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## A STUDY OF ARTIFICIAL INTELLIGENCE (AI) AND ITS IMPACT ON STUDENTS' IN TEACHING-LEARNING PROCESS

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### Absract

The paper will provide an overview of Artificial Intelligence (AI) in Teaching- Learning process and help the students to gain an understanding of AI technologies in the educational setting. Additionally, this study examines the impact of artificial intelligence (AI) technologies on the Teaching- Learning processes and academic performance of students. The research aims to explore the types of AI technologies utilized, the frequency of their use, and students' perceptions regarding their effectiveness in improving academic performance. 70 participants were selected to ensure relevance. Data were collected through a structured questionnaire comprising 11 items through Google Form. The findings reveal that AI offers significant benefits, including personalized learning, improved academic outcomes, and enhanced student engagement.

**Keywords:** Artificial Intelligence, Personalized Learning , Administrative Tasks.

### Objectives:

- To study the basics of Artificial Intelligence (AI) in Teaching- Learning process.
- To explore the use of artificial intelligence technologies in Teaching- Learning process.
- To investigate the frequency of artificial intelligence tool usage in academic activities.
- To investigate students' perception of the impact of artificial intelligence (AI) use in their learning process (exams, projects, and grades).
- To study the overall impact of AI usage in teaching learning.

### INTRODUCTION

Artificial Intelligence (AI) plays a significant role in every aspect of life. One such important sector is AI in education. AI aims to create intelligent computer systems that can handle challenging problems. The education system also has a wide range of applications for this technology. The use of AI applications in the education field can assist our teachers in increasing their efficiency by sparing them to perform high-level intellectual tasks in teaching. Applications such as intelligent tutoring systems, educational robots, learning analytics dashboards, adaptive learning platforms, and human-computer interactions have demonstrated significant potential for enhancing teaching and learning. For example, intelligent tutoring systems have been shown to provide personalized feedback and support, improving student engagement and learning outcomes. Similarly, adaptive learning platforms leverage AI to tailor educational content to individual learners' needs, promoting more effective and efficient learning experiences. In the present scenario, University Grant Commission (UGC) has also recommended the application of modern techniques including hybrid methods. It is realized that the AI technique can fill the quality gap in the education system so it requires due importance. AI plays a significant role in both general and higher education, influencing students' academic development by offering a mix of opportunities and challenges. AI has the potential to revolutionize education and address the diverse needs of learners. However, positive educational outcomes are not guaranteed solely by the adoption of advanced AI technologies. However, the rapid information processing and insightful responses provided by AI challenge traditional learning methods, raising questions about the distinctions between human learning and machine-based learning. For example, while AI can efficiently process and analyze data, it may lack the nuanced understanding and creativity inherent in human cognition. This underscores the need for a balanced approach to AI integration, ensuring that it complements rather than replaces human interaction and the



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development of critical thinking skills. AI holds immense potential to transform education through personalized learning and adaptive systems.

## ARTIFICIAL INTELLIGENCE

Artificial intelligence is the use of a computer or computer-enabled system's capacity to process information and provides results that are similar to human logical behaviour in problem-solving and decision-making.

### APPLICATIONS OF ARTIFICIAL INTELLIGENCE (AI):

- Humanoid robot teachers can assist human teachers in delivering lectures to their students and can make teaching more interesting using AI capabilities.
- AI can help in creating personalized teaching patterns for individuals as per their potential in different areas of learning. It can analyze the knowledge gap and preferences of individual students.
- Artificial Intelligence can play an important role in tutoring students by solving their doubts outside the classroom.
- AI-powered grading software uses machine learning techniques by replicating a human teacher's grading pattern in education.
- Natural Language Processing Assist students in making necessary corrections in relation to their documents and reports. Such as AI-enabled software that provides suggestions related to errors present in the document like Grammarly is an example of it.
- People can explore and engage with a three-dimensional computer-generated environment known as virtual reality. By incorporating experiential learning into their lessons, VR educators are redefining what it means to be a student.
- AI can help the administration in organizing their tasks such as rescheduling curriculum, rescheduling classes, making attendance, grading paper, sharing reports of the students automatically to their parents, etc. It will help in reducing manual work along with help in the reduction of the use of paper and can be considered beneficial for the environment.
- AI-based software tools will help in the creation of smart content. It can also help in keeping the information up to date.

### RESEARCH REVIEW

The use of AI in teaching learning process is not without its challenges. The effective integration of artificial intelligence in teaching learning requires a thorough understanding of both the technology and the learning process. This complexity is further heightened by ethical concerns, especially in the context of the increasing use of generative artificial intelligence.

According to **O'Neil, 2016** , Ethical concerns, such as data privacy, algorithmic bias, and the digital divide, must also be addressed to ensure equitable and inclusive learning environments. However, the rapid information processing and insightful responses provided by AI challenge traditional learning methods, raising questions about the distinctions between human learning and machine-based learning. For example, while AI can efficiently process and analyze data, it may lack the nuanced understanding and creativity inherent in human cognition (**Luckin et al., 2016**). According to **Williamson, 2017**, the concerns about the application of AI in surveillance, control, and assessment practices could undermine trust and autonomy in educational settings. Studies have shown that students in personalized learning environments exhibit improved self-efficacy and a more positive attitude toward their education (**Johnson & Smith, 2019**). In traditional education, students are encouraged to take an active role in their learning process by developing skills in exploration, analysis, and problem solving. Critical thinking skills are essential for shaping students' overall learning experiences. Educators often rely on questioning techniques, collaborative activities, and assignments to enhance students' ability to evaluate information and develop independent perspectives (**Facione, 2020**). From personalized learning experiences to intelligent tutoring systems that provide tailored guidance, support, and feedback based on individual learning patterns and knowledge levels (**Hwang**



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et al., 2020). These experiences are increasingly achievable through AI-driven tools that analyze vast amounts of data to identify learning gaps and tailor interventions accordingly (J. A. Baker, 2021). According to Holmes & Tuomi, 2022 “Higher education institutions must clearly define the role and extent of AI in student education to address these challenges effectively”. A key challenge is ensuring AI complements, rather than replaces, human interaction. While AI automates tasks and provides data-driven insights, it lacks the empathy, creativity, and nuanced understanding of human educators (Holmes & Tuomi, 2022). For instance, Qadir (2023) highlights the risk of students misusing AI tools in dishonest or unauthorized ways, such as using AI-generated content to complete assignments without proper attribution. The integration of AI in academic environments raises critical questions related to equity, accessibility, and the evolving role of traditional teaching methods. The influence of AI on education is transformative and multifaceted. AI enables personalized learning by adapting educational content to meet the unique needs of individual students (Hennekeuser et al., 2024).

## SAMPLE

The sample consisted of 70 students of 11<sup>th</sup> class, purposefully selected, which emphasize AI integration. A purposive, non-probabilistic sampling method was employed to ensure the selection of participants with direct experience in AI-integrated learning environments, thus enhancing the relevance of the findings.

## DATA COLLECTION

Digital platform was used to collect data from the sample students. This platform was chosen for its user-friendly interface and integrated analytical tools, which facilitated efficient data management and interpretation. A self-administered questionnaire consisted of 11 items distributed via Google Forms.

## METHOD AND TECHNIQUES USED

Descriptive method was used in this research and frequency and percentage calculations as statistical techniques were utilized.

## ANALYSIS AND INTERPRETATION

For providing a clear overview of students’ perceptions, usage patterns, and the perceived effectiveness of AI tools, data were analyzed using descriptive statistical methods, including frequency and percentage calculations. The analysis was conducted at two levels as follows: vertical analysis, which focused on individual responses to identify unique insights; and horizontal analysis, which examined patterns across the entire dataset to ensure a comprehensive understanding of emerging themes. To enhance the validity and reliability of the findings, the analysis adhered to a structured, process including the transcription of participants’ responses and calculation of statistical indicators. The data interpretation involved addressing each research question both quantitatively, by calculating frequencies within specific thematic categories; and qualitatively, through the statistical analysis of the participants’ responses.

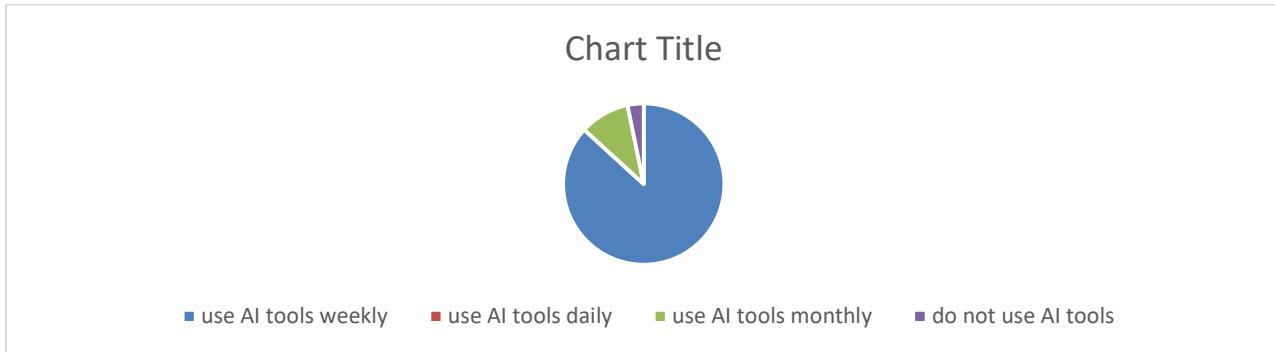
### • ACCORDING TO THE STATISTICAL DATA OBTAINED REGARDING THE USE OF ARTIFICIAL INTELLIGENCE

It was shown from Table-1 that 94.2% of respondents use artificial intelligence technologies in academic activities. This high percentage suggests the widespread adoption of AI tools among students, reflecting the increasing integration of advanced technologies into the educational landscape. Furthermore, as shown from table-1, the main types of AI used in academic activities, 71.3% of respondents use virtual assistants (e.g., ChatGPT, Siri, Google Assistant, etc.), 18.6% of respondents use AI-based educational platforms (e.g., Coursera, Duolingo, etc.), 4.3% of respondents use other types of AI.



**Table-1**

AI used in academic activities	71.3%
AI-based educational platforms	18.6%
use other types of AI	4.3%
Overall use of artificial intelligence	94.2%



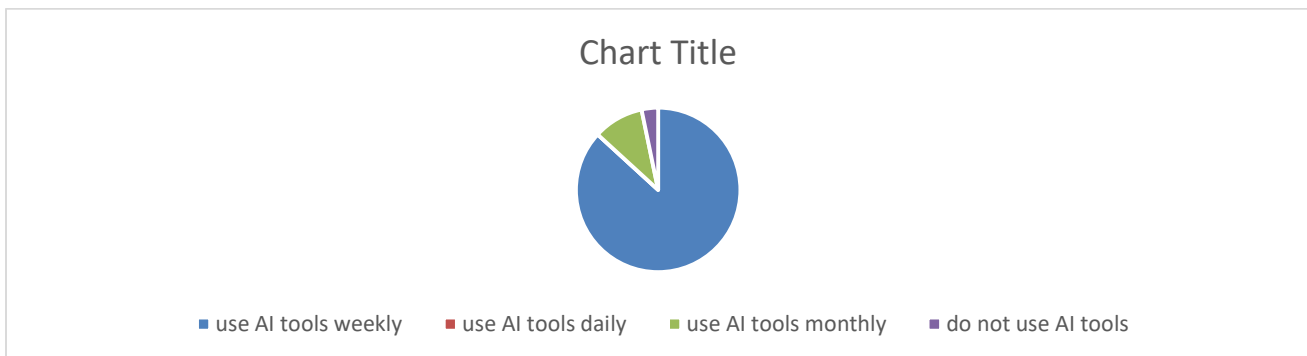
The results of the analysis suggest that AI usage in academia is already a well-established practice, with a clear preference for virtual assistants and AI-based educational platforms. This reflects a global trend towards the integration of interactive and accessible technologies in the educational process.

**• ACCORDING TO THE FREQUENCY OF ARTIFICIAL INTELLIGENCE TOOL USAGE IN ACADEMIC ACTIVITIES.**

The results show from table-2 that significant variation among students, with data indicating the widespread adoption of these technologies. Most students 74.3% use them weekly, suggesting that these tools have become an integral part of the educational process, assisting with homework, projects, and knowledge enhancement. A considerable percentage, 14.3%, use AI daily, indicating a higher reliance on these technologies, possibly because they consider them essential for learning—whether through virtual assistants, educational platforms, or other AI-based tools. On the other hand, 8.5% of students use AI monthly. Only 2.8% of students stated that they do not use AI tools in teaching learning.

**Table-2**

use AI tools weekly	74.3%
use AI tools daily	14.3%,
use AI tools monthly	8.5%
do not use AI tools	2.8%





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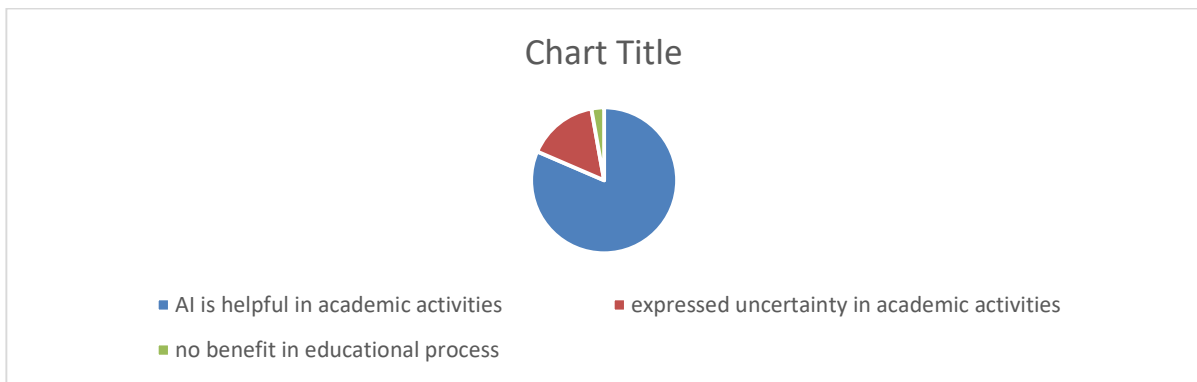


• **ACCORDING TO STUDENTS’ PERCEPTION OF THE IMPACT OF ARTIFICIAL INTELLIGENCE (AI) USE IN THEIR LEARNING PROCESS (EXAMS, PROJECTS, AND GRADES)**

From table-3 the results showed a significant majority of students i.e. 81.4% believe that AI is helpful in their academic activities. According to them using AI-based technologies enhances their educational experience by optimizing the time spent studying and providing quick access to personalized educational resources that facilitate their understanding of complex materials. However, 15.7% of students expressed uncertainty about the effects of AI on their learning, which may suggest either limited use or a lack of familiarity with the potential of these tools. In contrast, only 2.8% of students considered AI to be of no benefit to their educational process. These students might prefer traditional learning methods or may face difficulties in using these technologies, limiting their understanding of AI’s potential in supporting their studies.

Table-3

AI is helpful in academic activities	81.4%
expressed uncertainty in academic activities	15.7%
no benefit in educational process	2.8%



• **ACCORDING TO OVERALL IMPACT OF AI USAGE IN TEACHING LEARNING**

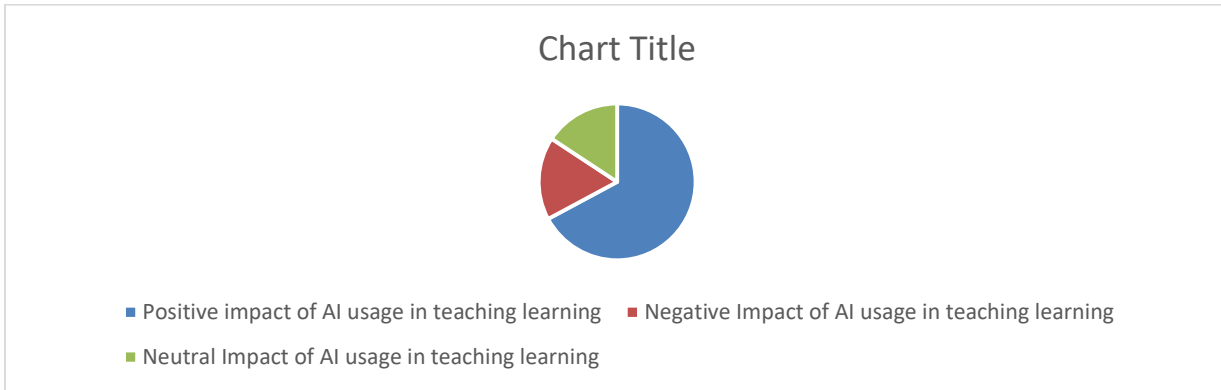
For describing the Overall impact of AI usage in teaching learning, we identified three categories i.e. Positive impact, Negative Impact and Neutral Impact. It was shown from table-4 that Positive impact of AI usage in teaching learning (47 responses) : A large number of respondents viewed AI as a valuable tool for enhancing learning and collaboration. AI was seen as facilitating access to resources, providing personalized content, and improving communication with peers and instructors. Furthermore, results show that Negative Impact of AI usage in teaching learning (12 responses): Some participants experienced challenges, such as over-reliance on AI reducing critical thinking, a lack of human interaction, and concerns about the accuracy or suitability of AI-generated content. Moreover, results also show that Neutral Impact of AI usage in teaching learning (11 responses): Some participants perceived no significant shift in their learning or collaboration due to AI. They found AI tools useful but not transformative, suggesting that AI supplements rather than fundamentally alters their academic interactions.

Table-4

Positive impact of AI usage in teaching learning	67.1%
Negative Impact of AI usage in teaching learning	17.1%
Neutral Impact of AI usage in teaching learning	15.7%



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The results reveal a generally positive outlook on AI’s integration into academic environments, with most respondents reporting enhanced learning experiences.

### FINDINGS

- The results show that 94.2% of respondents use AI in their academic activities. Virtual assistants are the most used AI applications (71.3%), providing support for information retrieval, task management, and real-time feedback.
- 18.6% of respondents use AI-based educational platforms, reflecting a shift toward personalized and interactive learning.
- 74.3% students use AI tools weekly, suggesting that these tools have become an integral part of the educational process, assisting with homework, projects, and knowledge enhancement.
- 14.3%, use AI daily, indicating a higher reliance on these technologies, possibly because they consider them essential for learning.
- 8.5% of students use AI monthly.
- 2.8% of students stated that they do not use AI tools in teaching learning.
- The results showed 81.4% students believe that AI is helpful in their academic activities. However, 15.7% of students expressed uncertainty about the effects of AI on their learning.
- 2.8% of students considered AI to be of no benefit to their educational process.

### CONCLUSIONS

The main role of AI in education is the automation of both academic and administrative tasks, personalized learning, smart content, and all-time accessibility. Over the course of time, AI has resolved the issue of accessibility in several fields like health, environment, etc. India’s potential for AI growth has made it unavoidable for the country to integrate technology into education in order to take advantage of it and better educate India’s young people for the future. Based on the above results, we conclude that AI offers significant benefits, such as personalized learning, improved educational outcomes, and increased student engagement. The responsible implementation of AI in education can bring significant benefits, contributing to more adaptable and efficient academic preparation. AI should not replace traditional methods but should complement them, offering a personalized and optimized learning experience. However, it also presents challenges, such as over-reliance on technology, diminished critical thinking, and the risk of academic fraud. Educational institutions must adopt data protection measures and prevent bias, carefully weighing the pros and cons of AI implementation. In conclusion, while AI holds immense potential to enhance learning efficiency and academic performance, its successful implementation requires addressing concerns related to accuracy, cognitive disengagement, and ethical implications. A balanced approach is essential to ensure equitable, effective, and responsible learning experiences in AI-enhanced educational environments.



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## SUGGESTIONS

- The impact of AI on critical thinking and creativity should be extensively investigated.
- Future research with a larger, more diverse sample should be conducted to provide more robust insights. Research should include students from various academic disciplines, years of study, and demographic backgrounds, offering a more comprehensive understanding of AI's impact on students in different educational contexts.
- Studies should adopt longitudinal designs with larger, more diverse samples to better understand the long-term effects of AI on academic outcomes and career development.
- Institutions should implement training programs for both educators and students to foster a thorough understanding of AI tools and their proper use.

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