational programs help deaf students adapt to and understand educational material while acquiring essential life skills.
- AI increasingly assists mental health and psychological specialists working with students with attention deficit hyperactivity disorder (ADHD) and learning difficulties, helping them interpret behavioral data to evaluate the effectiveness of interventions or treatments.
- AI technology is also applied in supporting gifted students with hidden learning difficulties, particularly those with visual learning abilities, allowing them to showcase their skills and creativity. Many advanced educational applications and options are currently available (Al-Ghuwairi, pp. 12399–12400).
- AI systems have demonstrated effectiveness in assisting students with disabilities, including those with visual or hearing impairments and those with social skill challenges (e.g, language and communication). Devices using AI can help these students read books and simultaneously develop social communication and learning skills.
- Specialized systems are designed to assist students with all types of disabilities, with AI supporting augmented reality, virtual reality, and robotic technologies to teach students with health and mental challenges (Al-Sayyid, 2024, p. 27).
- AI provides educational programs and individualized plans tailored to the needs and abilities of students with special needs.
- It offers supportive services according to the specific category of special needs.
- AI applications can be implemented in inclusive schools across school administration, student activities, curriculum, and content, effectively simulating the teacher's role.
- Its applications play a crucial role in promoting psychological and social integration for students with special needs at personal, academic, and social levels.
- AI can be used in diagnosing autism spectrum disorder.
- AI applications support rehabilitation processes for certain groups of students with special needs. Examples include: **StorySign**, **Live Transcribe**, **Listen at Home** for deaf students; **Be My Eyes** for visually impaired students; and applications for children with autism spectrum disorder such as **Miracle Modus**, **Avaz**, **Autism5**,

among others, designed to address specific challenges and facilitate social integration.

- These applications assist teachers in selecting effective communication strategies with children who have intellectual disabilities (Makkari & Ajwa, 2023, p. 81).
- AI educational applications help distribute tasks according to individual competencies, facilitate learner–machine interactions, provide adaptive teaching strategies, enable automated correction, improve administrative performance across platforms, offer personalized and suitable services, and support educational decision-making (Ibrahim, 2025, pp. 91–92).

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9. Conclusion

Despite the significant advancements in the field of education, there are still challenges and obstacles that hinder some teachers from using artificial intelligence applications, many teachers are accustomed to traditional teaching methods and have not received sufficient training to utilize these modern technologies effectively. Additionally, some face a lack of essential technological resources required to implement these tools. Therefore, it is necessary to provide professional development and training courses for teachers to enable them to use artificial intelligence applications. Educational institutions should also be equipped with the necessary resources, including internet access, computers, projectors, and other essential tools.

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