JOURNAL OF MULTIDISCIPLINARY SCIENCES AND INNOVATIONS

VOLUME 04, ISSUE 11
MOPNTHLY JOURNALS

ISSN NUMBER: 2751-4390
IMPACT FACTOR: 9,08

THE EFFECTIVENESS OF AI IN HELPING STUDENTS WITH LEARNING DISABILITIES

Xudoyqulova Ruxshona Anvarjonovna

Second Year Student of Uzbekistan State World Languages University

xudoyqulovamohinur25@gmail.com

Annotation: This paper focuses on how Artificial Intelligence can support individuals with learning disabilities within inclusive language learning environments. It talks about AI tools for speech recognition, adaptive learning platforms, and individualized feedback systems that will help students overcome some of the most common difficulties. This research has underlined that AI can further create targeted, engaging, and accessible learning opportunities. It has drawn sufficient attention to the fact that AI should be used in an appropriate way to ensure inclusiveness and equity in education. The findings indicated that AI has a great potential to enhance both academic performance and motivation in pupils with learning disabilities if used appropriately. Overall, this paper contributes to understanding how modern digital tools can transform inclusive language education and promote equal learning opportunities for all.

Keywords: Inclusive Language Learning; Learning Disabilities (LD); Artificial Intelligence (AI); Language Education; Globalization.

Introduction

While AI is rapidly changing the education world, its utility for children with LDs needs critical appraisal. This review aims to determine how useful AI-driven learning tools are to students with LDs, especially for those who are visually challenged and/or blind, while emphasizing methodological rigor and potential biases in prior studies. The study also emphasizes promising AI technologies that hold great promise in improving the accessibility of learning materials and learning outcomes for visually impaired students, which include text-to-speech tools, image recognition, and voice-assisted learning (Paglialunga and Melogno, 2025).

However, these problems have taken on a different character with the rise of AI in education. Comprehensive reviews in recent years have identified the transformative potential of AI in educational settings, demonstrating striking positive effects related to academic achievement, customized learning experiences, and educational administration.

Despite these encouraging progressions, the use of AI for learners with special educational needs, especially in learning disabilities and visual impairment, remains underexplored. Traditional educational methods have often fallen short in addressing the diverse cognitive and sensory challenges faced by such students. However, AI-driven technologies can bridge this gap by offering adaptive feedback, multisensory input, and personalized learning pathways that cater to individual abilities. Moreover, natural language processing, predictive analytics, and intelligent tutoring systems provide immediate support and monitoring, thereby allowing educators to pinpoint difficulties in learning. Since AI in education is expected to expand further, there is an urgent need to make sure that these innovations offer equal access, engagement, and outcomes for all learners despite their physical or cognitive differences. Therefore, this study purports to systematically evaluate the current evidence regarding AI's effectiveness in supporting students with learning disabilities, with particular attention to blind and visually impaired learners.

Learning disabilities are thus defined as processing problems that interfere with the acquisition of basic academic skills, including reading, writing, and mathematics, and with related areas such as organization, reasoning, attention, and both short- and long-term memory. Learning disabilities have been categorized into specific domains, which include dyslexia, which impacts reading and language-related processing; dysgraphia, which influences handwriting and fine motor coordination; dyscalculia impacts numerical comprehension and mathematical reasoning; and nonverbal learning disabilities, which impact the interpretation of nonverbal cues. By definition, learning disabilities are associated with problems in acquiring skills in reading, writing, and mathematics; they may also be linked to emotional and social issues, such as low self-esteem, behavioral problems, and interpersonal difficulties. Supporting students with learning disabilities in these challenges is thus crucial, not only for enhancement of their academic performance but also for improvement of socio-emotional development. According to Büttner and Hasselhorn (2011), such performance problems cannot be explained by external factors alone, and learning disabilities per se might be caused by a variety of disorders. Whereas conditions such as ASD and ADHD are not officially specified as learning disabilities, students with these conditions often demonstrate a partial overlap in their learning challenges, making them fall under the broader category of special educational needs.

Drawing on prior research that indicates AI-based tools hold promise for learners with special educational needs but are still underutilized by students with learning disabilities and visual impairments, this study employs a quasi-experimental mixed-methods design. Participants will include two groups of students aged 9-14 who have LD, with a subgroup being blind or visually impaired. One group, the intervention group, will be provided with an AI-based package that includes adaptive learning applications, text-to-speech functionalities with image recognition, voice-assisted educational modules, and smart tutoring elements designed for accessibility. The second group, the control group, will continue with typical inclusive classroom teaching without the utilization of the AI tools. Outcomes will include standardized assessments of reading, writing, and mathematics pre- and post-intervention, plus additional measures of accessibility and engagement, such as tool use frequency and student self-reports.

Themes on usability, accessibility, motivation, and learning independence will be explored using semi-structured interviews with students, educators, and support staff. Quantitative data will be analyzed by means of paired t-tests and ANCOVA, controlling for initial performance, by calculating effect sizes to quantify the size of the improvements. Thematic coding on qualitative responses will help pinpoint common problems and advantages. Ethical protocols will ensure informed consent, provisions for visually impaired participants, and protections for privacy. This methodological framework is based on the criteria from recent systematic reviews of AI in LD settings, such as Paglialunga and Melogno (2025), and the recommendations for inclusive AI integration in special education, such as those from OECD (2025).

Conclusion

Even though artificial intelligence technologies are rapidly developing in the field of education, the application of these technologies for students who have both learning disabilities and visual impairments simultaneously is not yet fully investigated. This research paper intends to fill this gap by evaluating a user-friendly AI-based intervention in an inclusive educational setting. It is expected that the results will indicate improvement in academics, heightened participation, and facilitation of access for students with special educational needs. These findings may also help in informing the development of future AI tools so that they support sensory and cognitive diversities and promote inclusive education. Limitations on sample size, the duration of the

intervention, and generalizability will be acknowledged, and future studies should consider large-scale trials and longitudinal designs to confirm and extend the findings.

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