International Journal of Innovative Research in Computer Science and Technology (IJIRCST)
ISSN (Online): 2347-5552, Volume-13, Issue-4, July 2025
DOI: https:/doi.org/10.55524/ijircst.2025.13.4.5
Article ID IRP-1656, Pages 45-50
www.ijircst.org

Special Kid Learning Application Development [Sklad] - Using Generative Artificial Intelligence

Dr. S. Manju[1], *Shakthi.S[2], and M. Gowtham[3]

[1]Associate Professor, Department of Computer Applications (PG), PSG College of Arts & Science, Coimbatore, Tamil Nadu, India
[2, 3]Master of Computer Application, Department of Computer Applications (PG), PSG College of Arts & Science, Coimbatore, Tamil Nadu, India

*Correspondence should be addressed to Shakthi.S; 242003shakthi@gmail.com

Received 8 June 2025; Revised 24 June 2025; Accepted 9 July 2025

ABSTRACT – In the present day, technology has greatly changed education, making it easier to access and enjoyable. However, children with specific needs, like kid with dyslexia or physical challenges, may find it difficult to find ways to learn that suit their unique learning preferences. "Special Kid Learning Application Development [SKLAD]" aims to solve such problems by providing a platform for those kids to learn. SKLAD is a learning web application designed for special kids with the integration of generative AI. This website contains generative AI which generates responses to the questions and it also has an AI with speech-to-text, and text-to-speech features which help the kids to assess and learn easily. And an AI to read documents aloud to the kids, further supporting their learning journey. Additionally, YouTube-based learning modules are integrated which allows the kids to have a wide range of courses.

KEYWORDS - Special kids, Application, Learning, React, MongoDB, YouTube-based learning, text-to-speech, speech-to-text.

I. INTRODUCTION

Special children like dyslexics and physical challenged kids tend to struggle a lot in the normal learning environment. Though there are numerous learning platforms available nowadays, they also tend to neglect the specific needs of such children. Special Kid Learning Application Development (SKLAD) aims to fill these voids by offering an inclusive, AI-driven learning platform specifically suited to their individual needs.

SKLAD combines speech-to-text, text-to-speech, generative AI chat, and learning modules based on YouTube to provide a personalized and adaptive learning environment. With dyslexia-friendly fonts to improve the readability and understanding, the system is designed specifical for dyslexic kids. The system's AI-enabled features let kids interact with the content more effectively, which makes learning easier and more interesting.

Developed with the MERN stack, SKLAD integrates YouTube API for video-based learning provides easy access to learning video content, facilitating both visual and auditory learning modes. In a conversational manner, the AI chat assistant helps kids learn by answering their questions, giving clarifications and offering interactive support. Furthermore, advanced voice technologies like text-to-speech and speech-to-text features, make it easier for kids who struggle with reading or writing.

Key features of SKLAD are:

- AI Chatbot Support: A chatbot powered by generative AI that provides assistance and direction in real time.
- Speech Technologies: For improved accessibility, built-in speech-to-text and text-to-speech features are available.
- Dyslexia-Friendly: Fonts of the text, colors and layout tailored for dyslexic children.
- YouTube-Based Education: Thoughtfully selected educational playlists from YouTube for a systematic learning experience.

II. LITERATURE REVIEW

AI is playing an essential part in helping students with disabilities through adaptive learning environments and one-to-one support. Based on the paper "AI for Students with Disabilities," AI-based assistive tools enhance communication, cognitive ability, and independent learning [1]. Likewise, "Artificial Intelligence Enabled Personalised Assistive Tools to Enhance Education of Children with Neurodevelopmental Disorders" discusses AI-based tools to help individualized education for children with autism and dyslexia through speech recognition and real-time feedback mechanisms.[2].

Mobile apps have also played an important role in improving special education. "Design and Development of Learning Applications for Special Needs Students Using Android Studio" offers a case study demonstrating the study demonstrating the value of simple interfaces and multimodal content presentation [3]. "Development Process of Instructional Mobile Application for Special Needs Children" prioritizes inclusive design principles and feedback-based learning approaches, whereas "EasyLexia-A Mobile Application for Children with Learning Disabilities" illustrates the enhancement of literacy abilities in dyslexic children with AI-based phonetic training [4][5].

Additionally, "Enhancing Special Education through Mobile Applications" is an extensive overview of how

mobile technology is transforming special education with the aim of enhancing engagement and cognitive growth. The research also touches on challenges like accessibility and the digital divide [6].

According to Dawson et al.'s article "Assistive Technologies to support kids with Dyslexia", kids with dyslexia can read and write more independently due to technologies like text-to-speech and speech-to-text [7].

"A Mobile Application to Improve Learning Performance of Dyslexic Children with Writing Difficulties" describes an interactive tool that uses a Writers Learning Algorithm (WLA) to improve handwriting skills. The software uses reinforcement learning, real-time progress tracking, and audiovisual cues to boost accuracy and memory. Usability testing revealed an 89% score improvement and great engagement among dyslexic kids [8].

III. IMPLEMENTATION

3For the special kids learning application, the implementation includes several core features designed to enhance accessibility, engagement, personalized learning experiences, AI assistances

A. Authentication Module

The platform provides a secure authentication system to protect user data and ensure safe access as shown in Figure 1. The login page offers:

- Multiple login options:
  - Email & Password authentication (using Firebase or JWT-based authentication).
  - Google OAuth integration for seamless login with Google accounts.
- Security measures:
  - JWT (JSON Web Token) Authentication to protect user sessions.
  - Password encryption & validation to ensure secure login credentials.
  - Error handling and validation for incorrect login attempts.

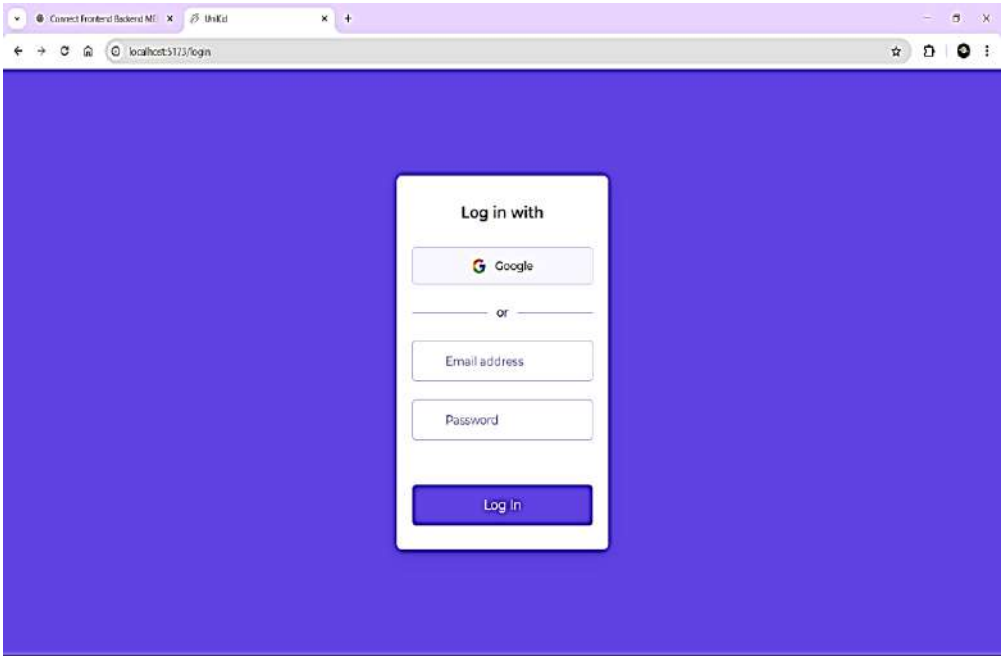

Figure 1: Login page using Oauth

B. User Module

Once logged in, the Dashboard Page provides a personalized experience with:

- User profile display: Name, profile image, and user-specific content.
- Enrolled courses with progress tracking to help children resume learning from where they left off.
- Navigation links to key sections such as the course list, AI-powered tools, and the profile page.
- Recently viewed courses section, allowing seamless continuity in learning as shown in Figure 2 below.

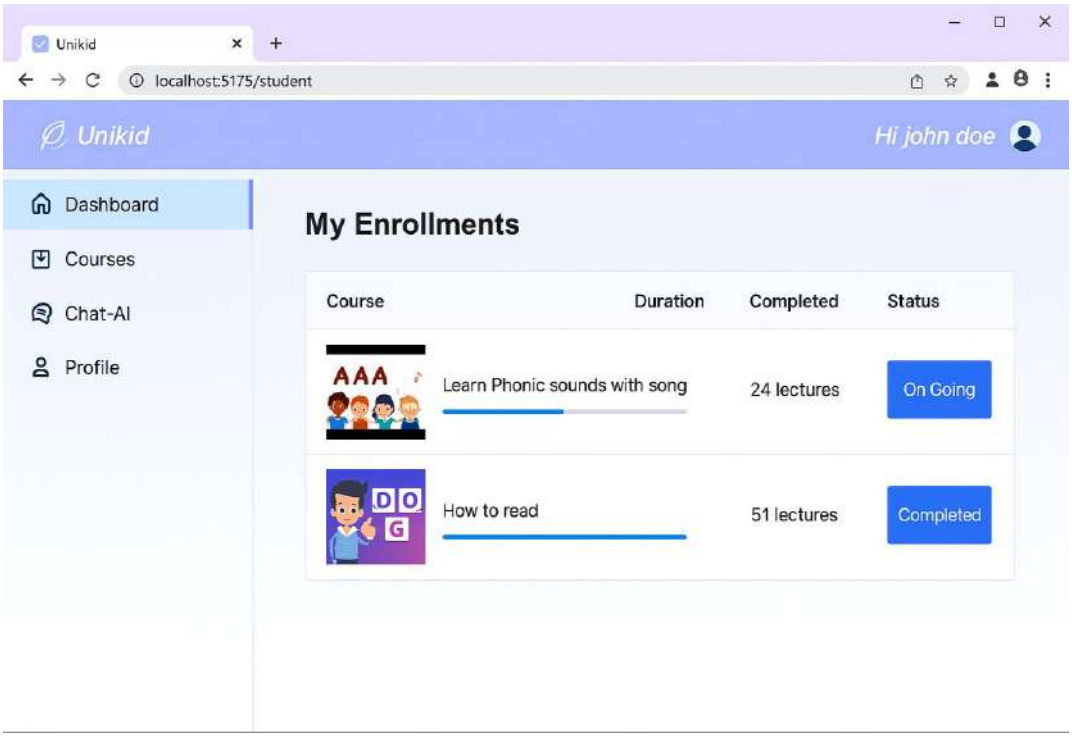

Figure 2: User Dashboard

C. *Course Module*

A user navigates to Course Details Page, where it contains:

- Detailed course information including title, description, learning objectives.
- Integration of the YouTube API, which enables users to view educational videos straight on the website.
- A course preview section, providing an introduction to the content.
- An "Enroll" button, allowing users to add the course to their learning dashboard.

D. *Course Player Page*

The Course Player Page provides an interactive learning experience as show in the Figure 3:

- YouTube video integration, allowing children to watch lessons directly on the platform.
- Progress tracking, enabling users to resume from where they left off.
- A "Mark as Completed" option to help learners track their achievements.
- Interactive controls like play and pause, ensuring a user-friendly experience.

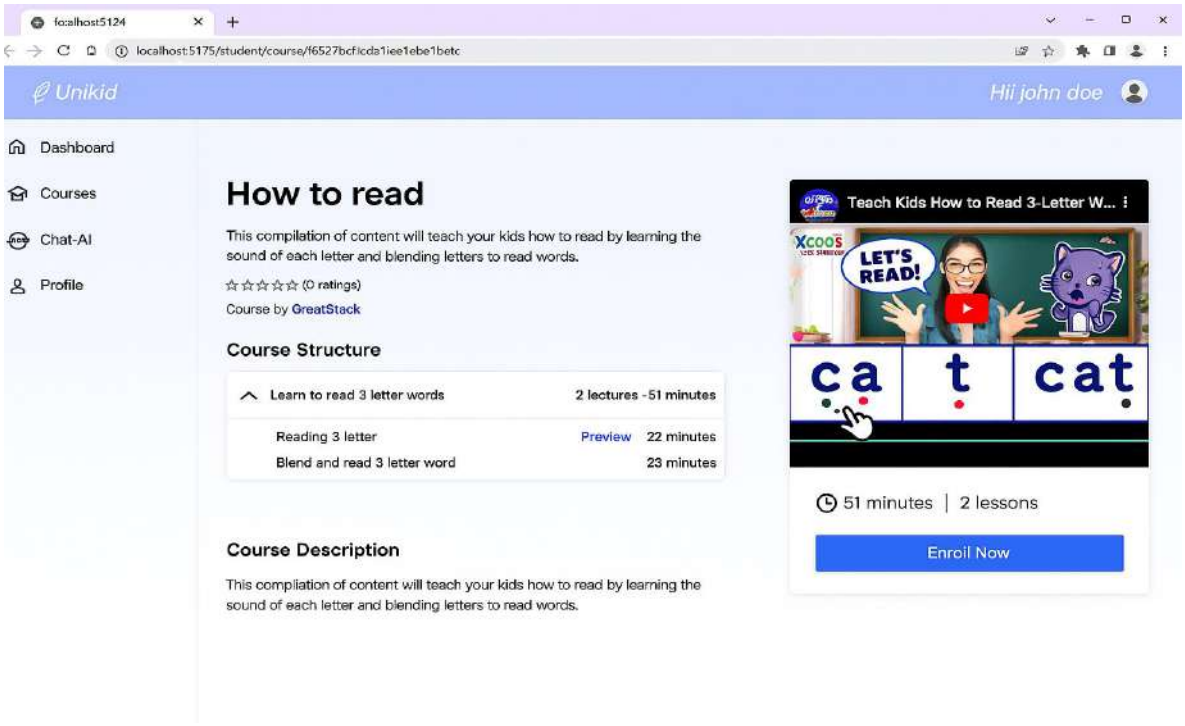

Figure 3: Course Details page

E. AI-Powered Learning Assistance

- Chat AI- Provides AI-powered chatbot support for kids to ask questions and get instant responses. Uses Gemini AI API to generate friendly, adaptive responses as shown in Figure 4.

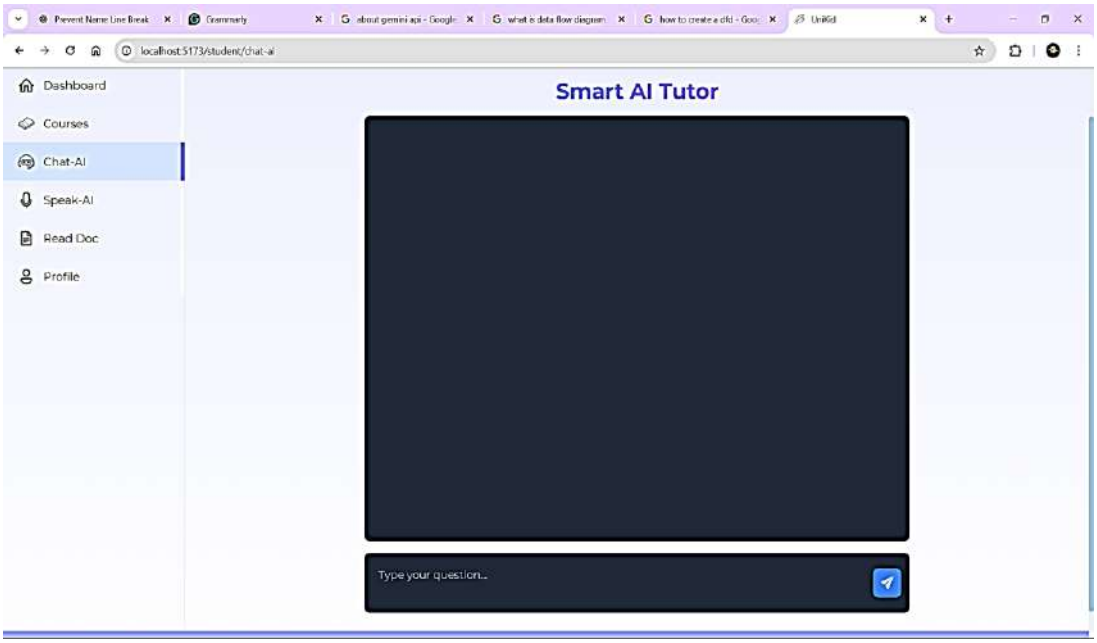

Figure 4: Chat AI with Gemini API

- Speech AI
  - Supports speech-to-text and text-to-speech feature
  - It has mic option which helps in speech-to-text
  - Then once the responds generated by AI the text-to-speech feature will read it aloud.
  - Also, there is options to pause and resume the reading as shown in Figure 5 below.

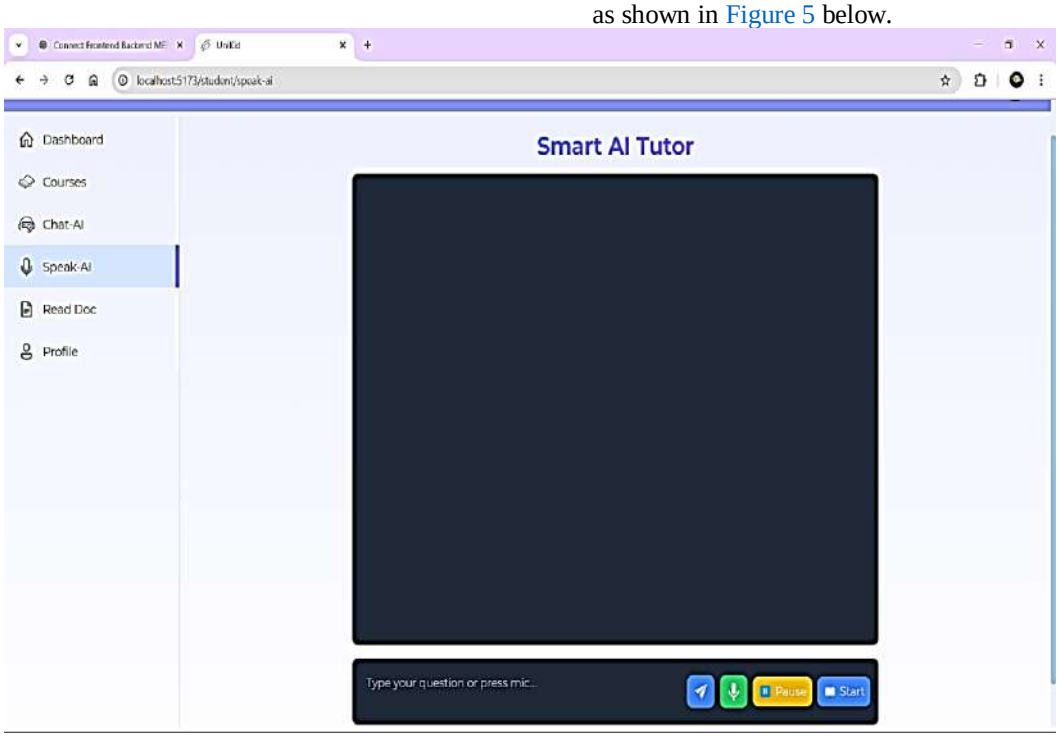

Figure 5: Speech AI with text-to speech and speech-to-text feature

- Read- Doc Reads aloud uploaded documents or text-based content for children as shown in Figure 6.
  - Uses Text-to-Speech (TTS) APIs like Gemini API

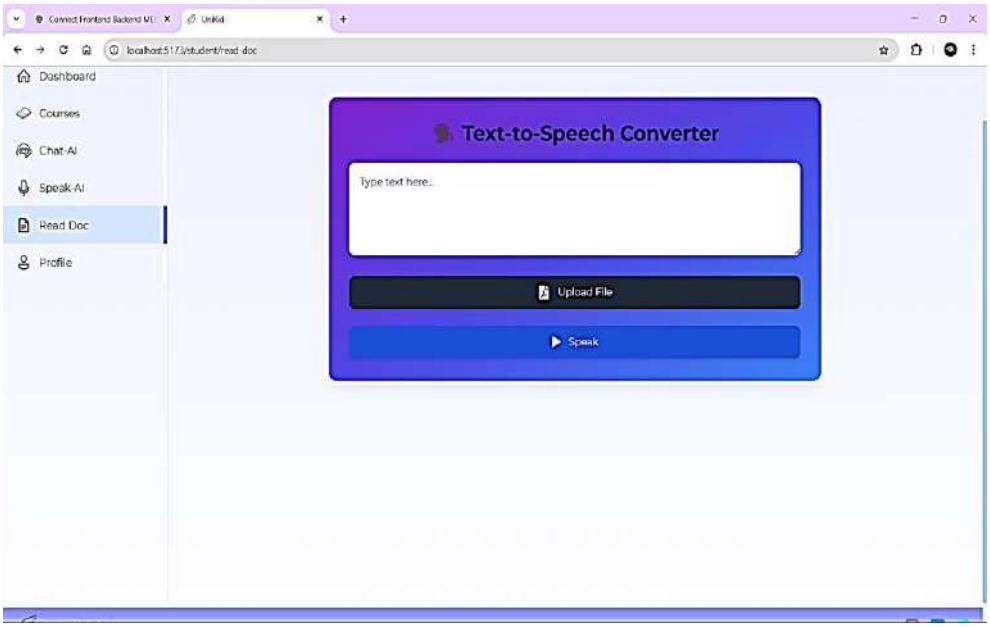

Figure 6: Read Doc page with uploading feature

IV. POPULAR LEARNING APPLICATION FOR SPECIAL KIDS

- Flashcards Deluxe – iOS – $3.99: Electronic flashcards are a great tool for helping students with dyslexia practice reading independently. Flashcards Deluxe lets you design flashcards with two sides, add images and change the way the text looks on the card, as well as built-in text-to-speech support.
- Spell Better – iOS – $9.99: As far as word processors go, Spell Better is like others in that it provides spelling support by suggesting words as the characters are typed. However, the app offers better literacy support than most by displaying the meanings of words and their pronunciations when students tap and hold a word in the prediction bar, helping students expand their vocabulary.
- Ghotit Real Writer: Ghotit is a learning disabilities app that specializes in the needs of kids with dyslexia and writing difficulties. It applies more advanced technology to correct and improve spelling, grammar, and structure in writing. In this case, it may correct some common mistakes the child with dyslexia makes, such as phonetic spelling, and try to make them write with more correctness by using corrections based on context.
- Reading Rockets: Children with dyslexia or other reading challenges are the focus of this application. The program includes a number of interactive resources aimed at improving children's fluency, phonics and reading comprehension. It applies multi-sensory techniques, including visual, auditory, and kinesthetic ways, for the children to understand the concepts of reading. For those who can't sit and focus on reading, Reading Rockets uses interactive games in reading so that children learn the essential skills.
- Voice Dream Reader: For kids who struggle with both reading and writing, Voice Dream Reader is a very useful application. Its text-to-speech feature makes reading comprehension simper for kids by letting them hear text read aloud. The application is an effective tool for kids with dyslexia, ADHD, or other learning problems since it lets users highlight text, take notes and arrange thoughts.

V. BENEFITS OF SPECIAL KID LEARNING APPLICATION

- Personalized Learning Experience:
  The application uses generative AI to provide to the specific input and replies based on different learning preferences of kids with special needs.
- Better Accessibility:
  Features like speech-to-text and text-to-speech make it easier for kids with physical disabilities, dyslexia to access content.
- Interactive and Engaging Content:
  AI-powered interactive tools make learning fun for kids with learning difficulties by fostering an engaging learning environment.
- Real-Time Feedback and Adaptability:
  The AI system continuously improves learning outcomes by learning from user interactions and modifying its replies.
- Reduction of Learning Barriers:
  SKLAD guarantees that students with special needs can access educational materials that are appropriate for their skills by accommodating a variety of limitations.
- Encourages Independence:
  By offering immediate assistance and direction without requiring continual human engagement, the program promotes autonomous learning.

VI. CHALLENGES IN SPECIAL KIDS LEARNING APPLICATION

- Complex AI Training Requirements – The effectiveness of AI depends on extensive training data specific to special needs education, which may be challenging to acquire.

- User Adaptability Issues – To properly browse and use the application, children with severe disabilities might need extra assistance.
- Technical Restrictions – Text-to-speech and voice recognition software may have trouble understanding background noise, speech impediments or various accents.
- Privacy and Ethical Issues – In order to safeguard kid's information, AI-driven app that handle sensitive data must abide by privacy laws.
- Reliance on Internet Connectivity – Because SKLAD is a web-based application, it necessitates constant internet access, which not all users may have.
- Potential Bias in AI Models – Unless AI algorithms are updated and improved upon on a regular basis, they may not fully comprehend the various demands of all unique children.

VII. CONCLUSION

The Special Kid Learning Application Development (SKLAD) with use of AI in special education shows how technology can help children with disabilities learn more effectively. The application improves accessibility and interaction through interactive content, adaptive support and personalized learning experiences. Despite difficulties like ethical difficulties and problems with AI training, continued innovation can increase its effectiveness. This study emphasizes how AI technologies are necessary to create a welcoming and supportive learning environment for children with special needs.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

REFERENCES

1. S. Rajeev and Dr. Shraddha Verma, "Enhancing Special Education through Mobile Applications: A Comprehensive Analysis," *vol. 09, no. 1*, 2024. Available from: [URL not provided]
2. R. Skiada, E. Soroniati, A. Gardeli, and D. Zissis, "EasyLexia: A Mobile Application for Children with Learning Difficulties," *Procedia Computer Science*, vol. 27, 2014. Available from: https://doi.org/10.1016/j.procs.2014.02.025
3. Soykan and F. Ozdamli, "Development process of instructional mobile application for special needs children," *International Journal of Technology Enhanced Learning*, vol. 11, no. 3, Apr. 2019. Available from: https://doi.org/10.1504/IJTEL.2019.100482
4. Veronica, Z. Rizky W., et al., "Design and Development of Learning Applications for Special Needs Students Using Android Studio," *vol. 12, no. 11*, 2021. Available from: https://tinyurl.com/4uymvfrj
5. P. D. Barua, J. Vicnesh, et al., "Artificial Intelligence Enabled Personalised Assistive Tools to Enhance Education of Children with Neurodevelopmental Disorders—A Review," *International Journal of Environmental Research and Public Health*, vol. 19, no. 3, 2022. Available from: https://doi.org/10.3390/ijerph19031192
6. S. Panjwani-Charania and X. Zhai, "Uses of Artificial Intelligence in STEM Education," 2024. Available from: https://tinyurl.com/2m7aau9j
7. K. Dawson, P. Antonenko, H. Lane, and J. Zhu, "Assistive Technologies to Support Students with Dyslexia," *TEACHING Exceptional Children*, vol. 51, no. 3, 2018. Available from: https://doi.org/10.1177/0040059918794027
8. R. Tariq and S. Latif, "A Mobile Application to Improve Learning Performance of Dyslexic Children with Writing Difficulties," *Journal of Educational Technology & Society*, vol. 19, no. 4, 2016. Available from: https://www.jstor.org/stable/jeductechsoci.19.4.151