RESEARCH ARTICLE

The Use of Artificial Intelligence Programs in Teaching and Developing Communication Skills for People with Special Needs: A Theoretical Approach Based on Successful International Models

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Abstract

This study aims to clarify the importance of using artificial intelligence in education, particularly for individuals with special needs who possess high capabilities, and its role in developing educational communication skills both among students and through their interaction with educational materials. It also facilitates the methods by which teachers engage with this special group. International models have demonstrated the effectiveness of teaching methods that employ intelligent applications on samples of people with special needs by providing interactive features and the contribution of robotics in enhancing this group's communicative and educational skills. The study utilised a descriptive approach to diagnosing the variables defining the phenomenon under investigation by delving into the characteristics of innovative education and the outcomes of employing artificial intelligence in teaching individuals with special needs, comparing the results with successful international models in the field. The study reached several conclusions, the most significant of which are that artificial intelligence applications contribute to the development of education and the enhancement of the efficiency of learners with special needs; educating special groups depends on the innovation of new and effective methods that keep pace with the demands of the artificial intelligence era, and the development of communication skills requires training courses before adopting intelligent teaching methods.

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Introduction

In the digital transformation era, artificial intelligence (AI) is reshaping many sectors, including education. For individuals with special needs, whose unique requirements call for tailored teaching approaches, integrating AI programs offers unprecedented opportunities to enhance learning and develop communication skills. Intelligent technologies enable the creation of personalized, interactive, and accessible educational environments, fostering social inclusion and personal growth for these learners. This paper explores the significance of employing AI in educating people with special needs by drawing on successful international models while highlighting the challenges, integration mechanisms, and innovative solutions that can optimize educational practices in this field.

Problem Statement

The world has witnessed a qualitative leap in technology, with its use becoming prevalent across all sectors due to the capabilities and speed it provides in delivering services and developing methods of learning and communication. Integration into technology is one of the imperatives imposed by globalisation, becoming a necessity rather than a choice. Many sectors, including education, have adopted these modern teaching methods, which have succeeded in numerous countries. However, educators' various challenges when teaching using artificial intelligence necessitate a thorough study and reference to leading international models in innovative education. Addressing these shortcomings and proposing the necessary alternatives, whether technical issues or training related to these digital tools, is essential.

The use of artificial intelligence is considered imperative and complements the requirements of digital transformation. Consequently, all institutions have sought to employ it in formulating programmes, designing plans, and shaping policies and strategies. They view it as an opportunity to manage the integration shift towards artificial intelligence and education through new patterns and more modern methods. With the emergence of the artificial intelligence era through digital transformation initiatives, those responsible for institutions concerned with educating people with special needs consider including innovative teaching methods equally, reflecting on how this affects employment and the skills necessary to remain at the forefront. It is regarded as a field for creativity and enhancing communicative and educational skills for this group.

The main research question is: What is the current state of using artificial intelligence programmes to develop education and communication skills for people with special needs?

This includes the following subsidiary questions: What are the mechanisms for adopting education using artificial intelligence? How can education and communication skills be developed for people with special needs? What are the challenges of transitioning to teaching with artificial intelligence for this group? What are the most important alternatives to overcoming educational challenges using artificial intelligence for people with special needs?

2. Artificial Intelligence Technologies

Artificial intelligence (AI) is a field of computer science dedicated to solving cognitive problems typically associated with human intelligence, such as learning, creativity, and image recognition.[1] Generative artificial intelligence has become highly disruptive across all sectors, and no clear framework or regulatory mechanism has yet been established, particularly regarding legal aspects and licensing.[2] AI models have been developed without sufficient oversight or accountability. Everyone seeks to acquire information without protecting intellectual property rights, raising concerns about the accuracy of statistics and data. There is also the critical issue of national security threats posed by AI, such as decoding encrypted information or eavesdropping.[3]

Educating people with special needs according to an innovative educational system is specifically designed using modern and well-studied mechanisms to respond to the integrated and diverse educational

[1] Amazon Web Services, "Artificial Intelligence Technologies," accessed May 31, 2025, https://aws.amazon.com/ar/what-is/artificial-intelligence/.

[2] Yasser Abu Muayqal, "Generative Artificial Intelligence," Sky News Arabia, accessed May 31, 2025, www.skynewsarabic.com.

[3] "Artificial Intelligence... Challenges of Responsible Use," accessed May 31, 2025.

requirements of individuals who face obstacles to learning through conventional methods due to various disabilities (motor, visual and hearing impairment, mutism, autism spectrum disorder, etc.). This innovative system, based on generative artificial intelligence software, includes teaching methods appropriate to the type of disability, the creation of educational materials, and supportive resources to enhance the communication skills of the special needs group. Moreover, the new AI software relies on initiatives that support psychological and social aspects, enabling this group to access educational materials and essential skills to develop their ideas and integrate with various segments of society.

The Importance of Smart Digital Integration in Education for Various Groups

The transition from old communication technologies, which have begun to fade, to digital interactions is a result of the development of digital technology and networked computing (the emergence of the internet). It is also regarded as an economic strategy universities and educational institutions undertake to employ digital technology and networked computing to work together. Digital integration and the convergence between state institutions are based on three fundamental elements: computing, communication, and content. Computing refers to processing information; communication involves transmitting information through communication; and content relates to the mastery of integrating multiple tasks into a single platform. This phenomenon encompasses linking information and communication technology with computer networks and multimedia content, commonly called the "three C's": computing, communication, and content. This development emerged as a consequence of the widespread use of the internet and the digitisation of content.[4]

It has also contributed to:

- The development of policies related to identifying and classifying students with disabilities.
- The advancement of scientific tools that determine and assess students with disabilities.
- Raising awareness and understanding and building policies and frameworks to integrate students with disabilities into mainstream education consistent with their abilities within the least restrictive environments.
- Preparing equal enrolment opportunities for equitable and appropriate education in schools for all students with disabilities, regardless of gender, socioeconomic background, geographic location, or the nature of their unique needs.
- Providing specialised learning opportunities that meet gifted and talented students' unique needs.
- Implementing school support systems for students at risk.
- Offering alternative or additional lifelong learning opportunities for those outside the formal education system or those who have not attended school.[5]
- Inclusive education for people with disabilities means removing the physical and behavioural barriers that prevent learners with disabilities from effective participation in education. Article 24 of the Convention on the Rights of Persons with Disabilities emphasises the right to inclusive education and prohibits discrimination based on disability in education. To achieve quality inclusive education for people with disabilities, minimum accessibility standards must be met in all schools, including during emergencies. Investment is required in teacher training to enable them to respond to diversity in classrooms and to the inclusion of people with disabilities. It is also essential to ensure the availability of educational materials and resources in inaccessible and adaptable formats, alongside investment in technology and assistive devices for children with disabilities. Furthermore,

[4] Mohammed Mamoun Matar, *Digital Integration and Its Impact on Media*, 2013, accessed May 31, 2025, http://maktaba-sa7afia.blogspot.com/2014/01/blog-post_1418.html.

[5] Ministry of Education, Kingdom of Saudi Arabia, "Regulatory Rules for Institutes and Special Education Programmes at the Ministry of Education: Equality in Education for Students with Disabilities," October 14, 2024, https://moe.gov.sa/ar/education/generaleducation/Pages/PeopleWithSpecialNeeds.aspx.

it is crucial to ensure the involvement of organisations concerned with disability in educational planning and monitoring.[6]

3. Uses of Artificial Intelligence Teaching Platforms

Adopting educational methods for people with special needs represents a bold strategy undertaken by several countries. It challenges all societies, especially amid urgent initiatives prioritising their education and enhancing communication skills. The important role played by human rights organisations insisting on the necessity of their social inclusion has been a key mechanism prompting governments to make decisions in this regard. This group has been recognised as a contributor to building the national economy and granting them the right to education, and have aimed to raise their cognitive and professional levels. Artificial intelligence technologies have enabled them to receive theoretical and practical training, increasing their capabilities by adopting more advanced and modern curricula. For example, China has provided educational environments aligned with their physical and mental abilities, using educational methods and approaches tailored to each group's characteristics and educational needs. The goal is to develop communication skills among individuals with special needs, adapt their skills, and improve performance using robots powered by artificial intelligence.

Digital educational platforms utilising artificial intelligence programmes are used in:

- Adapting specialised teaching programmes according to the needs of individuals with special needs.
- Adopting educational tools that benefit students with special needs.
- Providing training and implementing projects.
- Enabling individualised learning opportunities for this special group through teaching platforms.
- Facilitating easy access to resources and ensuring equal learning opportunities for all students.
- Offering cost savings through distance education and enabling students to benefit from all required subjects regardless of disability.
- Contributing to diversifying educational activities, including presentations, questions and answers, explanations, and discussions.

Digital platforms also offer numerous advantages, such as:

- Practical, interactive teaching methods, since blended learning via platforms allows work to be tailored to the needs and circumstances within institutions, providing a suitable teaching environment.
- Combining knowledge and application within innovative educational platforms.
- Presenting simplified and easily understandable explanations through innovative digital educational platforms.
- Offering interactive educational videos to ensure continuous learning.
- Helping to address shortages in teaching staff by compensating for gaps in pedagogical supervision in specific specialisations.
- It contributes to the development of student's skills and enables them to engage in individualised learning experiences.
- Through artificial intelligence, individual talents are identified, and the necessary skills for people with special needs are developed.
- By adopting modern technological transitions, intelligent programmes have become essential in developing remedial teaching for people with special needs across various fields, particularly during instruction. This approach is a priority embraced by several countries such as Finland, China, Japan, Qatar, and the Kingdom of Saudi Arabia. The latter is considered one of the successful international models in this field, where educational programme designers and curriculum developers in Saudi

[6] Inter-Agency Network for Education in Emergencies, "Article 24 of the Convention on the Rights of Persons with Disabilities," Kingdom of Saudi Arabia, accessed September 1, 2024, https://inee.org/ar/eie-glossary/altlym-alshaml-ldlhwy-alaaqt.

Arabia strive to integrate AI tools to enhance the effectiveness of teaching methods and adapt them to the cognitive capacities and types of disabilities among students and pupils.

- Artificial intelligence assists curriculum developers in creating flexible educational environments that prioritise individual differences among students with disabilities and provide specialised curricula that accommodate the student's circumstances and type of disability.[7]
- Students with disabilities use intelligent software, such as smart boards and interactive applications, to enhance engagement and contribute to the success of educational strategies programmed with artificial intelligence technologies.
- Artificial intelligence software provides various diverse educational resources, which has enhanced students' self-directed learning and developed cognitive and behavioural skills in children with special needs.
- Artificial intelligence programmes enable the establishment of a framework for evaluating student performance according to specific criteria and tracking the progress of their communication skills.

First, digital integration in terms of software refers to the intellectual component of systems and networks, which are divided into two main categories: system and application software.

Second, digital integration concerning software and applications includes general application programmes such as web browsers, email clients, groupware, spreadsheets, and databases. Meanwhile, specialised application programmes vary widely; examples include accounting software, financial software suites, and enterprise resource planning (ERP) systems.[8]

4. Mechanisms for Integrating Educational Institutions into Global Digital Dimensions

According to Successful Models:

Educational institutions serving special needs groups in Algeria strive to enhance performance levels to achieve the necessary reforms in the sector. To this end, several objectives have been established, including developing teaching methods and support for individuals with special needs, aiming to integrate them into society, promoting economic development, and providing future professional competencies upon which reliance can be placed. This can only be realised through the adoption of mechanisms for integrating educational institutions into global digital dimensions, including:

- Implementing organisational plans and policies that address delays in adopting a comprehensive digital foundation amid the global technological transformation.
- Establishing digital infrastructure and adopting unified digital transactions across all educational sectors instead of traditional training methods, taking into account successful models in various fields, such as the "Information Superhighway" initiative, which has driven the conversion of many traditional information sources into collections accessible via modern digital media.
- Facilitating the rapid and instantaneous exchange of all types of informational content, whereby educational institutions establish extensive information banks that filter data and deliver it through appropriate channels to learners with special needs.
- Technological convergence simplifies the production of knowledge content and allows its quantitative and qualitative expansion on a vast scale. It makes its distribution fast and easy while reducing the costs of professional production and dissemination. This enables learners with special needs to benefit from educational programmes efficiently, achieving quality training.
- We should adopt electronic, secure, and accessible data transmission technologies for all learners with special needs.

[7] Trainprog Academy, "Effective Strategies for Teaching in Special Education and Enhancing Its Outcomes," accessed May 31, 2025, https://trainprogacademy.com/%D8%A7%D9%84%D8%AA%D8%AF%D8%B1%D9%8A%D8%B3-%D9%81%D9%8A-%D8%A7%D9%84%D8%AA%D8%B1%D8%A8%D9%8A%D8%A9-%D8%A7%D9%84%D8%AE%D8%A7%D8%B5%D8%A9/.

[8] Abboud Najm, *Electronic Management: Strategy, Functions, and Problems* (Riyadh: Dar Al-Mareekh Publishing, 2004), 126.

- Standardising electronic devices may vary in size and function but can display diverse types of information in a unified format.[9]

5. Challenges in Transitioning to Artificial Intelligence-Based Teaching for This Group

Countries that have succeeded in adopting artificial intelligence projects in administrative, institutional, and educational fields have relied on several mechanisms fundamentally based on an integrated network system, which depends on the following elements:

First: Accelerating the Use of Intelligent Technologies in Institutions

This involves enhancing connectivity and utilising technological capabilities, transforming organisational methods and operations to reconsider how they function and organise themselves. It also entails adapting the services provided to individual learners more appropriately through completing the information infrastructure, establishing integrated communication systems, deploying distinguished applications, developing human competencies among educational institution staff, and improving electronic services and making them accessible to individuals and administrations.[10]

Second: Developing Incentive Mechanisms and Procedures to Enable Individuals to Benefit from Information and Communication Technology Equipment and Networks.

This includes providing high-capacity equipment and connection lines and supporting public communal spaces with technological resources.

Third: Developing the Digital Economy and Closely Linking It to the Education Sector at All Levels.

This involves implementing plans adopted through Algeria's digital strategy and creating favourable conditions to enhance national scientific competencies in software production, service provision, and equipment supply.

Fourth: Strengthening the Infrastructure of High-Speed and Ultra-High-Speed Digital Services.

This requires qualifying communication infrastructure and focusing on technical aspects.

Fifth: Developing Human Competencies.

This entails revising educational and vocational training programmes in modern information and communication technologies, including teaching ICT skills to all social groups.

Sixth: Strengthening Research, Development, and Innovation

Through research, value-added services in information and communication technologies can be advanced.

Seventh: Developing Digital Capabilities

This includes preparing and implementing a communication plan regarding the information society in Algeria.

Supporting Evaluation and Monitoring Mechanisms

This involves preparing an appropriate set of indicators to adopt evaluation and monitoring mechanisms for educational programmes for people with special needs.

Financial Resource Allocation

Implementing the digitisation strategy requires securing sufficient financial resources.

Supervising Digital Skills

Digital skills evolve along a continuous spectrum of renewal and performance improvement within educational institutions and are constantly updated in line with technological changes. Digital skills play a crucial role in achieving competencies, allowing policymakers and digital skills providers to continually assess the relevance and modernity of their programmes and training curricula. Many international organisations and educational institutions have developed frameworks and digital skills to enhance digital competence among individuals, primarily as students operate within societal systems that influence and are influenced by

[9] "Media Convergence Essay," AntiEssays.com, accessed May 31, 2025, http://www.antiessays.com/free-essays/Media-Convergence-462326.html.

[10] Abdelkader Abban, "Challenges of Electronic Management in Algeria: A Sociological Study in the Municipality of Kalitus, Algiers," PhD diss., University of Biskra, Faculty of Humanities and Social Sciences, Department of Social Sciences, 2015/2016, 91.

them. This support aids relevant authorities in formulating policies that foster digital competence development and plan initiatives to improve digital skills among targeted and specific groups.[11]

6. Challenges in Implementing Digital Educational Platforms in Algeria

Educational institutions for people with special needs face several challenges in integrating artificial intelligence, the most significant of which are:

- The transition towards projects using artificial intelligence programmes in education, coupled with weak internet connectivity and the absence of technological infrastructure.
- Inability to accurately estimate the expected outcomes from adopting technology in educational programmes via platforms.
- Challenges in collaboration between teachers, policymakers designing curricula on digital platforms, and field actors.
- The imposition of programmes focusing on technology use without accompanying training.
- There is a gap between methods for improving learning and strategies for accessing technological tools, alongside weaknesses in software and technical aspects of activating digital educational platforms.

7. Key Alternatives to Overcome Challenges of Education Using Artificial Intelligence for People with Special Needs

The framework of digital competence in Algerian universities is defined by:

A. Data and Information Literacy via Intelligent Programmes: Browsing, searching, sorting data and information, digital content evaluation during teaching for all groups, especially people with special needs.

B. Interaction through Digital Technologies: Communication and collaboration using digital technologies, managing digital identity.

C. Creating Digital Content: Developing digital content, integrating and reformatting digital content, and programming.

D. Digital Safety for Artificial Intelligence Programmes: Protecting digital devices, personal data, and privacy.

E. Problem Solving: Addressing technical faults, identifying technological needs and responses, creatively using digital technologies, and identifying gaps in digital competencies.[12]

- Algerian educational institutions can integrate the needs of students with special needs into the design and development of innovative digital usage of educational programmes by employing artificial intelligence applications.
- A significant challenge educational institutions face is their ability to keep pace with the rapid and substantial advancements in technology and artificial intelligence, especially given that Algerian institutions possess cadres and research laboratories whose roles have been sidelined for various reasons. This situation necessitates prioritising the study of these obstacles and seeking solutions through:
- Prioritising the use of artificial intelligence and modern technologies to address all requirements for developing the skills of people with special needs by studying the behaviour of learners and digital service users within educational institutions.
- Promoting and building a culture centred on developing the abilities of students with special needs in their interactions with artificial intelligence.
- Developing support services for digital centres.
- Establishing a strategy for intelligent management in education, whereby Algerian educational institutions must provide the technical, financial, and expert resources necessary to adopt a

[11] European Commission, *Digital Competence Framework (DigComp)*, from the European Commission working paper on the digital competence framework, accessed September 6, 2019, 12:23 p.m., https://ec.europa.eu/jrc/en/digcomp/digital-.

[12] European Commission, *Digital Competence Framework (DigComp)*, European Commission working paper on the digital competence framework, accessed September 6, 2024, 12:23 p.m., https://ec.europa.eu/jrc/en/digcomp/digital-.

comprehensive digital transformation project in curricula, teaching methods, and skills enhancement.

- Ensuring that technical capabilities are accessible to all.
- Providing software continuously and making it available to all students and competent learners.
- Supporting innovation and learning.
- Allocating dedicated spaces for educating groups with special needs.
- Supporting effective methods to transform work processes in designing and developing public services by experimenting with innovative approaches and solutions. Creating innovation and learning environments is a tangible example and allows collaboration among all educational institutions. These innovative methods and solutions address the needs of public services to enable faster, simpler, and more digital co-creation of public services. To achieve this, institutions must ensure a shift towards innovative teaching methods and work to realise learning through artificial intelligence in various fields.
- Adopting a digital culture and establishing digital renewal and innovation cells.
- Providing innovation units with a simple structure within universities to explore innovative solutions and develop novel approaches for implementing digital projects in collaboration with companies, researchers, and innovation hubs.
- Encouraging innovation to eliminate stereotypical practices in interactions within educational institutions with people with special needs.
- Whether it concerns innovation and learning environments, teaching methods at the university, or mechanisms for knowledge exchange, educational institutions and Algerian universities must create suitable conditions to generate innovative ideas and ensure their systematic implementation.
- Adopting a comprehensive strategic vision targeting people with special needs to develop Algerian educational institutions and integrate artificial intelligence programmes.
- Establishing training programmes for the optimal use of educational platforms and fostering intelligent interaction between learners and teachers.
- Training and enhancing teachers' performance by equipping them with the necessary skills.
- Benefiting from successful international experiences in the field.
- Designing the teaching experience, including how instructors interact with technology and deliver digitally designed knowledge content through educational platforms.
- Providing appropriate support tools.

8. Conclusion

Merely acquiring and activating artificial intelligence technologies in educational institutions for people with special needs is insufficient to implement innovative teaching platforms and achieve the necessary objectives effectively. Therefore, it is essential to prepare teachers and instructors and enhance their skills to enable optimal use of technology through gradual programmes and curricula that help overcome challenges faced by this group, which possesses unique talents and abilities requiring proper care and development. This represents a practical and strategic step towards achieving more advanced education aligned with successful global experiences by:

- Motivating students, enhancing their self-confidence, and improving teaching skills for people with special needs are necessary.
- Integrating intelligent technologies to foster interaction and integration in teaching, with particular attention to pupils and students with special needs.
- Providing an integrated educational environment composed of artificial intelligence software that encourages the active participation of people with special needs.

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11. European Commission. *Digital Competence Framework (DigComp)*. Accessed September 6, 2024, 12:23. https://ec.europa.eu/jrc/en/digcomp/digital-.