

Generative AI for Supporting Neurodivergent Students

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INTRODUCTION

Traditional methods of teaching constantly fail to address the unique needs of neurodivergent children (Palumbo, 2025). Research has shown that neurodivergent students thrive when information is communicated visually but educators and parents find it difficult to create individualized visual support (Palumbo, 2025).

Students with special needs struggle not only with educational materials but also task initiation and organization. The purpose of this paper is to propose a generative AI-based solution that improves accessibility, learning outcomes, and engagement for neurodivergent learners.

PROBLEM DESCRIPTION

According to Smith, Whittaker (2025), neurodiversity describes the different ways people interact with the world, laying more emphasis on the cognitive variations in how people think, speak, and behave. It includes ADHD, autism spectrum disorder, dyslexia and many more.

Neurodivergent students require more time to complete assignments, quieter spaces to work, and additional support to remain focused in classroom settings. However, there is an immense shortage in special education teachers. This is especially challenging due to the increase in neurodivergent learners in the modern world. In America alone, 7.3 million students struggle with a disability with learning disabilities being the most common.

Although many educational institutions have tried to implement certain learning management systems, many of them are not suited for the needs of this special set of students. For example, Blackboard is said to be overly cluttered and overwhelming, causing cognitive overload. The inability for these students to learn properly has led to truancy, dropouts, and absenteeism. One study shows that 92.1% of students who skip school are struggling with a learning disability.

PROPOSED AI SOLUTION

Generative AI has made significant breakthroughs in educational technologies due to its dynamic interactions, and ability to generate content in response to changing user input (Ronksley-Pavia, Nguyen, Wheeley, Rose, Nuemann, Bigum, Neumann, 2025). Generative AI's potential to generate personalized content suits many of the evidence-backed approaches for supporting neurodiversity, like differentiated instruction, multiple means of representation, and individualized support. It will also help educators in developing and executing personalized learning strategies while reducing the burden associated with individualized support programs (Ronksley-Pavia, Nguyen, Wheeley, Rose, Nuemann, Bigum, Neumann, 2025).

It is for these reasons that I am proposing a generative AI powered learning assistant that adapts content and support to individual needs. Generative AI has the ability to create new content, based on patterns and trends in large datasets. Large Language Models (LLMs), as a form of generative AI can:

- ❖ Provide simplified explanations.
- ❖ Generate visual aids because neurodivergent students thrive under visual communication.
- ❖ Create alternative formats such as audio, summaries, lists.
- ❖ Provide step-by-step guidance to help students complete tasks at their own pace.
- ❖ Draft personalized study plans suited to the students' needs.

How the AI supports neurodivergent students:

For students with ADHD: The learning assistant will create structured study plans, timers, simple checklists, and release information in chunks based on their attention span.

For students with autism (verbal and non-verbal): Will provide clear instructions, predictable communication patterns, and more clarity in its instructions.

For students with dyslexia: Assist in text-to-speech, summaries of visual aids, and dyslexia-friendly formatting.

Technologies and Models:

- i. GPT-based LLMs: They are a family of powerful AI models primarily developed by OpenAI that focus on understanding and generating human-like text and other content. An example is ChatGPT.
- ii. Multimodal AI: It is a type of AI that can understand and process different types of information such as text, images, audio, and video all at the same time (Mckinsey & Company, 2025).
- iii. Speech to text and text to speech APIs

IMPLEMENTATION METHODOLOGY

1. Data Collection:
 - a. Gather anonymous learning data such as past performance and interaction patterns of autistic students, dyslexic students, and other neurodiverse groups.
 - b. Include optional preferences and sensory needs.
2. Data Preparation:
 - a. Clean and categorize learning data into themes like attention, comprehension, and pacing.
 - b. Ensure the data is properly protected and stored according to government regulations.
3. Model Customization:
 - a. Prompt-engineer a generative AI model such as ChatGPT with sample learning materials.

- b. Add rules for neurodiverse communication. Ensure it communicates in a friendly, simple, and supportive manner.
4. System Deployment
- a. Build a simple user interface with personalized reading modes, voice input/output, a distraction-free mode, and audio/visual options.
5. Testing and Evaluation:
- a. Conduct safe tests with neurodivergent students.
 - b. Measure the impact, engagement, comprehension, task completion, and student welfare.
6. Deployment:
- a. Integration of the AI learning assistant into learning management systems like Canvas, or Google Classroom.
 - b. Provide mobile and web versions of the learning assistant for accessibility.
7. Monitoring & Continuous Learning:
- a. Monitor model performance and biases.
 - b. Collect feedback and refine prompts.

POTENTIAL CHALLENGES

Data Privacy: Sensitive educational needs require strong data privacy and protection.

Over-reliance on AI: Students may become too dependent on AI support rather than developing independent skills.

Access and Infrastructure: Not all neurodivergent students have access to reliable internet or devices.

REAL WORLD EXAMPLES

Microsoft immersive reader provides support for dyslexic students. ChatGPT's ADHD study planners have also proved effective in providing structure to learners suffering from ADHD. The learning assistant I am proposing builds on the existing approaches by providing more personalized support and neurodiverse specific designs.

CONCLUSION

Neurodivergent students require more support than the average student and due to the inability of teachers and parents to fully provide this support, generative AI can step in. It can provide personalized, accessible, and adaptive learning support on a greater scale. AI can help transform education into a more inclusive and responsive system.

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