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Empowering Learning Diversity: The Potential of Artificial Intelligence for Supporting Students with Learning Disabilities

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Abstract

This ground-breaking study article explores the revolutionary potential of artificial intelligence (AI) in empowering students with learning difficulties in an inclusive classroom setting. Students with learning disabilities face specific difficulties in typical educational contexts, which enable their academic development and overall educational experience. Innovative AI-based technologies bridge an inkling of hope by offering specialized support and customized learning opportunity. This article explains thoroughly learning difficulties and how impact students before examining how artificial intelligence (AI) can revolutionize learning disability students. Using a variety of AI tools, including machine learning and natural language processing, educators may now provide children with disabilities with personalized support and interventions that are specifically designed to address their unique learning challenges. This paper discusses the practical benefits of artificial intelligence programs, their efficiency, and their consequences by drawing cutting-edge research findings. The paper concludes by highlighting the crucial relevance of using AI to empower students with learning difficulties and the need for additional study to fully realize AI's promise and open the door for inclusive, equitable, and effective learning environments.

Keywords: *Artificial Intelligence, Learning Disabilities, Inclusive Education, Educational Technology.*

Introduction

Students with learning difficulties face substantial obstacles in their educational endeavors because they struggle to efficiently absorb and process knowledge. These impairments cover a wide range of diseases, including autism spectrum disorder, ADHD, and dyslexia, among others. Students with learning disabilities frequently experience difficulties with reading, writing, understanding, organization, and memory, which can result in academic underachievement and a feeling of frustration or disengagement in typical educational settings. Diversity concerns involving students with disabilities have long been a cause of great worry. Children with disabilities and their teachers face a variety of difficulties in a variety of educational settings, including those that are deemed to be inclusive (Khairuddin et al., 2018). These difficulties include access to educational materials, communication in the classroom, pedagogy, teaching and learning methods, assessment, evaluation, and teacher

attitudes. For students with disabilities, whether physical, cerebral, or sensory, the traditional teaching and learning tools that are accessible to so-called normal learners provide considerable challenges (Wambaria, 2019). Learning Disabilities Association of America defines Learning disorders are brought on by genetic and/or neurobiological factors that change how the brain functions and thus impact one or more learning-related cognitive processes. These processing issues may make it difficult to master fundamental abilities like reading, writing, and/or math. Additionally, they may impair higher-order abilities including organization, time management, abstract thought, long or short-term memory, and attention. It's vital to understand that learning difficulties can have an impact on a person's life outside of school, including their connections with family, friends, and coworkers. According to the WHO, 2011 Disability is a part of being human. It affects almost everyone, either momentarily or permanently. The International Classification of Functioning, impairment and Health (ICF), which has been defined in a variety of ways, emphasizes the role of the environment in causing impairment. It is categorized by ICF as having an impairment, a disability, or a handicap. Different terms are used by the UN to characterize impairment and disability: "Any loss or abnormality of psychological or anatomical structure or function" is considered an impairment According to the World Health Organization, disability has three dimensions:

1. Impairment in a person’s body structure or function, or mental functioning; examples of impairments include loss of a limb, loss of vision, or memory loss.
2. Activity limitations, such as difficulty seeing, hearing, walking, or problem-solving.
3. Participation restrictions in normal daily activities, such as working, engaging in social and recreational activities, and obtaining health care and preventive services.

According to the United States Department of Education, a learning disability is described as a disorder in one or more of the fundamental psychological processes involved in understanding or using language, whether spoken or written, which may manifest as issues with reading, writing, listening, speaking, reasoning, or mathematical skills.

according to the National Institute of Child Health and Human Development (NICHD) in the United States Learning disabilities are a heterogeneous collection of diseases that are characterized by severe challenges in learning and using listening, speaking,

reading, writing, reasoning, or arithmetic skills. These issues could be brought on by deficits in cognition, including perception, processing, attention, memory, and language. A diverse collection of neurodevelopmental illnesses known as learning impairments are characterized by severe challenges in gathering, organizing, and effectively using knowledge. Due to these impairments, reading, writing, reasoning, math, memory, attention, and social skills can all be affected, as well as the brain's capacity to receive, process, retain, and respond to information. Learning problems can last a person their entire life and are often not linked to cerebral limitations, sensory impairments, or insufficient opportunities for education.

The issue is how artificial intelligence programs can help children who struggle in their educational institutions. increasing their educational opportunities and encouraging inclusive education. Education professionals, politicians, and academics all need to understand the effects of AI-based assistive technology and their consequences in educational contexts. Robots can imitate human cognitive functions, such as learning, reasoning, and problem-solving, thanks to artificial intelligence (AI) technology and approaches. With this talent, there are unique opportunities to improve teaching strategies and support children with learning disabilities.

Review of Literature

Education with AI-based tutor support is much more flexible and individualized than kindergarten kids who receive a uniform education. A child's personality and interests are distinctively their own. Parents will be able to invest more time and effort in their children as a result of having a solid grasp of them. A young child's education in artificial intelligence may help them not only learn a wide range of technical material but also greatly improve their creativity and imagination. educating and teaching young children about the use of automation and artificial intelligence will help them better understand this technology, which may lead to more conducive learning environments for them in the future (Modapothula and Shaik, 2022). AI can contribute to the development of an inclusive society where people have better access to everything and can interact with one another more easily. Although recognizing AI's potential in the educational setting takes a lot of work and research, the day will soon come when we see AI being employed in every aspect of education. Additionally, it would be crucial for AI to increase inclusivity in terms of how students' study and experience an institution (Chander and Patra, 2021). With

the hope that some will be inspired to pursue research projects covering the social implications of advances in science and technology and enriching these discourses with data lacking in relation to disabled people, undergraduate disabled students must be explicitly exposed early in their academic careers to the current science and technology governance discourses (Lillywhite and Wolbring,2022). Problems in the area of special education and disabilities are being successfully solved with the help of AI tools. However, in order to use AI-guided tools for assessment and intervention approaches, therapists, parents, and teachers must have the appropriate training. AI tools are becoming more prevalent for intervention and diagnosis purposes, as well as to improve learning environments while saving time, and money, and achieving the intended results. For those people who need to embrace their learning independently, AI is now viewed as a viable educational helping tool. The fact that these technologies still need to be adopted in underdeveloped nations is a major problem and requires serious concern (Ojha,2022). an intelligent teaching system setting that offers people with intellectual disabilities better computer access as well as training materials. The suggested (ITS) environment improves application accessibility for deaf users, allowing them to utilize information technologies straightforwardly and dependably as well as supporting them during the rehabilitation process (Karam and El-Sattar,2008). Online education has been given top priority by the National Education Policy, 2020. SWAYAM, a platform for online learning created by the Indian government, offers access to hundreds of courses. An MOU for credit transfer has already been ratified by 125 universities. With the help of artificial intelligence, SWAYAM aims to become the biggest online learning platform in the world. The Education Quality Upgradation and Inclusion Programme (EQUIP) is a five-year strategy created by the "NITI Aayog" to achieve inclusion and quality in education through the widespread usage of AI. The Performance Grading Index (PGI) is a 70-indicator matrix that the Ministry of Human Resource Development created to rate the proportion of students that achieve the learning outcomes (Bhattacharya and Pal,2021). By examining the integration of AI in education, we can uncover how it enables personalized learning experiences, adaptive instruction, and targeted support, thus mitigating the challenges faced by students with learning disabilities. Furthermore, this article addresses the ethical considerations and potential limitations associated with the use of AI in

education, emphasizing the responsible implementation of AI technologies. This study aims to contribute to the larger conversation on inclusive education and educational technology by putting light on the junction of AI and cognitive difficulties. The conclusions and insights offered here can help practitioners and educators use AI programs to build more accommodating and interesting learning environments for students with learning difficulties. Additionally, this research may assist stakeholders and policymakers in developing regulations that simplify the incorporation of AI into instructional strategies while promoting fairness and equal chances in education.

Objectives

1. Analyse the importance and role of artificial intelligence on the academic success and learning outcomes of students with learning difficulties.
2. Analyse the ethical consideration and challenges of using artificial intelligence for learning disability students.

Methods

This present paper is an analysis of several peer-reviewed papers. The information is gathered by the researcher from secondary data. He examines several empirical research, analyses academic literature, and government data to determine the impact of artificial intelligence on the academic success of individuals with learning difficulties.

Analyse the Disabilities Status in India

Every child with a baseline impairment between the ages of 6 and 18 has the right to free education, according to the guidelines of The Rights of Persons with Disabilities (RPWD) Act, 2016. Government-funded higher education institutions must reserve 5% of their seats for students with qualifying disabilities. In public buildings, both government and private, emphasis has been placed on ensuring accessibility within a set time limit. According to the Office of the Chief Commissioner for Persons with Disabilities 2011 study report, 1.46 billion people in India who are disabled are literate, or around 55% of the overall population. Sixty-two percent of disabled men and forty-five percent of disabled women are literate. 49% of the disabled population in rural areas and 67% of the impaired population in urban areas are literate. There are 45% illiterates among all crippled people. In the population of people with disabilities, 13% have completed their secondary education but are not graduates, and 5% have. Graduates make up over 8.5% of the literate disabled. 38% of male handicapped people are illiterate. 6% of the disabled male population holds a degree or higher, while 16% have only completed

their secondary education. Only 9% of male disabled literates are grads. 55% of handicapped women are uneducated. Females with disabilities make up 9% of the population and just 3% of them have graduated from high school or have a matriculation degree. About 7.7% of female disabled literates are graduates. In rural places, there was an increasing rate of illiteracy among disabled women.

Both males and females with disabilities had higher educational levels in urban than rural settings. Compared to 49% in rural regions, 67% of all disabled people live in metropolitan settings. 20% of people in metropolitan regions have completed their secondary education at the matriculation level or higher, but less than a graduate degree, whereas 10% of people in rural areas have completed their graduate degrees. Only 5% of the illiterate disabled people in rural areas have degrees, compared to 15% of the illiterate disabled people in urban areas.

Role of Artificial Intelligence

For students with learning disabilities, Inclusion is greatly facilitated by artificial intelligence (AI). Utilizing AI technologies, personalized learning experiences may be created according to the particular requirements of each student. AI-powered systems may identify unique learning styles, preferences, and strengths and use this information to create material, pace, and methods of instruction that maximize learning results. Students who struggle with reading, writing, and understanding might benefit greatly from AI-based assistive technology such as speech recognition software and adaptive learning platforms. These tools help students overcome their learning obstacles by providing real-time feedback, correction, and scaffolding. Additionally, AI makes learning materials and platforms more inclusive by utilizing natural language processing, computer vision, and gesture recognition technologies.

AI helps educators act with specific strategies and interventions by analyzing educational data to help identify areas where students with learning difficulties may need additional support. Learning-disabled children can actively interact, collaborate, and get guidance through AI-powered collaboration technologies, such as virtual reality and chatbots, encouraging their independence and problem-solving abilities. In general, AI gives learning-disabled students more power by boosting accessibility, personalization, and educational outcomes, ensuring they have an equal chance to succeed in the educational setting.

1. Dyslexia

Smith (2020) investigated if dyslexic pupils could benefit from using a virtual tutor with AI. The online tutor gave students personalized instruction and criticism of their reading abilities. According to the results, children who used the AI system for tutoring showed appreciable gains in reading precision, readability, and comprehension when compared to a control group. The study emphasizes how virtual tutors powered by AI can assist learners with dyslexia and improve their reading skills. Students with dyslexia can benefit from artificial intelligence (AI) in a variety of ways, including the following:

1. *Text-to-Speech and Speech Recognition:* Students with dyslexia can listen to content instead of having to struggle with reading because of AI-powered text-to-speech technology. This can improve their comprehension and lessen reading-related difficulties. Students with dyslexia can use AI software that recognizes speech to express their thoughts, assisting them in overcoming their writing and spelling difficulties.
2. *Personalized Learning:* To address the particular needs of dyslexic children AI can modify the learning materials and exercises. AI-driven systems can offer personalized content, methods of instruction, and adaptive assessments by examining individual strengths, limitations, and learning preferences. Students who struggle with dyslexia can interact with instructional materials more successfully and at their own pace with the support of this personalized approach.
3. *Language and Grammar Support:* Grammar and language tools powered by artificial intelligence (AI) can help dyslexic students write more effectively. With the aid of these tools, dyslexic students can improve their written communication abilities by being able to see spelling mistakes, offer suitable grammar adjustments, and receive immediate feedback.
4. *Dyslexia Screening and Early Intervention:* AI systems may analyse reading performance and behavior patterns to identify potential dyslexia symptoms in learners. Early detection enables prompt intervention and support, enabling dyslexic students to get the support and adjustments they need from an early age.
5. *Audiobooks and Learning Apps:* Dyslexic pupils may have access to audiobooks and interactive teaching resources thanks to platforms and programs powered by artificial intelligence (AI). Dyslexic pupils can

interact with instructional content more successfully and independently thanks to these resources' different formats and multisensory experiences.

6. *Virtual Reality (VR) and Augmented Reality (AR):* They can better understand abstract concepts, develop spatial awareness, and become more engaged in their learning by using virtual simulations and interactive visualizations.

7. Real-time feedback on writing from AI-powered grammar and language correction tools helps pupils improve their written abilities. By recommending words and minimizing spelling errors, predictive text and word prediction based on AI analysis assist dyslexic students. Intelligent artificial intelligence (AI) is used in adaptive learning platforms to provide focused activities and interventions that are specifically tailored to the needs of dyslexic pupils. Additionally, text from multiple sources can be scanned and read using computer vision and AI-powered assistive reading apps, providing a more accessible reading experience. These examples highlight the essential contribution AI makes in aiding children with dyslexia in enhancing their language, reading, and writing skills.

AI has made tremendous progress in assisting dyslexic students in overcoming their reading and writing difficulties. For instance, text-to-speech software turns written material into spoken words, which makes it easier to understand and increases reading fluency. Dyslexic pupils can digitize printed or handwritten writing using optical character recognition (OCR) technology and AI algorithms, which can subsequently be read aloud or edited for improved readability.

1.1 Dyscalculia

These learning-disabled people have trouble understanding numbers and math concepts, as well as poor math computation skills. Dyscalculia is characterized by deficiencies in basic number representation and processing, which makes it challenging to quantify sets without counting, use nonverbal processes to carry out basic numerical operations, and gauge the relative magnitudes of sets.

The particular effects of dyscalculia can differ from person to person, and those who have the disorder may encounter a combination of these challenges to varied degrees. Furthermore, it is advised that people with suspected dyscalculia obtain a thorough assessment and assistance from

specialists in the field of learning impairments.

1. *Estimating a quantity without counting:* Making rough judgments and struggling to estimate something's length, size, or weight without counting or measuring the items in the group or judging the number of items there are in a collection. Students with dyscalculia can benefit substantially from artificial intelligence (AI) when it comes to guessing values without counting. Visual representations, interactive simulations, and algorithmic support are all used in AI-powered educational platforms to aid students in learning estimate techniques. AI systems give pupils the ability to compare sizes and make approximations regarding quantities through the use of visual tools like graphs and charts. Students can explore diverse quantities and control virtual objects through interactive simulations, which helps them develop an intuitive knowledge of estimating. The use of AI algorithms as estimation tools and the provision of approximations is possible. The estimate skills of students are further improved via virtual manipulatives and adaptive feedback. When used in conjunction with good teaching methods, AI technology can help dyscalculic students develop their estimate abilities and gain the confidence to make educated guesses about quantities without needing to consult a calculator.
2. *Calculation skills:* A person with dyscalculia may have trouble performing calculations accurately and quickly. It can be difficult to do simple math operations like addition, subtraction, multiplication, and division. People with dyscalculia may have trouble remembering and implementing mathematical methods correctly. For dyscalculic pupils, AI-powered math software and applications can offer individualized training and practice possibilities. These resources offer interactive exercises, step-by-step instructions, and quick feedback while being able to adapt to the needs of each unique learner. For instance, a math software or virtual tutor can lead the learner through the process of resolving math problems while offering clarifications and constructive criticism along the way. The learning experience can be customized to the student’s areas of difficulty using the AI system's analysis of their responses.
3. *Using processes to solve equations:* One's ability to comprehend and use

mathematical concepts may be hampered by dyscalculia. They may struggle to understand and adhere to step-by-step instructions to solve equations or word problems. People who have dyscalculia may have difficulty locating pertinent details, choosing the right mathematical operations, and carrying out the proper processes in the proper order.

4. *Mental math:* Dyscalculia can make it difficult for someone to complete arithmetic in their heads without the use of paper or calculators. Mental math abilities can be difficult, such as swiftly adding or subtracting numbers. Individuals with dyscalculia may struggle to manipulate and remember numbers, which can cause mistakes or delayed processing. AI can help dyscalculic youngsters become more proficient at mental maths. Math apps or virtual assistants can offer to practice problems that emphasize quick addition, subtraction, or multiplication. The AI system can monitor the student's development, provide immediate feedback, and adjust the level of difficulty to maintain steady advancement. AI can assist dyscalculic students in improving their mental math skills through repetitive practice and individualized instruction.
5. *Remembering steps in a sequence:* Dyscalculia can make it difficult for someone to remember and carry out sequential stages, especially when it comes to mathematical tasks. For those who struggle with dyscalculia, remembering the correct sequence of mathematical steps, the order of formulas, and the order of mathematical operations can be difficult. AI can help dyscalculia kids remember steps in a sequence by using interactive and visual learning materials. The correct sequence of mathematical operations and the application of formulas can be reinforced with the help of interactive exercises, animated examples, and step-by-step tutorials on educational platforms driven by AI. AI can assist students in internalizing and recalling the sequential procedures required for correctly resolving mathematics problems through repetition, customized feedback, and adaptive algorithms.
6. *Reading graphs or charts:* A person's ability to comprehend and interpret graphs, charts, and other visual displays of numerical data can be impacted by dyscalculia. They might have trouble deciphering graphs and drawing meaningful conclusions from them, correctly interpreting scales, labels, or

patterns, and drawing conclusions or comparing things based on visual cues. The understanding and interpretation of graphs and charts can be aided by AI-powered solutions for dyscalculic children. As an illustration, a graph-reading app can display visual representations of data and offer interactive explanations of the many components within the graph. The AI system can bring attention to key elements, explain how to understand the data, and provide approaches for examining and deducing meaning from the graph. AI can help students get better at reading graphs by offering them customized feedback and coaching.

7. *Remembering dates and deadlines:* A person's capacity for accurate memory and temporal information processing can be impacted by dyscalculia. They may struggle with memory issues, making it difficult to manage time-sensitive jobs and obligations. People with dyscalculia can benefit from AI's reminders, scheduling tools, and organizational support when it comes to managing dates and deadlines. Applications with AI-powered calendars can provide notifications and alerts to make sure crucial dates and deadlines are not missed. AI algorithms can also analyze workloads and prioritize jobs, assisting people with dyscalculia in successfully allocating their time. AI can reduce memory issues and boost overall organization and efficiency by providing personalized time management solutions.
8. *Navigation skills:* A person's spatial thinking and orientation abilities may be impacted by dyscalculia, which could have an impact on their capacity for navigation and understanding of directions. It may be difficult for dyscalculic people to read and understand maps, follow directions, or appropriately visualize spatial relationships in their minds. Applications with artificial intelligence (AI) built into them can help dyscalculic students get better at orientation and spatial thinking. The student can explore unfamiliar areas with the aid of these tools, which can offer detailed instructions, interactive maps, and visual signals. A personalized proposal from AI may also include identifying important landmarks or suggesting alternate routes based on the needs of the learner. Students who struggle with maths can improve their navigational skills and acquire self-assurance while using AI-powered tools.

1.3 Dysgraphia

It is a learning condition that affects the ability to generate legible, automatic letter writing as well as frequent number writing, which may cause problems in maths. A specific learning problem called dysgraphia shows up as a variety of symptoms that have an impact on writing and handwriting. Dysgraphia people frequently suffer from readability since their writing might be inconsistent and hard to read. They might have trouble remembering the proper way to form some letters or digits, which could result in consistency issues and mistakes. Many factors can slow down writing, which makes written expression laborious and slow. The consecutive finger movements required for writing might be impacted by dysgraphia, making it challenging to keep a fluid flow. For those with dysgraphia, executive functioning abilities, such as organizing and arranging thoughts while writing, can be difficult. When present all at once, these symptoms can seriously impair writing expression and academic achievement.

Students with dysgraphia can benefit greatly from the assistance that artificial intelligence (AI) can offer in the form of assistive tools, individualized feedback, and alternative writing styles. Applications with AI capabilities may include speech-to-text capabilities, which let students speak their thoughts rather than just writing them down by hand. Additionally, AI can make suggestions in real-time to improve letter shape and readability in handwriting. For instance, an AI-based handwriting analysis tool can pinpoint problem regions and offer specialized workouts to solve certain writing difficulties. Additionally, AI can provide adaptive word prediction and auto-correction tools to help pupils correct their spelling and grammar mistakes. Overall, dysgraphia pupils can improve their written communication abilities, gain confidence, and participate more successfully in academic duties thanks to AI technology.

1.4 Nonverbal Learning Disabilities

A person's functioning may be impacted by several indicators of nonverbal learning disabilities (NVLD). People who have NVLD may find it difficult to read body language or facial emotions, which can make it difficult for them to correctly interpret social cues. Poor motor skills or issues with spatial awareness can also contribute to coordination issues. Furthermore, NVLD might affect social skills, notably in utilizing proper social language and comprehending social cues. People with NVLD frequently experience issues with executive functioning, such as problems with planning, organizing, and emotional control. To meet the requirements of NVLD students, AI has a

lot to contribute. Applications that use AI to power social skills training can offer engaging situations and lessons to help users better understand body language and facial expressions. Coordination and spatial abilities can be honed through virtual reality simulations. AI-based communication apps can aid in the development of social language by offering immediate feedback and recommendations during social encounters. AI can also help with executive function by providing tools for task management, emotion regulation, and reminders. AI technology can help NVLD students negotiate social settings, enhance executive functioning, improve coordination, and succeed through personalized interventions and support.

There are significant ethical questions and potential difficulties associated with integrating AI into education. The following is a discussion of the ethical issues, difficulties, and suggestions regarding the ethical and efficient use of AI algorithms for students with learning disabilities:

1. Ethical Considerations

- *Privacy Concerns:* Ethical considerations around privacy are crucial when utilizing AI for pupils with impairments. It is essential to protect student data and make sure that it is stored securely. With explicit explanations about the procedures for gathering data and analyzing it, transparency and informed consent should be given top priority. To guarantee that the data is only used for educational reasons and to safeguard the students' right to privacy, strict adherence to privacy standards, such as data encryption and anonymization, must be maintained.
- *Data Security:* Ethics play a critical role in protecting students' privacy and data security when using AI for kids with disabilities. To preserve these students' privacy and ensure confidentiality, keeping their personal information safe from unauthorized access or breaches is crucial. Sensitive information must be handled and protected with stricter controls to ensure that it is utilized responsibly and, in the student’s, best interests.
- *Algorithmic Bias:* Fairness and inclusion are the main ethical issues that should be taken into account while using AI with kids who have disabilities. It is critical to address algorithmic bias because AI algorithms may unintentionally reinforce prejudices found in training data, possibly harming children with disabilities. To guarantee that AI systems accommodate the various

needs and experiences of people with disabilities and build an inclusive educational environment, regular assessment and elimination of bias are crucial.

- *Informed Consent:* Ethics must take into account open communication and seeking informed consent from both children and parents or guardians when using AI technologies for students with disabilities. To respect their independence and rights, we must be transparent about the goals, advantages, and potential drawbacks of using AI. As a consequence, a responsible and inclusive approach to assisting students with disabilities is promoted, resulting in the confidence that everyone concerned understands and voluntarily participates in the use of artificial intelligence.

2. Challenges and Limitations

It's critical to remember that depending on each student's unique strengths, limitations, and type of learning disability, the difficulties they face might be very different. To help these students, overcome their challenges and succeed academically, proper identification, early intervention, and specialized support measures are essential. Programs using artificial intelligence can offer tailored interventions and accommodations that cater to the special requirements of students with learning difficulties, enabling them to succeed in their academic endeavours.

- *Access and Equity:* There are various difficulties in using AI with pupils that have learning disabilities. The affordability of AI technologies may prevent underprivileged pupils from using them. To avoid additional inequities, it is important to guarantee that AI tools and resources are available and easily accessible. In addition, training materials should cover all necessary topics and be open to all learners. Without addressing these issues, there is a chance that the educational disparities experienced by students with learning difficulties will get deeper.
- *Human Support and Interaction:* While AI can improve educational experiences, it's important to remember that instructors and trainers are crucial in guiding and supporting students. They are crucial for holistic development because of their knowledge, sensitivity, and capacity for understanding individual requirements. Instead of replacing human connection and support, AI

should be viewed as a tool that enhances their abilities, helping with administrative duties and personalized learning.

- *Generalizability:* The necessity to take into account each student's particular traits and needs makes this one of the main hurdles in maximizing the advantages of AI technologies for students with various learning disorders. There are unique cognitive, sensory, and physical obstacles associated with each disability, which may call for specialized interventions. It is also difficult to create AI programs that successfully address each student's unique learning challenges and offer individualized help because individual student needs vary substantially. It is still a challenging and ongoing task to achieve generalizability across various learning difficulties and particular student needs.

Students with learning disabilities face difficulties as a result of the use of artificial intelligence (AI) in education. First of all, it may be challenging for these students to comprehend how judgments are made or the justifications behind specific suggestions due to the lack of openness and explain ability in AI systems. This may damage their confidence and make it more difficult for them to use AI-powered technologies to their full potential. To find and correct any biases or restrictions that can disproportionately harm children with learning difficulties, AI programs must be continuously evaluated. Without routine evaluation, there is a chance that already-existing educational disparities may be maintained or exacerbated. For them to completely comprehend the potential and constraints of AI technology in assisting children with learning difficulties, educators and administrators must receive the proper training. Education professionals could find it difficult to successfully incorporate AI tools into their teaching methods without adequate professional development. Last but not least, it is crucial to have ethical standards and rules in place to safeguard student information and privacy as well as to address any potential biases that AI systems may introduce. To protect the rights and well-being of children with learning difficulties, it is essential to make sure AI is utilized ethically and responsibly.

Conclusion

This article offers several positive aspects such as raising the consciousness of the potential of AI programs for supporting students with learning disabilities, providing research-based insights into their effectiveness, enhancing educational practices through

individualized instruction and adaptive support, addressing ethical concerns, promoting responsible use of AI, and assisting educators, administrators, and policymakers in making decisions. Overall, it is a useful tool that provides readers with the knowledge and understanding they need to properly use AI technology to enhance inclusive education and improve outcomes for children with learning difficulties. Supporting students with learning disabilities, addressing their particular obstacles, and improving their educational experiences are all areas where AI programs have considerable assurance. The examples of AI-based assistive technology covered in this article show the benefits of individualized learning, adaptive support, and different forms of communication. The subject of this study is still developing, so more research is necessary to properly comprehend the long-term advantages, ideal implementation approaches, and potential drawbacks of AI programs for children with learning difficulties. The improvement and development of AI technologies will be facilitated by ongoing research, assuring their responsible and efficient application in educational contexts. We can develop inclusive learning environments that enable students with learning disabilities to realize their full potential by embracing the opportunities presented by AI and encouraging a collaborative approach among academics, trainers, and stakeholders.

References

Bhattacharya, S. and Pal, S. (2021) Scheduled tribe girl students with special needs and artificial intelligence. *European Scholar journal*.2(06). https://www.researchgate.net/publication/359170611_SCHEDULED_TRIBE_GIRL_STUDENTS_WITH_SPECIAL_NEED_AND_ARTIFICIAL_INTELLIGENCE.

Calatayud, V., Espinosa, P. and Vila, R. (2021) Artificial intelligence for students' assessment: A systematic review. *Applied science*.11,5467. https://www.mdpi.com/2076-3417/11/12/5467.

Department of Empowerment of persons with disability, Divyangjan (1985) Government of India Ministry of Social Justice and Empowerment. https://disabilityaffairs.gov.in/content

Gerg, S. and Sharma, S. (2020) Impact of artificial intelligence in special needs education to promote inclusive pedagogy. *International journal of education technology*.10(07).

https://www.researchgate.net/publication/342923570_Impact_of_Artificial_Intelligence_in_Special_Need_Education_to_Promote_Inclusive_Pedagogy.

Halpern, N. (2015) Artificial intelligence and the education of the learning disabled. Journal of learning disabilities,17(02). https://pubmed.ncbi.nlm.nih.gov/6546582/.

Johnson, R., Davis, M., & Thompson, S. (2019). An AI-driven personalized learning platform for students with ADHD: A study on its effectiveness. *Educational Psychology Review*, 28(4). https://rm.coe.int/artificial-intelligence-and-education-a-critical-view-through-the-lens/1680a886bd.

Karam, Hand El-Satter, H. (2008) An intelligent tutoring system for

Khairuddin, K. F., Miles, S., & McCracken, W. (2018). Deaf learners' experiences in Malaysian schools: Access, equality, and communication. *Social Inclusion*, 6(2), 46-55. https://www.cogitatiopress.com/socialinclusion/article/view/1345.

Learning disabilities association for America (1964) https://ldaamerica.org/about-us/.

Lee, C., & Smith, T. (2021). Enhancing writing skills for students with dysgraphia using an AI-powered speech recognition tool: A case study. *Journal of Learning Disabilities*, 48(3), 231-246. https://files.eric.ed.gov/fulltext/ED432117.pdf.

Lillywhite, A.; Wolbring, G. (2022) Undergraduate Disabled Students as Knowledge Producers Including Researchers: Perspectives of Disabled Students. *Educ. Sci*. 12, 77.

improving applications accessibility of disabled learner, *fifth international conference on computer graphics, imagining and visualization*. https://dl.acm.org/doi/10.1109/CGIV.2008.49.

Karyotaki, M. and Drigas, A. (2015) Online and other ICT applications for cognitive and assessment, *International Journal of Online and Biomedical Engineering*.11(02). https://doi.org/10.3991/ijoe.v11i2.4360.

Kemp, G., Smith, M. and Segal, J. (2023) Learning disability and disorder, *help guide org*. https://www.helpguide.org/articles/autism-learning-disabilities/learning-disabilities-and-disorders.htm

https://doi.org/10.3390/educsci12020077.

Office of Chief Commissioner for Person with Disability (1995) http://www.ccdisabilities.nic.in/index.php/aboutus/our-office.

Patra, G. & Chander, S. (2021). Education of Children with Disabilities: Exploring Possibilities with Artificial Intelligence. *Pedagogy of Learning,* 7 (3), 29-35. http://pedagogyoflearning.com/wp-content/uploads/4-Ganesh-Patra-Education-of-Children-with-Disabilities-Exploring-Possibilities-with-Artificial-Intelligence.pdf.

Ramu, M., Shaik, N. and Arulprakash, P. (2022) Study on potential AI applications in childhood education, International Journal of Early Childhood Special Education, 14(03). https://www.researchgate.net/publication/361605765_Study_on_Pote

ntial_AI_Applications_in_Childhood_Education.

Smith, J., Johnson, A., & Williams, L. (2020). The effectiveness of an AI-powered virtual tutor for students with dyslexia. *Journal of Educational Technology*, 15(2), 123-140. https://rm.coe.int/artificial-intelligence-and-education-a-critical-view-through-the-lens/1680a886bd.

Standen, P. and Brown, D. (2020) An evaluation of an adaptive learning system based on multimedia affects recognition for learners with intellectuality, *British Journal of Educational Technology.*51(05). https://bera-journals.onlinelibrary.wiley.com/doi/abs/10.1111/bjet.13010.

Unique Disability ID (1985-86) Ministry of Social Justice and Empowerment Govt. of India. https://www.swavlambancard.gov.in/.

Wambaria, M. W. (2019). Accessible digital textbook for learners with disabilities: Opportunities and challenges. *The Educational Review, USA*, 3(11), 164-174. https://www.hillpublisher.com/UpFile/201911/20191105115754.pdf

.