Integrating AI Technologies in Inclusive Education Settings: Opportunities and Challenges

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The simultaneous development of education and emerging technologies has imposed an extensive integration of artificial intelligence (AI) tools within educational settings. In the realm of inclusive education, AI offers great support for both educators and their disabled learners by personalizing students' learning, reducing teachers' workload, giving quick feedback on students' performance and learning gaps with smart teaching systems, adapting learning content and objectives to students' special needs and paces, providing tailored support, enhancing accessibility, enhancing students' engagement and outcomes. However, an effective implementation of AI-driven systems in inclusive education settings, especially in developing countries like Morocco, might face various challenges such as limited funding, poor infrastructure, lack of both tutor and student training on the use of AI-powered assistive technologies, and parents' resistance due to their concerns about their children's data privacy and potential misuse. Hence, a number of measures should be taken in any mainstream school for an impactful and productive integration of AI in educating students with disabilities. These measures include allocating specific budgets for implementing AI in mainstream schools, looking for international partnerships, improving internet connectivity, providing both students and teachers with adequate continuous training on using AI technologies, and developing robust ethical standards to safeguard the students' data privacy. This paper presents a comprehensive review of the impact of AI on inclusive education settings, revealing both the benefits and the challenges related to its implementation.

Artificial intelligence; assistive technologies; educational accessibility; inclusive education; personalized learning; students with disabilities.

1. Introduction

As established by international frameworks such as the Convention on the Rights of Persons with Disabilities, inclusive education is regarded as a fundamental human right which calls for ensuring equal educational opportunities for all children regardless of their impairments (United Nations, Committee on the Rights of Persons with Disabilities, 2016). Within this context, it is understood that inclusion is based on adapting educational systems to overcome obstacles that hinder students' participation and learning opportunities. Thus,

inclusion fosters learning environments that embrace diversity and support participation of all learners, including those with disabilities in particular (Melo-López et al., 2025).

With the advancement in assistive technologies, AI tools have become vital in creating more inclusive and accessible teaching-learning environments for students with disabilities. Emerging studies, such as (Toyokawa et al., 2023; Sghaier et al., 2022), propose that AI can meaningfully improve students' equitable learning opportunities and active student engagement. In this regard, AI represents a promising means to remove obstacles to inclusion through promoting disabled students' accessibility, enhancing their learning personalization, ensuring quality instruction to meet diverse learners' needs, improving their participation in the classroom, and increasing their performance and grades (Melo-López et al. 2025; Yang, 2025). Not only this, but it can also ease and lessen teachers' workload, enabling them to allocate more time to creative teaching practices and effective pedagogical engagement (Zahurin et al., 2024). Moreover, Limna et al., (2022) highlight that artificial intelligence's capabilities such as generating predictions, delivering diagnoses, providing recommendations, and supporting decision-making, make it a fundamental component in the development of education. These abilities are perceived as highly pertinent and potentially beneficial within inclusive education settings, as argued in this paper.

Though AI represents a promising tool in ensuring more inclusive environment for students with disabilities, its implementation faces numerous challenges, especially in developing countries. These challenges encompass limited financial resources, underdeveloped digital and physical infrastructure, lack of professional training in the use of emerging assistive technologies for teachers and students (Yang, 2025), inequitable access to technology, families' resistance that stem from limited awareness, insecurity, or sociocultural beliefs about disability, information privacy, and technology (Prathama et al., 2022; Choez Calderón & Miranda Bajaña, 2024; Hong et al., 2018; Klimova et al., 2023).

2. Inclusion and its benefits for students with disabilities

According to UNESCO (2024), about 251 million children remain out of school across the world despite global efforts to ensure equitable education for everyone regardless of their impairments. This educational exclusion of children with disabilities excessively affects them and their families. In this regard, UNECEF (2021) also highlights that 49% of children with disabilities are more likely to have never joined school and 42% of them are less likely to acquire essential reading and numeracy skills in comparison to their nondisabled peers. Thus, it is necessary to provide disabled children with equal and equitable learning opportunities just like their non-disabled equals to fill in the gaps of both inequality and inequity in education between all these learners. This objective can only be achieved through a good implementation of inclusive education. Forlin et al. (2013) emphasize that inclusive education has the potential to enhance school enrollment and academic performance as well as other learning outcomes among students with disabilities.

Not only this, but we see that the benefits of inclusive education for children with disabilities can extend beyond academic achievement to their long-term integration into society and the job market. According to (National Center for Education Statistics, 2024), thanks to the implementation of the inclusive education approach, the number of students with disabilities who attended special education classes or benefited from related services was significantly increased by 3% in the 2022–2023 school year to reach a total of 7.5 million students in comparison to the prior academic year. This progress reveals the positive influence of the inclusive education model on the educational access and the learning opportunities of students with disabilities. Although all these benefits of inclusion, students with disabilities still might face various obstacles, such as those related to adequate adaptations of teaching practices to students' special needs (Kendall, 2016), those related to timely access to accommodations (Reed & Kennett, 2017), etc. This suggests that adequate pedagogical adaptations are highly needed to enhance students with disabilities' participation in the classroom, taking into account their individual impairments and learning needs. These adaptations include differentiated instruction, accessible materials, flexible pacing, etc.

3. The use of AI in modern education

The use of AI in education is defined as the integration of the intelligent technologies in the teaching-learning process, such as machine learning, deep learning, and other smart adaptive teaching systems, in educational settings. This is to help analyze and code huge amounts of data, interpret patterns, draw conclusions, personalize learning, and enhance instruction and learning outcomes just like human thinking and reasoning (Holmes et al., 2019).

The integration of AI tools in education has started emerging in numerous educational systems worldwide. Initially, the adoption of technology in modern education began with relatively basic digital tools like slide projectors, calculators, and word processors. This paved the way for the inclusion of more advanced technologies, like AI, in teaching. Nowadays, AI capabilities are being developed and comprehensively utilized to enhance the teaching and learning outcomes in schools. A key development in this regard is the establishment of AI adaptive learning materials tailored to the learners' individual attributes to provide them with the required knowledge and skills and target their learning needs based on their different abilities and paces. The integration of AI in designing such educational resources and materials would not only enhance the effectiveness of instruction, but would also ease educators' work (Spulber, 2024).

As declared in Safdar et al. (2024), AI has made a noteworthy progress in general education. Smart learning systems deliver knowledge and offer feedback to learners according to their learning progress and needs, while the learning management systems (LMS) identify the learners' actions and behavior to direct them to the adequate learning pathways. An example

of these technologies is the AI-assisted chatbots which can respond to students' inquiries and also provide them with adequate feedback and guidance on their work.

Furthermore, as discussed in Spulber (2024), artificial intelligence algorithms basically contributed to reshaping the foundational principles of the educational system, notably leveling up education quality. AI offers a great support for both teachers and students. On the one hand, AI support for teachers can be seen in personalizing teaching, providing didactic materials, etc. On the other hand, AI can support students through offering intelligent tutoring tools, personalized programs, assessment, feedback, etc (Holmes and Tuomi, 2022; Spulber, 2024). Thus, for both teachers and students, AI can accelerate the teaching process and make it more effective and productive; It can analyze student-related data, such as prior knowledge, individual preferences and intelligences, learning styles, and learning gaps, in order to tailor the efficient instructional strategies that meet the characteristics of each learner (Lokare and Jadhav, 2024; Spulber, 2024).

AI can help teachers create diverse and personalized materials for their students if used appropriately to generate texts, assignments, questions, and other teaching content, which are personalized to students' knowledge and proficiencies. AI also serves different purposes, including homework personalization, assessment, accessibility, and inclusion. It can be used to accurately evaluate students' performance, monitor their progress through assignment analysis, and provide them with purposeful personalized feedback. Not only this, but AI is also useful in learning translation techniques and understanding foreign languages, especially in multilingual education contexts Spulber (2024). Furthermore, promoting inclusive education is one of the most essential contributions of AI in modern education. It enhances accessibility through offering tools that accommodate students with diverse needs, it improves personalized learning, and it eases teachers' work. This plays a vital role in ensuring more inclusive environment for students with disabilities (Spulber, 2024; Yang, 2025; Safdar et al.,2024; Melo-López et al. 2025; Fitas, 2025; Yang and Taele, 2025; Julien, 2024; Toyokawa et al., 2023).

4. AI impact on inclusive education settings

As understood from what is discussed above, AI and assistive technologies are advantageous in ensuring more inclusive environments for students with disabilities. They play a vital role in enhancing quality and equity in inclusive schools. These two key elements of inclusive education can be significantly achieved through the integration of AI tools (e.g., predictive text, chatbots, intelligent tutoring systems, etc.) and assistive technologies (e.g., braille displays, screen readers, hearing aids, etc.) into the teaching-learning process for students with disabilities. As discussed in Spulber (2024), the impact of these tools and technologies on inclusive education settings can be seen in reduced teacher workload, improved accessibility through assistive technologies, and personalized learning, all of which contribute to increased academic success and performance, stronger

emotional bonds between teachers and students, and greater motivation and engagement necessary for inclusion.

4.1. Enhancing student personalized learning

The integration of AI in inclusive education settings has a positive impact on personalized learning of students with disabilities. For instance, Tuna (2022) highlights the effective role of humanoid robots and virtual agents in supporting personalized learning for students with Autism Spectrum Disorder (ASD), which also help educators easily plan their activities and interventions. This can also be confirmed by Spulber (2024) who found that AI can significantly enhance personalized learning through both content adaptations to the specific needs of students and given quick feedback with smart tutoring systems.

Furthermore, as stated in Yang (2025), personalized learning is beneficial for students with disabilities as AI tools can compare students' prior and current performance data and analyze it to predict their areas of strengths and weaknesses. This, in turn, leads to easily specifying each special learning problems and needs, their appropriate placement, their learning goals as well as the required classroom adaptations and adequate teaching methods to address the diverse learning gaps and obstacles of these students.

As the role of educators in delivering content has been transformed from traditional ways to more facilitative and personalized teaching strategies and methods that cater for all individual learning requirements of all learners, AI technologies, like adaptive learning platforms and intelligent tutoring systems, are effective in personalizing teaching and learning experiences for the benefit of students with diverse disabilities. These technologies can analyze learners' data and adequately tailor teaching content to their special learning needs and pace, allowing more time for educators to establish more creative learning experiences for students and focus on each learner's individual needs and areas of weaknesses to be developed (Fitas, 2025).

Hence, we can conclude that AI-powered technologies, by personalizing the learnings of students with disabilities, also have positive impact on teachers' work. They ease and reduce educators' workload, free up their time, and allow them to be more creative and tailor effective teaching plans that better serve each student's specific learning needs.

4.2. Reducing and easing teacher workload

As AI represents a promising tool to enhance customized learning for students with disabilities and provide quick feedback on their performance, it helps them identify areas for improvement and also guides inclusive teachers in adopting more interactive approaches tailored to students' needs and learning styles. This, in turn, enhances motivation and participation among students with disabilities (Julien, 2024). With a comprehensive and varied understanding of AI tools, teachers can efficiently identify and address the diverse learning needs of students with disabilities. In addition to staying up to date with the different AI tools, teachers can better ensure accessibility and inclusivity for

their students when they well understand how these tools can be practically applied in the classroom (Becker et al. 2018; Julien, 2024). Educators can also contribute to the development of AI-powered tools according to the needs of their students with disabilities to improve their instructional practices and successfully support and engage all students (Julien, 2024).

Baidoo-Anu and Owusu Ansah (2023) argue that artificial intelligence can support educators in recognizing the different learning gaps of their disabled students and identify the styles through which every individual learner learns the best, which allows them to tailor appropriate interventions and successfully meet the learning needs of all students. AI is gradually reshaping education in our modern era by guiding teaching and learning and enabling both students and teachers to adapt to this gradual development. For instance, as highlighted in Julien (2024), AI-powered EdTech tools can quickly and effortlessly gather and analyze data, and prepare reports, enabling teachers to assess the status of students. This facilitates continuous evaluation of students' performance, discover their areas of weakness and strength, offer focused and valuable feedback to both students and teachers, and also recommend resources to further development of teaching and learning. Furthermore, AI can not only be used in achieving teaching and learning goals, but can also take part in accomplishing various tasks assigned to administrative and information technology staff; in addition to tutoring, artificial intelligence would be influential in scheduling, managing data, and grading (Julien, 2024).

Integrating AI in inclusive education has become an indispensable necessity, for AI can be a helpful tool for better teaching, better learning, tailored instruction, personalized learning, accessibility, and time saving. AI can significantly help teachers with grading, students' performance analysis and assessment, as well as lesson planning. Thus, teachers gain valuable insights into their students' needs, struggles, and areas to be addressed. Subsequently, educators can opt for creative tasks, and tailored activities and lessons that would enhance students' performance and boost their accessibility. Additionally, AI can reduce the workloads burden on educators as it spares them the repetitive administrative tasks, such as reports, data summary and data entry. This, in turns, allows teachers to focus more on classroom practices and students' interaction. Moreover, it has been proven that AI-powered lesson planning can equally save teachers' time and provide differentiated activities and tailored tasks to suit each student's unique disability. This ensures adaptability, accessibility, and inclusivity (Fitas, 2025).

In the same flow with all the aforementioned studies that discussed the key benefits of AI-powered tools on educators, other studies such as (Toyokawa et al. 2023 ; Safdar et al.,2024; Melo-López et al. 2025) also highlight that AI tools can transform teachers' support and professional learning in the context of inclusion, help teachers more develop their instructional and organizational practices to better support all students, and reduce teachers' burden and workload in busy classrooms through providing feedback on

students' personalized learning needs and progress. This, in turn, allocates more time for teachers and facilitates their interventions and reflections to better deal with every learner.

As we discussed earlier, AI-driven technologies play a vital role in personalizing learning for students with disabilities while also facilitating and reducing teachers' workload. Consequently, these two factors effectively enhance students' accessibility to learning materials and content, thereby promoting their inclusivity and improving their learning outcomes.

4.3 Enhancing student accessibility

Using AI technologies in inclusive education is one of the best strategies to bridge the gaps between students with disabilities and their access to learning materials. By bringing AI tools and inclusive education principles together, they can help in making learning environments more inclusive for students with diverse special needs, which supports their learning progress. Some educational institutions already developed certain AI systems to promote inclusive education, enhance disabled students' access to learning, and increase their performance and grades. For instance, Toronto University created a platform called "ATutor", one of the first accessible e-learning systems designed for students with visual impairments, whereas the university of Iraq established "LAYA Iraq" **(**learn as you are), an AI-powered learning management system (LMS) designed with a strong focus on accessibility and inclusivity for users with different impairments, especially those with reading and cognitive disabilities (Yang, 2025). Moreover, as stated in Yang (2025), Wood (2019) revealed that using new emerging AI-driven technologies can better enhance accessibility and improve educational development of students with chronic conditions. Furthermore, Batanero et al. (2019) highlight that when the learning content is adapted to the unique needs of students with disabilities and integrated into AI-driven teaching platforms, the learning outcomes of these students remarkably improved. Namely, the progress of visually impaired students increased by 45%, students with hearing impairment by 46.25%, and those with both visual and hearing impairments by 87.5%. This underline the potential of AI-powered educational platforms to foster inclusivity, accessibility, and educational attainment among students with diverse learning needs.

Yang and Taele (2025) state that AI-driven platforms like Audemy enhance accessibility for students with disabilities, especially blind and visually impaired students. They allow them to interact with digital content via adaptive questioning platforms, screen readers, and speech-to-text applications, and audio-based customization. Intel-powered AI personal computers also contribute to improving accessibility for blind and visually impaired students through enabling private processing, handling ethical data, and reducing privacy risks.

Other studies stress the importance of AI technologies in promoting disabled students' accessibility to learning content and materials as well as improving their

engagement in the learning process in inclusive classes. For instance, Patiño-Toro et al. (2023) emphasize the pivotal role of Massive Open Online Courses (MOOCs), designed for deaf students, in overcoming these students' barriers to communication and expanding their equitable access to higher education. Toyokawa et al. (2023) also highlight the positive impact that AI tools can have on disabled students' active reading through real time determination of their learning strengths and weaknesses, which assist educators in tailoring teaching content and methods to their specific needs. Moreover, Kamber, (2025) confirms the necessity of AI tools in enhancing student accessibility, especially in higher education. He believes that AI technologies like text-to speech and speech recognition systems, play a significant role in improving student accessibility and academic success, which also promotes social justice and equitable education for students with disabilities.

The integration of AI tools in inclusive education and their benefits on students with disabilities are also discussed in Safdar et al. (2024). They agree that text-to-speech and speech-to-text applications can help students who have writing difficulties or students who can better understand through audios like dyslexic and visually impaired students. They also stress the role of technologies in computer vision to assist blind or visually impaired students in describing images and pictures, while the integration of augmented and virtual reality systems in educating students with disabilities, particularly those with attention disorders, can enhance their learning experience and improve their academic achievement. Moreover, the study sheds light on the potential benefit of AI-driven emotion recognition tools on leveling up the social skills of students, especially those with social and emotional learning difficulties. Not only this, but also AI-powered real time language translation and natural language processing tools can effectively assist students with language disorders and non-native students in having accessibility to learning and easily integrating with other students in an inclusive class. In the following section we shed light on the different AI-powered assistive technologies and their potential benefits on students with disabilities as discussed in Fitas (2025).

4.4 Enhancing inclusivity through AI-driven assistive technologies

Given that students with diverse types of disabilities encounter different challenges in their learning process, AI and its powered assistive technologies have proven their vital role in transforming educational strategies in supporting the varied special needs of these students (Yang, 2025; Fitas, 2025). As illustrated in the diagram below by Fitas (2025), this section sheds light on different AI-driven technologies and discusses their educational applications and benefits on students with diverse disabilities.

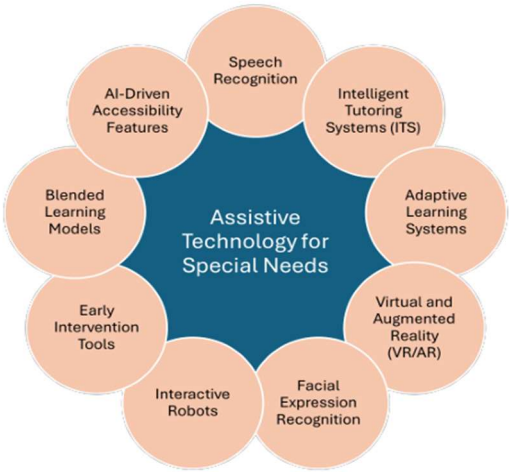

Figure 1: Visualization of all the mentioned categories of assistive technology for special needs (Fitas, 2025, p. 13)

4.4.1. Intelligent tutoring systems (ITS)

Intelligent Tutoring Systems (ITS) are AI-powered tools that help teachers and disabled students, especially those with dyslexia and dyscalculia, personalize learning. ITS also take part in adapting students' learning to their unique styles and pace as well as providing real-time feedback and tailored resources. For instance, ALEKS (assessment and learning in knowledge spaces) and Q-interactive platforms improve learners' engagement by adapting content difficulty based on students' responses. Powered by AI technologies, such as natural language processing (NLP) and machine learning, ITS deliver personalized feedback, explanations, and formative assessments to ease learning, and support accessibility and independence for disabled students. Thus, ITS encourage adaptability, inclusivity, and evidence-based education (Fitas, 2025).

4.4.2. Speech recognition tools

By converting speech to text and vice versa, speech recognition and synthesis tools such as Speech-to-Text (STT) and Text-to-Speech (TTS) ensure accessibility for students with visual, reading, speech, and hearing disabilities. For visually impaired and reading-challenged students, TTS support them by raising content comprehension through effectively and intelligibly turning text into natural-sounding speech. STT can accurately transcribe spoken language into texts, enabling students with speech impairments to efficiently interact with teaching content. AI tools like Stamurai can offer speech therapy support and enhance personalized learning and accessibility experiences for students with disabilities, while augmentative and alternative communication (AAC) devices and automated captioning systems would meaningfully promote classroom participation.

Moreover, AI integration in AAC technologies would further boosts their functionality, supporting independent learning and personal growth of students (Fitas, 2025).

4.4.3. Adaptive learning systems

Adaptive learning systems, driven by AI and machine learning, offer customized learning through ongoing assessment of students' performance and adapt learning materials to the students' special needs and diverse learning style. Carnegie Learning, DreamBox, and Notebook platforms are examples of adaptive learning systems that can be applicable to subjects like maths and reading activities. Compared to traditional learning models, adaptive learning algorithms offer real-time feedback, predictive analytics, and dynamic content adaptations to enhance students' participation, accessibility, performance, accessibility, and inclusivity (Fitas, 2025).

4.4.4. Virtual and augmented reality (VR/AR)

The integration of virtual and augmented reality (VR/AR) technologies in inclusive education offers engaging learning environments similar to real-world situations, especially for students with autism spectrum disorder (ASD), as they ensure a safe and monitored environment to support social interactions and enable students to manage complex settings. For instance, VR supports social, cognitive, and linguistic skills, while offering engaging and adaptable experiences that traditional therapies often fail to provide for students with ASD. Additionally, AR tools, such as Augmenta1 1y application, help learners with dyslexia by providing content in accessible formats to respond to diverse needs and make education more inclusive. Other AI-integrated tools, such as Google Glass and Lexplore, can further support personalized learning experiences as they assist students with reading and social challenges (Fitas, 2025).

4.4.5. Facial expression recognition

The use of AI-powered facial recognition technologies in inclusive education settings support students with Autism Spectrum Disorder (ASD), for they can detect their emotional states as well as their social and communication challenges, enabling educators to appropriately respond to them. AI-driven tools that integrate Internet of Things (IoT) abilities and emotional intelligence algorithms, such as those using Haar-cascade Python libraries, Convolutional Neural Networks (CNNs), can identify real time facial expressions and emotions and control stress levels of students with ASD through Galvanic Skin Response (GSR) sensors. This, in turns, enable educators to offer timely personalized support and interventions, which would improve social participation and engagement as well as interactive competencies and skills these children. Moreover, Human-Robot-Game platforms also have been developed to raise facial recognition metrics, offering adequate assessment of emotional reactions of students with ASD and measuring their socio-educational progress. Though barriers like overfitting and the need for improved

generalization might persist, certain emotion recognition systems using deep learning, such as Visual Geometry Group-16 (VGG-16) and Residual Network-18 (ResNet-18), can efficiently help classify students' emotions and insightfully foster supportive learning environments (Fitas, 2025).

4.4.6. Interactive robots

Integrating interactive robots in inclusive education settings would emotionally and educationally support students with physical and cognitive disabilities. These AI-generated robots use features like gestures analysis, speech recognition, and customized feedback mechanisms, to develop accessible and engaging learning experiences for disabled students, especially those with neurodevelopmental disorders. For instance, the Sahayak app combines AI and augmented reality to personalize learning experiences to the unique needs and styles of students with intellectual disabilities, improving their reading and comprehension skills through interactive elements. Other educational robots, like Emorobot, enhance social skills in autistic learners via emotions recognition peer interaction simplification (Fitas, 2025).

4.4.7. Early intervention and diagnostic tools

Artificial intelligence-driven diagnostic tools have notably enhanced early detection and intervention practices for learning disabilities and developmental challenges through the use of machine learning algorithms to adequately examine student progress and behavior and accurately identify challenges related to certain disabilities like dyslexia, dyscalculia, ADHD (attention-deficit / hyperactivity disorder), and autism spectrum disorder (ASD). AI-powered platforms can track students' struggles and provide timely and personalized intervention strategies tailored to the students' needs, while the integration of multi-sensory technologies in diagnostic systems can assess cognitive, motor, and social skills of students, which would efficiently help in customizing adequate interventions to enhance developmental progress. Early AI-driven diagnosis is beneficial for students with dyslexia and autism spectrum disorder, as it can reduce the impact of the disorder on students' educational attainment, social interactions, psychological dimensions (Fitas, 2025).

4.4.8. Blended learning models

Blended learning models that utilize traditional methods combined with AI-powered technologies boost inclusive and flexible educational environments for students with disabilities; they address diverse learning needs, foster learning engagement, and ensure accessibility and participation for all students. Moreover, the integration of AI with Universal Design for Learning (UDL) model has the potential to effectively surpass traditional models in improving the educational outcomes of students with disabilities, ensuring their learning accessibility and personalization. AI-driven hybrid learning models

improve learning engagement, participation, and autonomous learning in both in-person and virtual classes, which in turn enhances academic performance. In blended learning settings, using AI through strategies like gamification and customized learning pathways has revealed significant educational progress. For example, a study conducted in Shanxi, China, stated that students' vocabulary acquisition improved by 25%, while their reading comprehension skills increased by 30%. Furthermore, combining AI with the principles of multiple intelligences theory strengthens personalized instruction, fosters learning performance, and enhances problem-solving competencies and creativity (Fitas, 2025).

4.4.9. AI-driven accessibility features

Boosting learning independence and inclusivity for students with disabilities are key aspects of how AI-driven accessibility features are transforming modern education. Technologies like image recognition, customizable interfaces, and real-time translation accommodate diverse learning needs through adapted learning environments. For instance, AI-driven braille devices support learning independence for students with visual impairments, while automated captioning systems and text-to-speech converters assist students with visual or hearing impairments in having access to educational content. Moreover, AI-advanced features, like speech and emotion recognition, support SWD (students with disabilities) in inclusive education settings by improving their communication proficiency and user satisfaction. Other tools, such as navigation, object detection, and optical character recognition (OCR), can guarantee navigation safety and information accessibility for students with visual impairments. Furthermore, adaptive learning systems and AI-driven chatbots would also contribute to personalized learning and timely interactive communication, while AI-powered multisensory systems can bridge accessibility gaps for students by providing adaptive feedback through the integration of visual, auditory, and tactile sensory modalities in their learning process (Fitas, 2025).

5. Challenges of integrating AI in inclusive education settings

Despite the benefits of AI-powered technologies on students with disabilities, numerous potential challenges might face the productive implementation of these technologies in inclusive education settings. These include limited funding, lack of infrastructure, lack of teacher and student training, and families' concerns about their children's data privacy and its potential misuse. In this regard, studies like (Spulber, 2024; Yang, 2025; Melo-López et al. 2025) highlight that an effective adoption of AI tools in educating students with disabilities require adequate funding, infrastructure availability, and adequate preparedness of both teachers and students. Without adequate resources and professional development of educators, AI impact on inclusion remains restricted. Moreover, as stated in Yang (2025), some learners can have more than one disability while certain AI systems can only meet one special need. This, in my opinion, requires adequate funding as well as training for teachers to adopt or develop AI educational systems that can meet these learners' different special needs to extend their education accessibility and engagement.

Safdar et al. (2024) also discuss the aforementioned challenges. Their study emphasizes that under resourced schools might face the problem of AI systems unavailability, which can also lead to some gaps in students' educational achievement. In addition, they shed light on the problem related to students' privacy and data ownership, which should be addressed to protect the information collected about these students, their disabilities, characteristics, and behaviors. Another challenge is that AI can be biased and treat students unfairly, misjudging their abilities, race, gender, social status, or disabilities. Moreover, some AI systems might not be transparent, and it is hard for their users to know how these systems make decisions. This, in turns, make them untrustworthy for teachers, students, and parents. Furthermore, the study highlights the challenge of overreliance on AI and its negative impact on students with disabilities, especially those with social and emotional learning difficulties and those who need direct human interaction, which requires building a balance between AI use and teacher-student interaction.

AI cannot replace teachers because it lacks human consciousness, emotions, and awareness, which makes it unable to understand complex human experiences and fully match their intelligence and creativity. In addition, AI can only depend on data input to produce an output, which means that the accuracy of AI's generated information is conditional upon the accuracy of the information provided to it. This can lead to biased and destructive learning. The study also tackles other challenges such as overreliance on AI technologies and its negative effect on critical thinking and problem solving skills, the high cost of AI systems, the potential physical harm (headaches, fatigue, etc.) of using AI technologies, students' data privacy and security concerns, curriculum perpetuated bias, and lack of teachers' and students' pre-training (Julien, 2024).

Excessive reliance on AI also raises concerns about over-automation, which restricts direct human interaction in inclusive education settings. Thus, AI should only complement the human pedagogical engagement rather than replacing it, which keeps the meaningful teacher-student interaction. In addition to this, productive implementation of AI-driven technologies requires the investment in infrastructure and teacher training and student, particularly in underprivileged countries (Melo-López et al., 2025).

All in all, due to challenges such as complexity of technology development, digital infrastructure gaps, ethical considerations, potential biases, inequitable access to learning, data privacy concerns, and lack of training of both teachers and students, AI-powered technologies must be implemented thoughtfully and with cautions in inclusive schools (Fitas, 2025).

6. Conclusion

AI integration in inclusive education settings has a significant impact on students with disabilities. AI-driven assistive technologies can efficiently personalize students' learning and give quick feedback on their strengths, weaknesses, and learning gaps. Not

only this, but it can also suggest adequate methods and strategies to overcome their learning obstacles and enhance their academic achievement. This, in turn, supports educators by reducing their workload and allowing more time for them to design effective plans and interventions tailored to the different needs of students. Furthermore, by personalizing students' learnings, analyzing their performance, and identifying their learning struggles, AI-powered technologies can also provide adapting learning contents and objectives to the special needs and paces of students with disabilities, thereby improving their inclusivity and accessibility, supporting their engagement, and enhancing their learning outcomes.

However, the implementation of AI in educating students with disabilities may encounter numerous challenges including lack of funding, inadequate infrastructure, concerns about data privacy and potential misuse, overreliance on AI, biased treatment of students, and lack of adequate training for both students and educators. Thus, several measures are required including allocating adequate budgets for the implementation of AI-powered technologies in inclusive schools, improving internet infrastructure, establishing international partnerships, developing robust ethical frameworks to protect students' data privacy, and offering adequate continuous training on the use of AI-driven technologies for both students and educators.

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