UTILIZATION OF ARTIFICIAL INTELLIGENCE IN AN INCLUSIVE EDUCATIONAL ENVIRONMENT

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Abstract: *This article highlights the new stages of artificial intelligence (AI) development and their significance for individuals with disabilities in our society. Specially designed AI software and devices provide opportunities for individuals with physical disabilities to receive high-quality education and secure employment opportunities. This scientific work explores how people with disabilities can benefit from artificial intelligence technologies to achieve quality education.*

Keywords: *Artificial intelligence, people with disabilities, Google Voice Access, Dragon Naturally Speaking, Microsoft Cortana, Coursera, Udemy, Khan Academy, Skillshare.*

INTRODUCTION

In recent years, modern technologies have radically transformed the architecture of higher education systems. The introduction of artificial intelligence (AI) technologies into higher education institutions has accelerated these processes even further. Leading developed universities worldwide have already integrated AI technologies into various aspects of their operations. AI has become a true assistant for professors and students, who have started using AI technologies directly during their lessons.Artificial intelligence is a set of programs designed to replicate human skills. AI helps solve problems, plan, acquire knowledge, and improve oneself in a timely and complete manner. Broadly speaking, AI is a branch of science focused on developing analytical systems capable of studying and solving complex problems. More narrowly, AI refers to computer-based learning technologies based on human cognition.Society is not solely composed of individuals without disabilities; rather, it includes people with varying abilities who have established their roles both within families and the broader community. This study seeks to explore the potential of artificial intelligence (AI) in enhancing the lives of individuals with disabilities. Specifically, we aim to examine what AI-driven solutions are available and whether AI can serve as a key to unlocking new opportunities for individuals with disabilities.The role of AI in shaping a more inclusive and accessible future is undeniable. According to global statistics, approximately 16% of the world's population, or 1.3 billion people, live with significant disabilities. Among them, nearly 240 million children are affected. A 2023 statistical study conducted within the European Union (EU) revealed that 101 million individuals, or 27% of the population aged 16 and older, experience some form of physical or cognitive disability. Furthermore, data suggests that the prevalence of disabilities is

higher among women than men within EU member states.In Uzbekistan, the statistics present a concerning picture. As of 2022, 2.3% of the population—or approximately 845,300 individuals—were officially recognized as having disabilities. This includes 142,300 children under the age of 18 and 396,700 working-age individuals with disabilities. Notably, the number of men with disabilities (475,800) surpasses that of women (369,500).Regardless of the geographical region—whether in Europe, Asia, or elsewhere—individuals with disabilities face persistent challenges. These challenges include physical barriers such as inadequate infrastructure in buildings, including the absence of ramps for wheelchairs, elevators, and specialized transportation. Accessibility issues extend to public spaces such as schools, libraries, restaurants, and workplaces, which often lack accommodations tailored to individuals with disabilities.Additionally, people with disabilities encounter significant obstacles in education and employment. Many educational institutions fail to provide appropriate teaching methods and assistive technologies tailored to students with disabilities. Digital accessibility remains another major challenge, as many websites, mobile applications, and digital platforms are not designed to accommodate individuals with visual, auditory, or mobility impairments. Furthermore, people with disabilities often struggle to access reliable information about their rights, government services, and support programs.To eliminate these societal barriers, inclusive infrastructure, accessible education and employment opportunities, technological solutions, and legal support must be implemented. AI and innovative technologies hold the potential to address these challenges by providing tools that improve accessibility, support independent living, and foster social inclusion.AI-based solutions can assist in breaking down communication barriers, improving mobility, facilitating learning, and ensuring access to vital information. The power of technology and innovation plays a crucial role in protecting the rights of individuals with disabilities, enhancing their engagement in society, and ensuring they have the necessary resources to lead fulfilling lives.This research highlights the significance of AI-driven advancements in creating an inclusive society where individuals with disabilities are empowered, informed, and supported through technological innovation. Future studies should explore strategies for increasing awareness and accessibility to AI solutions, ensuring that all members of society—regardless of physical or cognitive limitations—have equal opportunities to participate and thrive.

RESEARCH METHODOLOGY AND METHODS

Our society is not composed solely of healthy individuals; there are also people with disabilities who have their place in society and family. So, what possibilities and beneficial structures does artificial intelligence offer for people with disabilities? Can AI open new opportunities for individuals with disabilities? Based on research and analysis of these questions, we will attempt to find answers. Artificial intelligence plays an incomparable role in building a future with convenient and expansive opportunities for everyone.According to statistical data, 16% of the global population (1.3 billion people) lives with serious disabilities, including nearly 240 million children. In 2023, statistics showed that 27% of individuals over the age of 16 in the European Union had some form of physical or

intellectual disability. According to calculations, the number of women with disabilities in the EU is higher than that of men. When we look at the situation in Uzbekistan, the numbers are alarming. In Uzbekistan, as of 2022, 2.3% of the population (845,300 people) were identified as persons with disabilities. This includes 142,300 children under the age of 18 and 396,700 individuals under retirement age with disabilities. The number of men with disabilities (475,800) is higher than that of women (369,500). In any society, whether European or Asian, individuals with disabilities face many challenges. These include physical barriers in daily life, such as inadequate infrastructure in buildings (e.g., lack of ramps for wheelchairs, elevators, and special transportation), difficulties in accessing public spaces, and the absence of accommodations in schools, libraries, and dining areas for individuals with disabilities. Additionally, these individuals face challenges in accessing education and employment, as many schools and universities lack appropriate teaching methods and assistive technologies for students with disabilities. There are also restrictions on access to and use of information and technology, with many websites, mobile apps, and information platforms not being adapted for those with visual, hearing, or mobility impairments. Furthermore, individuals with disabilities may not receive enough information about their rights, government services, or support programs. To overcome these barriers, inclusive infrastructure, accessible education, employment opportunities, technological solutions, and legal support are essential. AI and innovative technologies can play a critical role in addressing these issues.Artificial intelligence is significantly improving educational opportunities for individuals with disabilities. For example, blind individuals can listen to texts via voice, while those with hearing impairments can convert speech into text. People with mobility impairments can control computers and smartphones remotely, using only voice and brain signals, without any physical movement. Special platforms using AI offer customized educational processes for disabled students. These platforms are continuously improving and increasing access to education for individuals with special needs.

The following table presents some AI platforms for people with disabilities and their features (refer to Table 1).

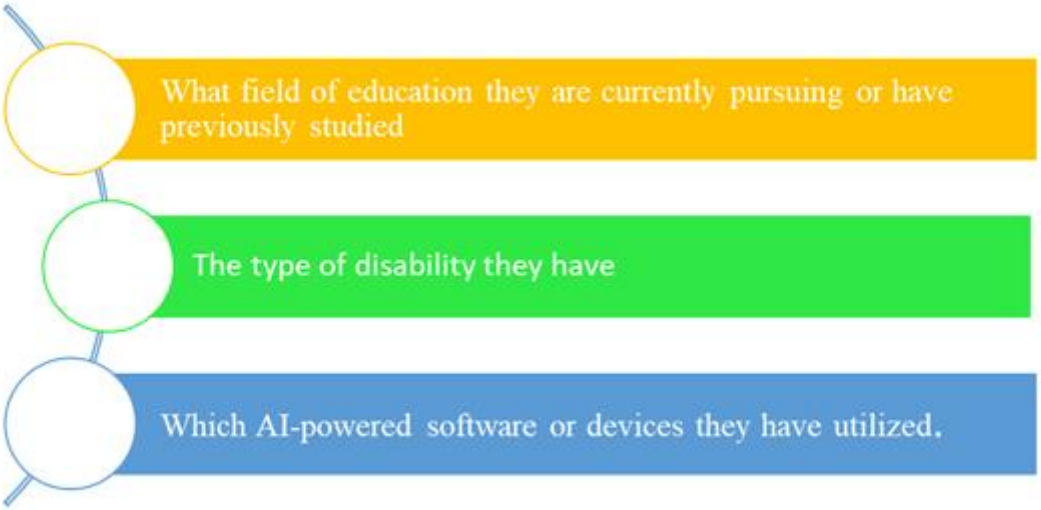
Special education programs based on artificial intelligence for people with disabilities.

Education Program	Description	AI Technologies Used
AI-Powered Speech Recognition	Helps students with speech impairments by converting spoken words into text.	Google Voice Typing, Dragon NaturallySpeaking, Otter.ai
AI-Based Text-to-Speech Tools	Supports visually impaired students by reading digital text aloud.	NaturalReader, Google Text-to-Speech, Read&Write
AI-Driven Eye-Tracking Systems	Enables individuals with limited mobility to control computers using eye movements.	Tobii Dynavox, Eye Gaze Edge, PCEye
Brain-Computer Interface (BCI) Learning	Allows students to control digital devices using brain signals.	Neurable, OpenBCI, Emotiv
AI-Powered Virtual Assistants	Provides real-time assistance for students with learning disabilities.	ChatGPT, Siri, Alexa, Google Assistant
AI in Augmented and Virtual Reality	Creates immersive learning environments for students with disabilities.	Google Expeditions, Oculus VR, Microsoft HoloLens
AI-Based Personalized Learning	Adapts study materials according to students' needs and disabilities.	Smart Sparrow, Carnegie Learning, Squirrel AI
AI-Enabled Accessible E-Learning Platforms	Facilitates inclusive education through online learning platforms.	Coursera, Udemy, edX, Khan Academy
AI-Enhanced Sign Language Recognition	Helps in communication for students with hearing impairments.	Google AI Sign Language, DeepASL, KinTrans
AI-Powered Assistive Devices	Includes smart wheelchairs, prosthetics, and robotic assistants for mobility support.	Whill Autonomous Wheelchair, ReWalk Robotics, AI Prosthetics

A study was conducted to evaluate the effectiveness of AI-based education programs for individuals with disabilities. This research was carried out online through a survey, which was shared on social media platforms. Participants who were using AI-assisted learning tools were requested to provide their feedback by answering the following questions:

1. What field of study are you currently pursuing or have completed?
2. What type of disability do you have?

3. Which AI-powered programs or devices have you used?
4. How convenient and effective do you find AI-assisted education?
5. Do you have any additional comments or suggestions?



A survey was conducted over a one-month period, and the results revealed that 130 individuals with disabilities use AI-driven technologies for a variety of purposes, including education. Many participants stated that they primarily rely on AI applications and devices for studying foreign languages and reading literary works.The concept of "Artificial Intelligence" was first coined by John McCarthy in 1956 during a seminar at Dartmouth College, a prestigious Ivy League university in the United States. The earliest known AI program was created in 1951 by British computer scientist S.Christopher by 1952, this system had gained the capability to anticipate player moves and engage in checkers.Renowned mathematician and computer scientist Alan Turing also examined this system in his scholarly article on chess programming. According to the responses from our study, the most widely utilized AI applications have been identified and are presented in first table.

The survey results identified several AI-powered applications and devices that significantly contribute to the educational process for individuals with disabilities. These technologies facilitate learning by providing accessible solutions tailored to specific needs. The key findings are outlined below:

1. Screen Reader Software

Individuals who are visually impaired or blind rely on screen reader programs that convert text into speech. Among the most widely used applications are JAWS and NVDA. Survey participants reported that these tools enable them to access literary works in an audio format,allowing for a more effective and convenient learning experience.

2. Speech-to-Text Applications

People with hearing impairments benefit from real-time speech-to-text conversion applications. Notable examples include Google Live Transcribe and Otter.ai. These applications allow users to transcribe songs, lectures, and even films into text. For instance,

students who cannot hear lectures delivered by popular professors on social media platforms can read the transcriptions instead.

3. Voice-Controlled Devices

For individuals with physical disabilities that limit movement, voice-activated assistants provide essential support. Commonly used devices include Apple Siri, Amazon Alexa, and Google Assistant, which allow users to control various functions hands-free.

4. Eye-Tracking Systems

People with severe motor disabilities who are unable to use their hands and feet can operate computers using eye-tracking technology. The survey highlighted Tobii Dynavox and EyeTech as some of the most recognized systems, enabling users to interact with digital content solely through eye movements

5. Adaptive Learning Platforms

AI-powered educational platforms personalize learning experiences based on individual needs. Khan Academy and Coursera are examples of such platforms, offering accessible and customized learning paths for students with disabilities.

CONCLUSION

These technologies significantly improve the accessibility of education for individuals with disabilities, removing barriers to knowledge acquisition. The survey results indicate that foreign language learners represent the largest group of users benefiting from these AI-driven tools. By providing adaptable learning solutions, these applications and devices enhance the overall educational experience and ensure equal learning opportunities.The findings of this study underscore the significant impact of AI-driven assistive technologies in fostering greater accessibility and inclusion for individuals with disabilities. These innovations empower users by mitigating challenges and enhancing their overall quality of life. However, despite the availability of such intelligent solutions, their reach remains limited, as many individuals within the disabled community are not fully aware of the tools and technologies designed to support them.This highlights an essential direction for future research: the development of systematic approaches to increase public awareness and facilitate the adoption of AI-assisted learning and accessibility tools. Ensuring that individuals with disabilities are informed and equipped with these resources will contribute to a more inclusive and equitable society. Moving forward, the implementation of targeted initiatives to bridge this knowledge gap will be crucial in fostering an environment where every individual, regardless of physical limitations, has the opportunity to realize their full potential. A truly progressive and thriving society is one that ensures equal access to resources, enabling all individuals to actively participate in shaping their own future.

REFERENCES:

1. Rustamova, J. (2025). Sun’iy intellekt orqali til o‘rganishning imkoniyatlari. International Conference on New Trends in Education and Language Learning, 7 January 2025. Retrieved from https://incop.org

2. Norboyev, F. Ch. (2024). Ta’limda sun’iy intellekt texnologiyalari tatbiqi. ResearchGate, 26 November 2024. Retrieved from https://www.researchgate.net/publication/386098406_Ta'limda_sun'iy_intellekt_texnologiyalari_tatbiqi

3. Ernazarov, D. Z. (2024). Oliy ta’lim tizimida sun'iy intellektning roli va ta’sirini oshirish. ResearchGate, 19 April 2024. Retrieved from https://www.researchgate.net/publication/379925224_Oliy_ta'lim_tizimida_sun'iy_intellektning_roli_va_ta'sirini_ortib_borishi

4. Sabirova, O. (2024). Ta’lim sohasida sun’iy intellektdan foydalanish. CyberLeninka, 2024. Retrieved from https://cyberleninka.ru/article/n/ta'lim-sohasida-sun’iy-intellektdan-foydalanish

5. Sirojidinov, B. (2024). Ta'limda sun'iy intellektning imkoniyatlari. Ares, 2024. Retrieved from https://ares.uz/uz/maqola-sahifasi/talimda-suniy-intellektning-imkoniyatlari

6. Anderson, J. (1983). The Architecture of Cognition.Cambridge, MA: Harvard University Press.

7. Anderson, J. R., Bothell, D., Byrne, M. D., Douglass, S., Lebiere, C., & Quin, Y. (2004). An integrated theory of the mind. Psychological Review, 111, 1036-1060

8. Anderson. J. & Lebiere, C. (1998). The atomic components of thought.Mahwah, NJ: Erlbaum.

9. Vijay Kanade.(2022) https://www.spiceworks.com/tech/artificialintelligence/articles/what-is-ai/

10. Li, M., & Chen, J. (2017). The Impact of AI-Based Pronunciation Tutoring Systems on Oral Proficiency Development. Language Learning & Technology, 21(3), 124-142.

11.Makhlouf, M. K. I. (2021). Effect of Artificial Intelligence-Based Application on Saudi Preparatory-Year Students’ EFL Speaking Skills at Albaha University. International Journal of English Language Education, 9(2), 36. https://doi.org/10.5296/ijele.v9i2.18782

12..Nurmuhammad Duisenov , Bekjan Axmedov , (2021). Sun’iy intellekt va ekspert tizimlari.