

# Chapter 8

## Exploring the Efficacy of Adaptive Learning Platforms Enhanced by Artificial Intelligence: A Comprehensive Review

**Puneet Kumar**

*Kalinga University, India*

**Sangeet Vashishtha**

*IIMT University, India*

**Pooja Sharma**

*IIMT University, India*

**Ekansh Agarwal**

 <https://orcid.org/0000-0001-5497-8838>

*NIMS University, India*

### ABSTRACT

*This research study explores the rapidly growing area of AI-powered adaptive learning systems and how they are influencing individualised education. The purpose of this research is to examine these systems' capacities to improve education for students from a variety of backgrounds, as well as their limitations and opportunities. Adaptive learning, which includes data analytics, machine learning models, and algorithms driven by artificial intelligence, is the focus of this review. Learners' requirements and preferences are taken into account as these technologies adapt the delivery of content, tempo, and evaluation methods to each individual. The study also looks at how adaptive learning platforms driven by AI affect students' motivation, grades, and ability to remember what they've learned. Additionally, the authors look into ethical concerns related to data privacy, algorithmic biases, and fair access to technology.*

DOI: 10.4018/979-8-3693-2440-0.ch008

## **INTRODUCTION**

Many of the goals set forward to improve learning and instruction are not being reached today. Teachers are looking for scalable, safe, and effective ways to fulfil these concerns with the help of technology. Educators naturally ponder if the swift advancements in technology in daily life could be beneficial. Like everyone else, educators make use of AI-powered services in their daily lives. Examples include automated travel planning on their phones, voice assistants in their homes, and tools that can write essays, fix grammar, and complete sentences. Since AI tools are only now available to the general public, many educators are looking into them. Teachers see potential to leverage AI-powered features like speech recognition to improve the support provided to multilingual students, students with impairments, and other learners who could gain from more personalisation and adaptability in digital learning resources. They are investigating how AI can facilitate the creation of new lessons or enhance existing ones, as well as how they locate, choose, and modify resources for their lessons (Cruz, 2023).

Educational technologies utilize artificial intelligence & adaptive methods of learning to assess learners' performance and offer tailored feedback and suggestions (Aida & other, 2023). This facilitates the identification of areas that require improvement and allows for the customization of learning experiences accordingly. Adaptive learning as well as artificial intelligence (AI) are currently influential technologies in the education sector, fundamentally transforming conventional teaching approaches. This examines the incorporation of technology for adaptive learning using AI algorithms to customize and improve the learning experience of students (Singh et al., 2022; Rathi et al., 2023). AI facilitates the gathering and examination of extensive data, allowing the system to customize and adjust the content and distribution of educational resources to cater to the unique requirements of each student. Through ongoing surveillance and assessment of student performance, AI systems may detect and pinpoint areas of deficiency, enabling the implementation of focused interventions to remedy them. This individualized approach not only enhances educational results but also fosters student involvement and drive. In addition, AI-driven adaptive learning systems can aid teachers via automating administrative duties, delivering immediate feedback, and producing detailed progress reports. Nevertheless, it is imperative to tackle obstacles such as privacy problems, ethical considerations, including the necessity for teacher training in order to effectively utilize these technologies. In summary, the combination of adaptive learning with AI has the potential to revolutionize education by providing individualized and efficient learning opportunities for pupils. AI-driven adaptive learning has the potential to revolutionize education in the digital era by allowing students and educators to attain the best possible results (Joshi, 2023, 2024).

The swift development of e-learning platforms, driven by developments in artificial intelligence (AI) & machine learning (ML), offers a significant potential for transformation in the field of education (Gligorea, 2023). Given the ever-changing nature of the field, it is important to investigate the integration of artificial intelligence and machine learning into adaptive learning systems in order to improve educational results. These technologies have demonstrated the ability to optimize learning paths, boost engagement, and enhance academic achievement, as seen by studies that have reported improved test scores. AI/ML integration in e-learning platforms greatly enhances the customization and efficacy of the process of learning (Easwaran et al., 2022; Mishra et al., 2021).

In a radically outdated educational context, the true role of AI is to support education as adaptive learning systems by extending its capabilities and usefulness. Two key ways that technology will support academic success are by removing physical barriers to learning and, as a result, shifting the emphasis from data maintenance to data utilisation. To understand routes' cost and influence in adaptive learning

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