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AI Enable Personalized Assistive Tools to Enhance Education of Disabled Persons and Its Legal Fallacies

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ABSTRACT:
Integrating AI-enabled personalised assistive tools in education represents a transformative approach to enhancing learning experiences for disabled persons and children with diverse needs. This abstract explores the potential of these technologies to provide tailored educational support, facilitating engagement and fostering independence. These tools can customise content delivery based on individual learning styles, preferences, and abilities by leveraging machine learning algorithms, natural language processing, and adaptive learning environments.
AI-driven platforms can assist in identifying specific challenges faced by students, offering real-time feedback and adaptive resources that evolve with their progress. Examples include speech recognition software for students with hearing impairments, interactive visual aids for those with cognitive disabilities, and personalised learning pathways that accommodate varying levels of ability. Furthermore, the implementation of these tools promotes inclusivity in educational settings, allowing all learners to participate meaningfully.
This abstract highlights the need for collaboration between educators, technologists, and policymakers to ensure the effective design and deployment of AI assistive technologies. By prioritising accessibility and user-centric design, these innovations can significantly enhance educational outcomes, empower disabled individuals, and cultivate a more equitable learning environment.

Keywords: Artificial Intelligence (AI), People with Disabilities, Data privacy.

Background of the study:
To establish a solid background for this study, it's essential to understand the transformative potential of AI-driven assistive tools for education, particularly for disabled persons, as well as the legal complexities they introduce. Historically, the education of children and persons with disabilities was limited due to the lack of tailored tools and resources that could cater to their unique needs. Before the emergence of technology, much of the educational support for individuals with disabilities was provided through traditional means like specially trained teachers, physical accommodations, and individualized education programs (IEPs). These methods, though effective to some extent, were resource-intensive, highly manual, and often could not adapt in real-time to the changing needs of learners. The introduction of early assistive technologies, such as screen readers for visually impaired individuals and speech-generating devices for those with speech impairments, marked a significant shift. These tools, though helpful, were often generic

and provided a one-size-fits-all solution, which limited their effectiveness. Additionally, these technologies were expensive, and their adoption was slow due to limited awareness and accessibility. With the rise of artificial intelligence (AI), the landscape of assistive technology has drastically evolved. AI can provide personalized, adaptive learning experiences that adjust in real time to the specific needs of each learner. AI-powered tools are transforming the education sector for individuals with disabilities by offering a range of personalized support mechanisms. The future of AI in personalized assistive education looks promising, with several trends and potential advancements on the horizon:

1. **Greater Personalization**: AI systems will become increasingly sophisticated in understanding the needs of individual learners.
2. **Emotional AI and Mental Health Support**: As AI systems advance in recognizing emotional and cognitive states, they could play a significant role in not only enhancing education but also offering mental health support for children with disabilities. These systems could identify early signs of burnout, frustration, or emotional distress, enabling educators and caregivers to intervene proactively.
3. **Collaborative AI Systems**: Future AI tools may emphasize collaboration between students, teachers, and AI systems, providing a more integrated and balanced approach to learning. AI could enhance communication between all parties, ensuring that the educational experience is tailored not only to academic needs but also to social and emotional development
4. Ethical AI and Inclusivity: focus on reducing algorithmic bias, ensuring data privacy, and creating inclusive AI systems that are culturally and socially aware of the diverse needs of disabled individuals.

Literature Review:

Collaborative AI-enhanced digital mind-mapping as a tool for stimulating creative thinking in inclusive education for students with neurodevelopmental disorders mingling Fang (2024) focuses on Mindomo, a computerized mind mapping application, was used. This application is specifically made to support inclusive teamwork in workplaces and educational settings. Its unique features, which appeal to people with a variety of educational needs, include compatibility with the digital mind-mapping program Mindomo, which was used. It is accessible through a computer browser and as an application for tablets and smartphones. This application is specifically made to support inclusive teamwork in workplaces and educational settings. Available on desktops through a browser also Its unique features, which cater to people with a variety of educational needs, include text enlargement capabilities, support for uploading audio files into diagrams, compatibility with screen reading and voice input programs, and the ability to receive voice input from phones. It is available as an application for tablets and smartphones. [1]Artificial Intelligence: The road ahead for the Accessibility of Persons with Disability: Technology is a great approach to improving the lives of those with impairments**.** Nilanjan Chakraborty (2023) AI has the potential to revolutionize the lives of people with impairments. The use of computers to hear, see, and reason with remarkable accuracy is growing, and artificial intelligence (AI) is very promising and has the potential to help people with vision, learning, hearing, mobility, cognitive, and mental health conditions perform better in situations about modern life, work, and relationships with other people. The fact that just 10% of people with disabilities have access to assistive technologies is heartbreaking. Impact of Artificial Intelligence in Special Need Education to Promote Inclusive Pedagogy: Shalini Garg(2020) According to

[1] Fang, M., Abdallah, A.K. and Vorfolomeyeva, O., 2024. Collaborative AI-enhanced digital mind-mapping as a tool for stimulating creative thinking in inclusive education for students with neurodevelopmental disorders. *BMC psychology*, *12*(1), p.488.

the research by the Florida Department of Education, (2020) disabilities are categorized as Specific Learning/Language Disabilities, Hearing, Visual and Physical Disabilities. As per other researchers, persons with disabilities are also grouped into four groups: Mobility Impairment, Hearing Impairment, Visual Impairment and Cognitive Impairment. AI provides different technologies to adapt to the requirements of people with disabilities. A Review of Artificial Intelligence (AI) in Education during the Digital Era Pongsakorn Limna(2022)focuses on the field of education that has already been impacted by artificial intelligence. An important and strategic component of educational progress is the application of artificial intelligence. Additionally, the usage of artificial intelligence as a digital assistant is growing. They support educators and learners. In several ways, such as providing students with a vast array of educational resources tailored to their individual learning requirements and topic matter. Advances in artificial intelligence do, however, come with significant disadvantages, including worries about privacy, security, and safety. Artificial intelligence technologies therefore have both beneficial and harmful effects on the education industry[2]. Artificial Intelligence-enabled Enabled Personalized
Assistive Tools to Enhance Education of Children with Neurodevelopmental Disorders—A Review: Research gap: The research gap identified in this study is the lack of robust public datasets for children with neurodevelopmental disorders (NDDs), which makes it challenging to develop personalized AI tools. Furthermore, there are ethical concerns about privacy and data security that are not adequately addressed in existing AI-based educational tools.[3].How Could Equality and Data Protection Law Shape AI Fairness for People with Disabilities? There is a clear gap in research on how to effectively address these issues in AI fairness for PWD, particularly around improving representation in training data, designing AI systems with universal accessibility, and navigating the legal complexities of ensuring fairness without violating privacy or anti-discrimination laws.[4]

Research Problem:
The users of AI-enabled personalized assistive tools face significant legal challenges, for enhancing the education of disabled persons.
There is no mention of accountability of specific Data Fiduciaries or Data Processors from the Indian Legal Perspective, where the data is transferred to the Third third-party apps.
Thus, it poses a legal challenge in cases where the data is misused by a third party, due to inadequate security.
Research Question:1.Whether AI-based assistive tools in education share personal data with third parties and what are the implications for student privacy.2.Whether There Is Legal Recourse for Disabled Users Facing Issues with AI Assistive Tools.
Research Hypothesis: If AI enables the development of personalized assistive tools for education tailored to disabled individuals, then concerns about privacy, particularly regarding the collection and processing

[2] Limna, P., Jakwatanatham, S., Siripipattanakul, S., Kaewpuang, P. and Sriboonruang, P., 2022. A review of artificial intelligence (AI) in education during the digital era. *Advance Knowledge for Executives*, *1*(1), pp.1-9.Limna, Pongsakorn, Somporch Jakwatanatham, Sutithep Siripipattanakul, Pichart Kaewpuang, and Patcharavadee Sriboonruang. "A review of artificial intelligence (AI) in education during the digital era." *Advance Knowledge for Executives* 1, no. 1 (2022): 1-9.
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[4] Binns, R. and Kirkham, R., 2021. How could equality and data protection law shape AI fairness for people with disabilities?. *ACM Transactions on Accessible Computing (TACCESS)*, *14*(3), pp.1-32.

of sensitive personal data, will increase, potentially necessitating stricter data protection measures and ethical frameworks to ensure user trust and security.

Research Methodology: In this research study, I have used a doctrinal approach to substantiate and validate the research problem. I have collected data from various articles and used it to give feasible solutions for the issues raised.

Scope and limitation:

Scope: It examines the impact of these tools on inclusivity in education and how they can empower disabled learners by providing real-time feedback, personalized resources, and customized learning pathways. Additionally, the study will assess how collaboration between educators, technologists, and policymakers can optimize the design and implementation of these tools to maximize their benefits.

Limitation: Since data collection and usage practices of AI tools are often proprietary, it is challenging to fully assess how third parties handle data. Additionally, AI's reliance on continuous data input for improved personalization can raise unique privacy concerns that may not yet be addressed by existing regulations assistive tools may work effectively for specific types of disabilities but may be limited in addressing the needs of all categories.

Recommendations:

If data needs to be shared with third-party vendors for educational support, explicitly disclose this to students and guardians, detailing how and why their data will be shared**.** Third-party providers should be legally bound to adhere to data protection standards specified under the DPDP Act. This includes restrictions on how they can use, store, or share the data they receive

1. Introduction to AI in Education :

Artificial Intelligence (AI) and technology have already touched the lives of individuals, more generally, it has influenced the educational sector to make it more inclusive and accessible for students and persons with visual, hearing, mobility and intellectual disabilities. The use of AI has impacted students with special needs.

In many Asian and Pacific developing nations, individuals with disabilities are frequently caught in a terrible cycle of social exclusion, employment participation, and mainstream development initiatives. The global report on limitations as determined by the World Health Organization (WHO) that over one billion individuals all across the world suffer from various disabilities. People like that lack access to jobs, healthcare, and education. Without handy assistive technology, they frequently don't have the resources to pursue education to live a better, independent life. According to WHO estimates, there are over 1 billion Individuals who would profit from using one or more assistive technology or goods.

Disabilities: persons with disabilities are also grouped into four groups: Mobility Impairment, Hearing Impairment, Visual Impairment and Cognitive Impairment. AI provides different technologies to adapt to the requirements of people with disabilities.[5]

2. Students with Learning Disabilities(SWLD):

Learning disabilities, also known as neurodevelopmental disorders, are due to genetic or neurobiological factors that alter brain functions. Learning disabilities involve processing problems that interfere with basic learning skills such as reading, writing, math and other skills such as organization, scientific

[5] Bhatti, I., Mohi-U-din, S.F., Hayat, Y. and Tariq, M., 2024. Artificial Intelligence Applications for Students with Learning Disabilities: A Systematic Review. *European Journal of Science, Innovation and Technology*, *4*(2), pp.40-56.

reasoning, attention, and long or short-term memory (Learning Disabilities Association of America, n.d.). Learning disabilities impacting different areas of learning have also been categorized based on domains, including dyslexia (i.e., affects reading and related language-based processing skills), dysgraphia (i.e., affects handwriting ability and fine motor skills), dyscalculia (i.e., affects the ability to understand numbers and learn math facts) and non-verbal learning disabilities (i.e., affects the interpretation of nonverbal cues) (Learning Disabilities Association of America, n.d.). A learning disability can be highly associated with students' reading, writing, or math performance. Additionally, students may be impacted socially and emotionally by having lower self-esteem, behavioural challenges, or social difficulties due to their academic struggles. Supporting SWLDs in managing and coping with their academic challenges can help them achieve academically and improve their social and emotional growth. SWLDs need individualized support that can be provided most efficiently through high-intelligence technology such as AI.

Technology cannot improve learning by itself—it is the users and the ways of using technology that make a change for learners. If used purposefully and meaningfully, technology can support students with and without disabilities to achieve greater academic achievement in the classroom. However, if technology is not integrated or incorporated correctly into a lesson or the classroom, it does not enhance or support learning. Therefore, uncovering how AI technologies are integrated into specific learning activities to support SWLDs is critical. Puentedura (2006) proposed the SAMR (i.e., substitute, augment, modify, and redefine) model as a powerful tool for understanding technology integration in learning. The SAMR model was initially laid out to look at the transformative nature of online learning and has since been found powerful in analyzing technology integration with other technologies, such as mobile learning. With its clear definitions of technology integration, the SAMR model can be used to identify how much technology can transform and enhance learning rather than just repeating a teacher's action.[6]

Disabilities can be grouped according to the type of impairment; generally, there are four groups. Mobility impairments (restricted movement or control of arms, hands and fingers): refer to physical disabilities that affect the ability to move, manipulate objects, and interact with the physical world Visual impairments (blindness, partial sight and colour blindness): include the range from low vision to full blindness, where the user cannot use the visual display at all. Although people with visual impairments have the greatest problem with information displayed on the screen (especially graphics and pictorial information), the use of a pointing device, which requires eye-hand coordination (such as a mouse), may also pose an issue for them. Hearing impairments (deafness and hearing loss): have difficulties detecting sounds or distinguishing auditory information from the background noise. Deaf individuals cannot receive any auditory information at all. Many of them communicate through Sign Language which differs significantly from spoken language. Cognitive impairments (including cognitive, language and learning disabilities like attention deficit disorder, dyslexia, dementia, etc.): there is a wide range of cognitive impairments, including impairments of thinking, memory, language, learning and perception. Both people with disabilities and with learning disabilities are the same.[7]

[6] *Panjwani-Charani, S. & Zhai, X. (in press). AI for Students with Learning Disabilities: A Systematic Review. In X. Zhai & J. Krajcik (Eds.), Uses of Artificial Intelligence in STEM Education (pp. xx-xx). Oxford, UK: Oxford University Press.*

[7] Laabidi, M., Jemni, M., Ayed, L.J.B., Brahim, H.B. and Jemaa, A.B., 2014. Learning technologies for people with disabilities. *Journal of King Saud University-Computer and Information Sciences*, *26*(1), pp.29-45.

3. AI Personalisation Techniques in Assistive Learning Tools:

AI has significantly advanced the development of personalized assistive tools in education, enabling tailored learning experiences that can better accommodate the unique needs of disabled learners. These technologies include Speech Recognition and Natural Language Processing (NLP): AI-driven speech-to-text tools, reading aids, and communication devices help students with hearing or speech impairments engage with classroom content.

Predictive Text and Voice Assistance: AI-driven text prediction and voice assistance provide an interface for students with motor disabilities to communicate and interact with learning materials more easily.Vision-based Technologies: AI-powered image recognition and text-to-speech applications can make printed or visual content accessible to visually impaired learners.[8]

4. Legal frameworks and Data privacy:

Privacy has emerged as a basic human right across the globe and in India too it has been recognized as a Fundamental Right under Article 21 of the Indian Constitution. Right to Privacy is closely related to the protection of data which in this technological and globalized world, has become very difficult to achieve. In India, this Right was not initially recognized as a Fundamental Right, and neither any specific law on data protection for securing the Rights of Privacy of the citizens was enacted. At the same time, there had been many allegations regarding violation of privacy rights both by the Government as well as by the Private Commercial Entities from time to time in India. Such allegations were also placed before the Courts of Law where the Courts had given landmark Judgements including guidelines and rulings. It thus becomes very important to analyze all these legal developments relating to the Right to Privacy and Data Protection to understand the extent of security granted by the Indian legal framework to the citizens over the Right to Privacy. Due to an increase in the instances of data theft and breach of data privacy, the government and the industries were forced to make some sort of effort for the protection of data despite having a legalized framework. The Ministry of Communication and Information Technology suggested certain amendments to the IT Act, 2000 as regards the protection of information. These suggestions led to the IT (Amendment) Act, 2008 which further incorporated important provisions related to Data Protection i.e. Section 43 A and Section 72A. The nature of these provisions is punitive i.e. both criminal and civil. [9]But under the IT Act, this suggested amendment has yet to be enacted into a new provision under the same and as a result, a new set of rules are established named Privacy Rule. Section 43A talks about reasonable security practices and procedures that are very essentially required to be adopted while handling sensitive personal data. Non-compliance with these Rules will attract action under the provision of Section 43A of the said Act which will impose liability to pay compensation. However, its limits have not been fixed. There is no specific mention of the responsibility of data fiduciaries or data processors when data is transferred to a third party. Thus it's challenging to enforce shift accountability in cases where data is misused by a third party and there is no framework to hold third-party processors accountable under the IT Act. Due to the lack of a comprehensive framework for data-sharing agreements or contracts in the IT Act, there is no mechanism for users to be notified of data transfers to third parties.

[8] Barua, P.D., Vicnesh, J., Gururajan, R., Oh, S.L., Palmer, E., Azizan, M.M., Kadri, N.A. and Acharya, U.R., 2022. Artificial intelligence enabled personalized assistive tools to enhance education of children with neurodevelopmental disorders—a review. *International Journal of Environmental Research and Public Health*, *19*(3), p.1192.

[9] Boruah, J. and Das, B., 2020. Right to privacy and data protection under Indian legal regime. *DME Journal of Law*, *1*.Boruah, Jayanta, and Bandita Das. "Right to privacy and data protection under Indian legal regime." *DME Journal of Law* 1 (2020).

Metanoa: (concerning privacy)Early detection of developmental diseases like autism, attention deficit hyperactivity disorder (ADHD), learning difficulties, speech delays, and others is made possible by Metanoa, an artificial intelligence (AI) platform. The technology and tools offered by Metanoa are currently free of license and usage fees. However, Metanoa retains the right to charge for data storage, the use of the technology, tools, platform, or services, or any new features that may be added at any time at its sole discretion. Any of the services offered to users on "Metanoa" may be discontinued at any time by Metanoa at its sole discretion. However, Metanoa will not reimburse you for any fees you have already paid. Upon termination, you will no longer be able to claim your personal information kept on "Metanoa" or any responses or content you or your representative post on any other user or healthcare provider you may have engaged with through "Metanoa," whether they are current or terminated. "Metanoa" will not be held accountable for supplying this information to you or any other service or provider in any way.so here violates the privacy of an individual. The data fiduciary and data processor have to be responsible for the same under sec9 of the dpdp act. So the amendment has to be made to make liable of data fiduciaries and data processors liable under Indian law.

AI Assistive tool: It is a device, software, or product that uses artificial intelligence(AI) to help users complete tasks. The AI-based tool can perform data analysis rapidly and provide deeper insights and hence competent in offering real-time personalized recommendations to users tools can simply how data is used, modified and handled and thus improve data management. An Artificial Intelligence(AI)--powered assistive device is offering solutions to visually impaired persons in a unique way. Distributed at the-based LV Prasad Eye Institute (LVPEI), Smart Vision is a device that can be attached to the side of a pair of eyeglasses. It utilizes AI technology to identify objects around the visually impaired, read text messages for them, detect obstacles on the way and recognise faces.

5. International perspectives and comparative legal analysis:

The DPDP Act and GDPR both aim to protect personal data, but their approaches to the accountability of data processors differ significantly.[10] The GDPR offers a more robust framework that explicitly defines the roles and responsibilities of data processors, while the DPDP Act is still developing in this area, with a focus on data fiduciary obligations. The regulatory framework under GDPR Provides robust enforcement mechanisms, including the establishment of independent supervisory authorities in each EU member state to oversee compliance, investigate complaints, and impose fines.[11]

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