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Transforming Inclusive Education through AI: Opportunities and Challenges

Nilu Rani¹, Dr. Anita Singh²

¹ Research Scholar, Department of Education, Pt. Sundarlal Sharma (Open) University, Chhattisgarh (C.G.), India

² Assistant Professor, Department of Education, Pt. Sundarlal Sharma (Open) University, Chhattisgarh (C.G.), India

ABSTRACT:

Giving all students, including those with special needs and disabilities, equal access to education is the aim of inclusive education. However, in order to improve these vulnerable children's independence and social engagement, educational programs and technological applications must be modified to meet their needs. Artificial intelligence is one of these cutting-edge teaching technologies that has emerged as a powerful tool for transforming educational experiences. New developments in artificial intelligence (AI) present a viable means of altering the conventional educational paradigm, establishing a crucial connection between AI and inclusive education. Therefore, the application of artificial intelligence (AI) in education has great potential to promote inclusive education; however, many challenges remain before AI can be effectively incorporated into an inclusive learning environment. As a result, this chapter looks at both the challenges of incorporating artificial intelligence (AI) into a welcoming learning environment for all students as well as the transformative potential of AI tools in empowering all students.

Keywords: Inclusive education, Artificial Intelligence, Opportunities, Challenges.

INTRODUCTION

Inclusion is a transformative process that aims to ensure everyone's full participation and equitable access to high-quality education, according to the Cali Commitment to Equity and Inclusion in Education (2019). It highlights the importance of valuing diversity and eliminating all forms of discrimination in educational systems (UNESCO). The international commitment to promoting equity and inclusion for people with disabilities in formal education and lifelong learning is also reaffirmed in the declaration. Sustainable Development Goal 4 (SDG 4) is also centered on the commitment to ensuring that all people have access to high-quality, inclusive, and equitable education as well as opportunities for lifelong learning. To do this, barriers related to accessibility, demographics, and geography must be eliminated. In this sense, artificial intelligence (AI), which has been acclaimed as one of the most groundbreaking inventions of the century (Becker et al., 2018; Seldon and Abidoye, 2018), offers a multitude of chances to enhance learning environments and encourage equitable access to excellent educational opportunities for all.

IMPORTANCE OF AI IN EDUCATION

Artificial intelligence (AI), a quickly evolving technology, is recognized for its growing significance and transformative impact on numerous aspects of life (Peters et al., 2015). Artificial intelligence (AI) in education refers to the application of AI technologies, such as machine learning and natural language processing, to improve the educational process (Alneyadi et al., 2023). To enable teachers to tailor instruction for each student, it uses algorithms that evaluate data, spot trends, and generate predictions (Khan et al., 2022). As educational systems adopt these technologies, there is a significant opportunity to modify and enhance the learning process and the pedagogical approaches employed (Grimus, 2020). Since AI has the ability to alter students' experiences and influence their intellectual, social-emotional, and physical development both inside and outside of the classroom, there is a great deal of potential benefit to its use in education (Karapet & Misak, 2024). AI is therefore used in almost every area of education (Xu & Ouyang, 2021; Ouyang et al., 2022) and is increasingly recognized as a key force behind educational research, instructional design, technological development, and educational innovation (Tan et al., 2024; Holmes et al., 2023; Hwang et al., 2020). Thus, curriculum design, scheduling, and administration are just a few of the teaching and non-teaching aspects that benefit from the use of AI in education (Nguyen et al., 2023; Chiu et al., 2023; Hopcan et al., 2023).

ROLE OF AI IN PROMOTING INCLUSIVE EDUCATION

Pagliara et al. (2024) claim that the use of modern AI applications has significantly improved inclusive education. Since AI tools can tailor educational materials to each student's needs, learning adaptability—also known as "personalization"—has been emphasized as one of their key characteristics (Khosravi et al., 2022). Therefore, by offering tailored learning supports and enhancing the accessibility of educational resources, especially for students with disabilities, AI's integration into education also contributes to inclusive education.

Students with learning disabilities (SWLDs), such as dyslexia, dyscalculia, and dysgraphia, have long benefited from AI (Drigas & Ioannidou, 2013). AI is used to diagnose learning disability symptoms and has the potential to develop AI learning interventions for SWLDs (Drigas & Ioannidou, 2012, 2013). Because AI-driven instructional software provides personalized learning experiences, it can be advantageous for students with learning disabilities. AI is used in the development of speech recognition software, which is thought to be a powerful tool for students who face physical or academic challenges because it allows them to easily access and operate a computer to record their thoughts on their own (Alliance for Technology Access, 2000).

The development of assistive technologies that enhance mobility and the way educational materials engage with students who have mobility impairments could be facilitated by artificial intelligence. Exoskeletons and artificial intelligence-powered prosthetics are revolutionizing mobility by facilitating greater participation in educational activities (Saiwa, 2024). Additionally, by using voice recognition software and eye-tracking technologies, students with limited mobility can freely use computers and access educational resources. Additionally, students who have trouble interacting with others benefit from AI-assisted facial recognition technology (Adiani et al., 2023).

The development of autonomous wheelchairs, navigation systems, and assistive robots for individuals with visual impairments is made easier by artificial intelligence (Kahraman & Turhan, 2021; Kim et al., 2023). Blind and VI people are happier and less likely to feel afraid and socially isolated because artificial intelligence-based technologies aim to eliminate different obstacles from their surroundings (Emerson & Anderson 2018; Beal & Rosenblum, 2018). (Mulloy et al., 2014). Word processors and text-to-speech systems, which were the initial areas of focus for AI development, have been used in conjunction with AT to make educational materials more accessible to SWDs. Brown and Cavalier (1992).

AI-powered professional development tools can support educators in implementing inclusive teaching practices and differentiating instruction effectively. Thus the automated procedures free up the time of the teachers; giving them the opportunity to concentrate on improving instructional design and encouraging student engagement. Furthermore AI systems are capable of analyzing large amount of data and by examining these data, educators can identify the trends, patterns, and opportunities for student's improvement (Xu, et al, 2021) and can identify individuals who may require extra emotional or behavioral care and thus optimize the learning experience for each student. Artificial Intelligence has the ability to assess student performance, identify areas of difficulty, and provide feedback and guidance (Rizvi, 2023). By utilizing AI-powered tools, educators can also customize instruction to address the unique needs and preferences of students, thus fostering inclusivity and equity in education (Johnson & Smith, 2021). Further AI solutions, such as those used in attendance tracking and grading systems, help to streamline administrative duties and thus putting administrative tasks to automation.

In the context of inclusive education AI aids can be utilized as predictive analysis and thus identification of students deemed to be "at risk" can be done using this prediction (Cano & Leonard, 2019; Slowik et al., 2021). This early identification can lead to early intervention (Leka & Kumari, 2018) which in turn can result in optimum management of these children and thus can greatly improve their later-life quality. Further AI tools have the potential to engage Children With Special Educational Needs (CWSN) more fully with their peers into the regular classroom environments thus promotes diversity and inclusivity in the learning community.

CHALLENGES OF INTEGRATION OF AI IN INCLUSIVE EDUCATION

The application of artificial intelligence (AI) in education has great promise for promoting inclusive education; however there are still many challenges in incorporating AI for creating an inclusive educational environment. Study suggests that there are a number of factors, necessary for the efficient use of technology, including the willingness of educators and students to accept digital resources, the customization of technology to fit a specific culture, and the appropriate recognition and respect of each learner's background and cultural context (Petko et al., 2018). Further due to a lack of infrastructure, many educational institutions are unable to provide students with the necessary resources to meet their learning demands. For many educational institutions, this requirement might be a major obstacle because it requires a large time and resource commitment for teacher training. However one of the major obstacles even in cases when such infrastructure is available is the requirement for more qualified staff who can deploy, manage, and support the necessary hardware and software (Holmes & Tuomi, 2022). Effective integration of AI-powered tools also depends on teachers' capacity to incorporate these technologies, as digital literacy also prevent staff members and teachers from effectively utilizing contemporary technology in the classroom (Nurdyansyah et al. 2022). While some teachers lack fundamental teaching techniques and skills, others are not even proficient with technology. They also thought that some digital resources, such those made for assistive technology, might not be accessible or compatible. Although AI can support and tailor each student's educational experience, it is unable to completely recognize and comprehend each student's unique requirements. Furthermore the importance of the emotional, social, and cultural facets of teaching and learning may be diminished if personalization is prioritized over other factors. Thus students with different needs are less likely to find instructional digital tools-including AI tools- effective or relevant if they are not created with inclusion in mind (Gotschalk and Weise, 2023).

CONCLUSION

The potential of artificial intelligence to support inclusive education is enormous. By offering ways to meet the various learning requirements of students with disabilities, artificial intelligence (AI) has the potential to help address the issues surrounding inclusive education. With opportunities to

personalize learning experiences, increase accessibility, behavioral and speech therapy, teacher assistance, and provide insights into students' requirements AI-powered adaptive learning systems aims to foster inclusivity in a learning environment However integrating technology into inclusive education continues to present difficulties. Issues of equal access are brought up by the digital divide, algorithmic prejudice, and data privacy. Another important component that has been acknowledged is the necessity of professional development and training for teachers in order to successfully incorporate AI tools into the classroom.

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