

# To What Extent Can AI Personalize Learning Experiences Compared To Traditional Teaching Methods?

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## Abstract:

*This study examines the extent to which artificial intelligence (AI) can personalise learning experiences in comparison to traditional teaching methods. With the increasing integration of AI-based tools in education, institutions are adopting adaptive learning platforms, AI tutors, and data-driven learning management systems to address diverse student needs. AI enables personalised learning by analysing large volumes of student data, adjusting instructional content, learning pace, and feedback to match individual abilities. Such systems support self-paced learning, provide instant feedback, and help identify learning gaps more efficiently than conventional assessment methods.*

*However, the study also highlights the limitations of AI-based personalisation. While AI is effective in supporting academic learning, it lacks emotional intelligence, contextual awareness, and moral judgment. Traditional teaching methods remain essential for fostering critical thinking, emotional support, classroom management, social development, and values education. Teachers play a vital role in motivating students, responding to behavioural cues, and guiding learners through personal and academic challenges—areas where AI cannot fully replicate human interaction.*

*The findings suggest that AI is most effective when used as a supplementary tool rather than a replacement for teachers. A blended learning approach that combines AI-based personalisation with teacher-led instruction offers the most balanced and effective educational model. This approach addresses both academic efficiency and holistic student development, particularly in high school education where emotional and social growth are crucial.*

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## I. Introduction

### Understanding Artificial Intelligence in Education

Artificial intelligence (AI) refers to a technology that enables computers and machines to simulate human learning, comprehension, problem-solving, and autonomy. In the context of education, AI can be highly beneficial in recognising learning patterns and supporting informed decision-making to strengthen the learning process. By generating personalised learning experiences, simplifying administrative tasks, and providing data-driven insights, AI has significantly transformed modern education systems. Common AI applications in education include learning analytics systems, AI tutors, and adaptive learning platforms. These technologies adjust the pace and level of difficulty based on individual student performance, ensuring that learning experiences are tailored to each learner's needs. AI tutors, such as chat-based study assistants and AI-powered mathematics tutors, also offer instant feedback, clarification, and additional practice opportunities, closely resembling personalised tutoring support.

### Traditional Teaching Methods and Their Limitations

Traditional teaching methods largely rely on teacher-led instruction, where the teacher serves as the primary source of knowledge for a group of students. Lessons are typically delivered at a fixed pace, with all learners expected to progress through the curriculum simultaneously, regardless of individual learning speeds or abilities. While this approach provides structure, consistency, and classroom discipline, it offers limited opportunities for personalised learning and immediate feedback. As a result, students who require additional support or alternative explanations may struggle to keep up, while advanced learners may feel insufficiently challenged.

### The Shift Towards Personalised and Student-Centred Learning

Many educational institutions are increasingly adapting to technological advancements to provide more student-centred learning experiences. Modern classrooms are highly diverse, with students displaying varying learning speeds, abilities, and interests. Some students understand concepts quickly, while others require more

time, repetition, or different instructional strategies to achieve the same level of understanding. This diversity demands teaching approaches that recognise and address individual learning differences rather than relying on a uniform instructional model. Personalised learning has therefore emerged as a prominent trend, allowing students to engage with content that aligns with their interests, abilities, and learning goals, making education more meaningful and relevant.

### **AI-Based Learning Versus Traditional Teaching Approaches**

Personalised learning supported by AI not only increases student engagement but also encourages long-term commitment by making learning more interactive and relevant. AI systems provide instant feedback, helping learners quickly identify and correct mistakes, while data-driven insights enable continuous adjustments to instruction based on learning patterns. In contrast, traditional teaching methods often struggle to achieve this level of personalisation due to time constraints and large class sizes, which limit teachers' ability to address individual needs. Therefore, the research question guiding this study is: ***"To what extent can AI personalise learning experiences compared to traditional teaching methods?"*** This research aims to evaluate the effectiveness, strengths, and limitations of AI-based learning in comparison with traditional approaches, ultimately determining which method better supports individual learning needs based on learners' abilities.

### **Objectives**

The main objectives of the study are:

- To examine the extent to which artificial intelligence can personalise learning experiences by adapting content, learning pace, and feedback to meet individual student needs in comparison to traditional teaching methods.
- To analyse the strengths and limitations of AI-based learning and traditional instruction in supporting academic performance, emotional development, classroom engagement, and moral guidance.
- To evaluate the effectiveness of a blended learning approach that integrates AI-based tools with teacher-led instruction in addressing both academic and holistic development needs of students, particularly in high school education.

## **II. Research Findings**

### **AI-Based Learning Management Systems and Personalised Instruction**

Institutes that integrate technology into their daily curriculum often use AI-based Learning Management Systems (LMS), which are digital platforms designed to enhance the management and delivery of educational content through artificial intelligence. AI personalises learning by analysing student data and adapting instruction to individual needs rather than applying a single uniform approach to the entire class. One of the key features of AI-driven learning is adaptive content based on student performance. These systems continuously analyse how students respond to questions and activities, identifying strengths and areas that require improvement. Based on this analysis, the system adjusts the difficulty level, type of questions, and learning materials accordingly. Platforms such as **Khan Academy** and **Duolingo** modify their pace and degree of difficulty according to learner performance, allowing students to revise concepts or progress to advanced content as needed. In addition, AI tutors, including chat-based study assistants and AI-powered mathematics tutors, provide instant feedback, clarifications, and additional practice, closely resembling personalised tutoring support. Applications like **Google Classroom** and **Canvas** also use personalised feedback and learning analytics to monitor student progress and identify learning gaps, enabling learners to progress at a pace that aligns with their individual abilities.

### **Personalisation in Traditional Teaching Methods**

In contrast, traditional teaching methods rely on personalisation through teachers' professional judgment and direct interaction with students. One commonly used approach is differentiated instruction, where teachers adjust teaching strategies, learning materials, or levels of support based on students' needs. For example, a teacher may simplify explanations, provide additional guidance, or reduce support depending on a student's level of understanding. Group work and peer learning also play a significant role in traditional classrooms by enabling personalised learning experiences. By forming groups based on similar interests or mixed ability levels, teachers encourage collaboration, discussion, and shared problem-solving. Peer learning can help lower-ability students gain confidence while reinforcing understanding among higher-ability learners. Furthermore, teacher observation and feedback are essential components of traditional learning. Teachers continuously assess student behaviour, participation, and progress, allowing them to modify instruction and provide qualitative feedback that extends beyond academic performance. A major strength of traditional teaching lies in the human element, as teachers can motivate, guide, and emotionally support students in ways that technology alone cannot fully replicate.

### **Impact of AI and the Irreplaceable Role of Teachers**

Recent educational reports indicate that artificial intelligence can positively influence student engagement and academic performance. An article published by **FXM Web** suggests that AI-driven personalised content enhances student engagement by aligning learning materials with individual skill levels. Adaptive learning platforms and AI-based feedback systems encourage active participation, particularly in subjects that require continuous practice, thereby improving academic outcomes. The report also highlights that AI supports self-paced learning, allowing students to revisit concepts multiple times and progress once they feel confident, reducing reliance on teacher-led instruction. However, research also emphasises the indispensable role of teachers in education. An article by **DigitalDefynd** argues that while AI can assist in instructional delivery, it cannot replace teachers in providing guidance, discipline, and moral support. Human judgment, empathy, and emotional intelligence remain crucial for motivating students and addressing their social and emotional needs—areas where AI continues to have significant limitations.

## **III. Analysis & Discussion**

### **Role of AI in Data-Driven Personalised Learning**

Artificial intelligence's ability to efficiently process and analyse large volumes of student data makes it a powerful tool for personalised learning. AI systems continuously collect information from student interactions, such as responses to questions, task completion time, and recurring error patterns. Through this data analysis, AI can quickly identify learning gaps that may not be immediately visible in traditional classroom environments. This enables timely modification of learning materials, ensuring that students receive targeted support where it is most needed. Furthermore, AI provides immediate feedback by responding instantly to student input, unlike traditional assessment methods where feedback is often delayed. Instant feedback helps reduce repeated mistakes, promotes conceptual clarity, and supports effective learning by allowing students to correct misunderstandings before they become deeply embedded.

### **Supporting Learners with Different Learning Speeds**

AI-based personalisation is particularly beneficial for students who learn at different speeds. Rather than being constrained by a fixed classroom pace, AI allows learners to progress through content according to their individual level of understanding. Students who grasp concepts quickly can move on to more advanced material, while those who require additional time can revisit concepts and practise repeatedly without the pressure of keeping up with peers. AI provides tailored practice, reinforcement, and scaffolding to students who need extra support, which helps build confidence and improve learning outcomes. This flexibility ensures that learning becomes more inclusive and responsive to individual needs.

### **Limitations and Ethical Concerns of AI-Based Personalisation**

Despite its strengths, AI-based personalisation has several limitations that restrict its effectiveness in daily learning environments. One major limitation is the lack of empathy and emotional intelligence. While AI can analyse academic performance, it cannot genuinely understand emotions such as stress, anxiety, or insecurity, nor can it respond with emotional sensitivity in the way a human teacher can. Another concern is the risk of over-reliance on technology. Excessive dependence on AI tools may reduce meaningful teacher–student interaction, potentially affecting students' communication skills, collaboration, resilience, and independent problem-solving abilities.

Additionally, data privacy and ethical issues pose significant challenges. AI systems require large amounts of student data, raising concerns about consent, data security, and potential misuse of personal information. Algorithmic bias is another risk, as biased or incomplete data can reinforce existing inequalities. Furthermore, AI lacks contextual awareness of social, cultural, and classroom dynamics. Unlike human educators, AI cannot interpret body language or cultural nuances, limiting its ability to respond effectively to complex classroom situations. These limitations highlight the importance of using AI as a supportive tool rather than a replacement for human instruction.

### **Strengths of Traditional Teaching and the Need for a Balanced Approach**

Due to these limitations, teachers continue to play a crucial role in students' academic and personal development, making traditional teaching a powerful and effective approach. One of its key strengths lies in fostering critical thinking through open-ended questioning, discussion, and debate. Teachers can respond dynamically to student ideas, encourage multiple perspectives, and promote independent thought. By observing students' body language, behaviour, and engagement levels, teachers can identify emotional or academic struggles and provide encouragement, reassurance, and personalised guidance.

Traditional teaching also excels in classroom management, moral education, and values development. Teachers create structured learning environments, manage discipline, and model ethical behaviour, fairness, and

respect. Through discussions of real-life situations, cultural norms, and social responsibilities, teachers help students develop moral reasoning—an area where AI has significant limitations due to its lack of human judgment and cultural awareness.

Overall, while AI is highly effective in enhancing academic personalisation and efficiency through adaptive content, instant feedback, and flexible pacing, it cannot fully replace the human elements of teaching. Teachers remain essential for emotional support, moral guidance, and holistic development. Therefore, the most effective educational approach is a balanced one, where AI-based personalisation complements traditional teaching methods, combining technological efficiency with human empathy and judgment to create a truly learner-centred education system.

#### **IV. Conclusion:**

##### **Summary of the Discussion**

This study highlights the distinct yet complementary roles of artificial intelligence and traditional teaching methods in education. AI has proven to be highly effective in academic personalisation by using data-driven and adaptive systems to modify content, pace, and feedback according to individual student needs. This enables learners to progress based on their abilities and supports students who require additional academic assistance. However, the discussion also emphasises that traditional teaching remains essential for aspects of learning that extend beyond academics. Teachers provide emotional support, motivation, classroom management, social development, and moral guidance—elements that AI systems are currently unable to replicate. The findings suggest that both approaches contribute uniquely to the learning process.

##### **Answer to the Research Question**

The research question, “To what extent can AI personalise learning experiences compared to traditional teaching methods?”, is addressed through the findings of this study. The results indicate that AI can significantly personalise learning in terms of academic delivery by adapting instructional materials, learning pace, and feedback to suit individual learners. AI effectively supports personalised learning pathways and reduces academic disparities through continuous data analysis. However, AI cannot fully replace traditional teaching methods, as it lacks emotional intelligence, moral judgment, and the ability to manage classroom dynamics. Therefore, while AI enhances academic personalisation, it functions most effectively when used alongside teacher-led instruction rather than as a replacement for it.

##### **Limitations of the Study**

Despite its findings, this research has several limitations. First, the study primarily focuses on the academic and developmental aspects of AI and traditional teaching without extensive empirical classroom-based experimentation. Second, the rapidly evolving nature of AI technology means that findings may change as systems become more advanced. Additionally, the study does not deeply explore variations across different socio-economic contexts, access to technology, or differences between subject areas. Ethical concerns such as data privacy, algorithmic bias, and unequal access to AI tools were discussed conceptually but not examined through primary data.

##### **Areas for Further Research**

Future research could explore the long-term impact of AI-supported learning on students’ critical thinking, creativity, and emotional development. Studies involving real classroom implementations across different age groups, especially in high school education, would provide more concrete insights into the effectiveness of blended learning approaches. Further research could also examine how teachers can be trained to integrate AI tools effectively without reducing meaningful human interaction. Additionally, investigating ethical frameworks, data protection policies, and strategies to minimise algorithmic bias would be valuable in ensuring responsible and inclusive use of AI in education.

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