Proceedings of 3rd International Conference on Interdisciplinary Humanities and Communication Studies
DOI: 10.54254/2753-7064/64/2024.19654

The Role of AI in Achieving Inclusive Education

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Abstract: Sustainable Development Goal (SDGs) 4 emphasizes inclusive education as one of the key objectives of experimenting with equity in education. The current convergence between education and developing technologies has led to the widespread use of artificial intelligence (AI) as a pedagogical tool in education. However, there is a lack of research on the relationship between inclusive education and artificial intelligence (AI) as part of the educational field. Therefore the main purpose of this paper is to explore how artificial intelligence (AI) can help to realize inclusive education. Through literature analysis, it is shown that artificial intelligence (AI) can increase students' accessibility, allow more and more disabled students to participate in the classroom, and artificial intelligence (AI) assistive technology can meet the different needs of disabled students. In addition, artificial intelligence (AI) can personalize learning for students with disabilities, improving their grades and performance. But further development of more comprehensive technologies and training of teachers is still needed in the future. Overall, artificial intelligence (AI) has played a positive role in achieving inclusive education.

Keywords: Artificial Intelligence, Inclusive education, Assistive technology, Students with disabilities.

1. Introduction

The United Nations has promulgated 17 Sustainable Development Goals (SDGs) and the fourth of them motions that everyone has access to high-quality, inclusive education, and encourage lifelong learning opportunities, which emphasizes the focus of education today and reflects the importance of inclusive education. So, what is inclusive education? Inclusive education is the best way to ensure that every child has an equal opportunity to attend school and that all students should be in the same school and classroom to learn and acquire the skills they need to succeed [1]. Also, it aims to provide communities, systems, and organizations the tools they need to fight prejudice—including damaging stereotypes—acknowledge diversity, encourage involvement, and remove obstacles to education and engagement for all [2]. Moreover, over the past decade, artificial intelligence (AI) has undergone a profound transformation due to advancements in technology and computers and is of great help to the development of education. Limna [3] say that AI, with its algorithmic capabilities to make predictions, diagnoses, recommendations, and decisions, is an important and strategic component of educational progress. Besides, there is a close relationship between inclusive education and AI. Knox say that it is possible to conceptualize inclusive education and AI education as sharing the same goal of "education for all" [4]. However, although the usage of "smart" software and smart computer

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systems is growing in many spheres of business, the economy, social life, and education, there doesn't seem to be any tangible involvement with the inclusive agenda [4-5]. Therefore, this paper will mainly discuss how the use of AI technology in teaching helps to achieve inclusive education, the benefits of AI technology for inclusive education, as well as its future challenges.

2. Disability & Inclusion

Before this article discusses how AI can help achieve inclusive education, this essay will first explain why inclusive education is important for people with disabilities. Article 26 of the Universal Declaration of Human Rights mentions that everyone has the right and duty to education. However, according to UNESCO [6], there are still 250 million children out of school. This situation is even worse for children with disabilities. Children with disabilities are 49 percent more likely to have never attended school and 42 percent less likely to lack basic reading and numeracy skills than children without disabilities [7]. Therefore, it can be seen that there is a huge difference between students with disabilities and students without disabilities. So, it is necessary to provide equal and inclusive education for children with disabilities, achieve educational equity, and reduce the gap between them. Inclusive education is a good way to solve the problem of disabled students attending school. Forlin find that inclusive education can improve enrollment, school achievement, and other learning outcomes for students with disabilities [8]. Besides, with inclusive education, the number of students receiving special education/or related services in 2022-2023 increased by 3% over the previous year to 7.5 million [9]. All of these can be seen that inclusive education has a positive effect on the learning of disabled students. However, although the proposal of education for all allows more disabled students to participate in education, they will inevitably encounter many barriers, which will also affect their learning outcomes. Kendall says that in comparison to their colleagues who were not impaired, students with a disability felt they were at a disadvantage, and they mentioned that to properly comprehend the material, they needed to read it at their own pace [10]. Not only that, Reed found that the achievement of students with disabilities is lower than that of students without disabilities, one of the reasons for which is the academic achievement barrier (timely access to materials) [11]. Therefore, if we want to further narrow the gap between disabled students and non-disabled students, it has become a goal to help disabled students better participate in the classroom.

3. AI and inclusive education

3.1. Accessibility

Using AI technology is a good way to solve their access to learning materials and it can adapt to the needs of different students, thereby increasing the accessibility of students. When AI and special needs education are linked, they can support the development of people with disabilities [12]. Moreover, we can find that there are already some AI education systems in the market to help students with disabilities and special needs learn. For example, the University of Toronto developed a system called ATutor which is the first e-learning platform that people who are blind could access, and the Iraq University created LAYA Iraq (Learn as you can) systems to accommodate users with reading and cognitive impairments. Besides, the systems of these AI platforms can increase accessibility for students with disabilities and thus improve their grades. Wood finds that students with chronic conditions can be better educated and increase their accessibility using new, emerging, and AI technologies [13]. Also, by adding teaching content suitable for the special needs of disabled students to the existing teaching platform, the results of the blind groups, deaf groups, and deaf-blind groups increased by 45%, 46.25%, and 87.5% respectively [14]. Therefore, it can be demonstrated that if AI is applied to education and teaching platforms, it can improve the performance of students with disabilities and promote inclusive education.

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3.2. Assistive technology

AI assistive technology may be the reason why an increasing number of students with disabilities can receive an education. Students with different types of disabilities face different difficulties in learning. Such as students with dyslexia may have difficulty completing reading and writing tasks, students with visual impairment may have difficulty entering learning environments, and students with hearing impairment may lack the ability to communicate and interact with others. However, using assistive technology is a good way to solve these difficulties and meet their learning needs. Khasnabis mention that assistive technology is to maintain or improve an individual's functioning and independence and thereby promote their well-being [15]. Screen readers, eye-tracking devices, braille displays, screen magnifiers, speech input, adapted keyboards or mice, and screen keyboards are a few well-known examples of assistive technology [16]. Moreover, this assistive technology is ubiquitous in all AI systems and can adapt to the needs of students with different disabilities. Imanish and Fitria say that an essential component of inclusive education is to consider the special needs of each student to maximize student participation [17]. Taking the LAYA system developed by the University of Iraq as an example, in terms of content selection, users can choose whether or not to display content in a simple language, as well as turn on or off specific content categories such as text, video or audio. Screen readers are supported, so they can adjust to visual impairments like blindness. Hearing-impaired users can learn sign language on a video track. Besides, students with disabilities who use this assistive technology have a great improvement in their grades. After using AT, dyslexic children's reading scores increased by the same amount as normal children's, indicating that the students' reading ability improved even though they did not receive standard reading correction training [18]. Meanwhile, using both high-tech and low-tech methods, caregivers of children with autism also reported improvements in life skills tasks [19]. Furthermore, Imanish and Fitria stated that an important component of inclusive education is to maximize student engagement by considering the specific needs of each student [17]. Therefore, the wide application of AI-assisted technology in the AI education system meets the needs of different people with disabilities, and we can also believe that assistive technology in AI is the embodiment of inclusive education and promotes inclusive education.

3.3. Personalized learning

Another aspect of how AI can help achieve inclusive education is that AI can customize personalized learning. Personalized learning means that learners get personalized learning experiences by accessing content that meets their needs [20]. Also, personalized learning is much easier when (AI) is incorporated. Schmid explain that the organization and management of personalized learning environments are more complex than traditional learning environments, but the organization and setup of personalized learning programs can be well mastered through the use of technology [21]. AI can be used as a learning assessment assistant to help students better identify their learning problems, further develop their learning plans, and improve their academic performance. Pratama found that 88% of students favor the use of AI as a virtual tutor due to the fact that AI can assess a student's learning preferences, strengths, and weaknesses and provide feedback and guidance that is specifically suited to them due to the fact that AI systems are able to analyze the largest amount of data and generate insights [22]. Therefore, AI can compare students' past historical data with current performance data, analyze and predict learning gaps, and suggest learning steps students must take to improve performance [23]. Moreover, personalized learning has a positive impact on people with disabilities. Personalized learning is of great help to people with disabilities, as personalized learning can identify the specific needs, learning goals, placement, and related services of students with disabilities, as well as appropriate teaching methods and necessary classroom adjustments [24].

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4. Challenges

Although AI is now widely used in education, it has a certain effect on inclusive education. However, challenges and problems cannot be avoided in the future. One of the main problems is funding. Whether it is to create an integrated AIEd system or to incorporate the existing education system into the teaching of AI, it requires a large amount of time expenditure [25]. Moreover, most of the digital equipment in AI is produced in relatively few countries, and importing it is often complex and expensive [26]. Therefore, for some developing countries, the government may not have sufficient funds to create an AI education system and purchase the required electronic equipment, and therefore people with disabilities in these countries are unable to gain accessibility to learning through access to assistive technology. In addition, existing assistive technologies are not perfect and need a lot of improvement, and personalized learning environments that are perfectly adapted to all learners with disabilities have rarely been designed and implemented [27]. For example, currently blind people can listen to most of the content on a web page while surfing the Internet, but if there are unlabeled or unreadable buttons and images, blind people cannot access the information [26]. Moreover, disability can range from mild, to moderate to severe (extreme forms), and some people have a combination of two very different disabilities, but today's digital system may only meet one need [20]. So, the future should take different disabilities into account, and further improve the current AI education system to meet their different needs. Not only that, it is necessary for people with disabilities and teachers also to train on how to use these AI. Zilz and Pang say that teachers are not ready to introduce advanced technology in the classroom [19]. If there is not enough training in assistive technology, it may hinder the effective use of assistive technology, thus limiting participation in educational Settings [28]. Therefore, in the future, teachers can be further trained to proficiently use these assistive technologies to improve the classroom participation of disabled students.

5. Conclusion

This paper discusses the universalization of inclusive education through the use of AI in the field of education. Equality and justice in education is specifically reflected in inclusive education by including the participation of people with disabilities in learning. Although more and more people with disabilities are now participating in learning, there is still a gap between them and the general student population. The application of AI technology can well reduce the gap between students with disabilities and ordinary students, and further promote equality in education. AI can increase student engagement and meet the different needs of students with different disabilities through assistive technology, thus improving their learning experience and performance. In addition, AI can provide personalized learning services for students with disabilities. AI can collect and record students' data and develop future learning plans for students with disabilities by comparing and evaluating the performance of students at school. All these aspects can reflect that the application of AI in teaching can positively help the education of people with disabilities. In the future, there is still a need to further develop new assistive technologies to meet the needs of more people with disabilities, as well as to provide professional training for teachers so that they can skillfully use these AI technologies in the classroom.

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