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Artificial Intelligence Academic Usage and Its Impact on Students: A Survey-Based Study

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Abstract- Artificial Intelligence (AI) has rapidly emerged as a transformative change in higher education, reshaping how students learn, solve problems, and engage with academic tasks. From generating content and assisting with coding to providing personalized learning support, AI-powered tools are increasingly becoming integral part to the academic experience. AI tools such as ChatGPT, DeepSeek, Grammarly, Claude are significantly influencing the academic environment in engineering education. The present study investigates the usage patterns, perceived benefits, and educational impact of AI tools among engineering students. A survey was done in engineering colleges and data were collected through purposive sampling from 96 engineering students through a structured questionnaire titled *AI Academic Usage and Impact Scale (AAUIS)*. The collected data was analysed using excel, the findings reveal that the majority of students use AI tools daily or several times a week for learning technical concepts, project documentation, coding support, brainstorming, and assignment completion. Most students felt that AI tools help them learn more efficiently by saving time, simplifying complex concepts, and supporting their academic work. Many reported that these tools make studying, coding, and completing assignments easier and more productive. At the same time, some students expressed concerns that excessive reliance on AI may reduce independent thinking, creativity, and problem-solving skills. The study suggests that AI has become an important part of engineering students' learning experiences; however, its use should be balanced with critical thinking, responsible practices, and clear ethical guidelines to ensure that technology supports, rather than replaces, meaningful learning.

Keywords: Artificial Intelligence, Academic Usage, Critical Thinking.

1. Introduction

Creativity, critical thinking, and problem-solving are among the most important skills required for success in the twenty-first century. In recent years, the growing use of Artificial Intelligence (AI) has begun to influence how students learn, complete academic tasks, and access information. AI-based applications are increasingly becoming part of students' everyday learning experiences, offering support in areas such as writing, research, coding, and concept clarification. Tools such as ChatGPT, Grammarly, DeepSeek, Claude, Gemini, and Notion AI

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are now commonly used by students in higher education. These tools can help students understand difficult topics, organize ideas, improve written work, and obtain quick responses to academic questions. As a result, AI has become an important educational resource that supports learning both inside and outside the classroom. The use of AI is particularly noticeable in engineering education, where students are required to work with complex technical concepts, programming tasks, laboratory projects, and research-based assignments. Many students use AI tools to obtain explanations, troubleshoot coding problems, generate project documentation, and explore new ideas. Such support can make learning more efficient and help students manage academic workloads more effectively.

At the same time, the increasing dependence on AI has raised several concerns among educators and researchers. While these tools offer convenience and accessibility, there is an ongoing debate about their influence on creativity, independent thinking, and genuine understanding of subject matter. Some scholars argue that excessive reliance on AI may reduce opportunities for students to develop original ideas and problem-solving abilities. Questions related to ethical use, academic honesty, and responsible technology adoption have also become important areas of discussion.

As the role of AI is growing in higher education, it is important to understand how students use these technologies and how they perceive their impact on learning. The present study examines the academic use of AI tools among engineering students and explores their views regarding the benefits, challenges, and educational implications of AI-assisted learning. The findings may help educators and institutions develop strategies that encourage the responsible use of AI while preserving creativity, critical thinking, and meaningful learning experiences.

2. Review of Related Literature

Existing research suggests that Artificial Intelligence (AI) is increasingly shaping educational practices by improving access to information, supporting personalized learning, and enhancing academic efficiency. AI-powered applications such as ChatGPT, Grammarly, Gemini, and GitHub Copilot are now commonly used by students for learning support, content generation, coding assistance, and problem-solving. As a result, AI has become an important component of contemporary educational environments.

Several studies have reported positive outcomes associated with AI-assisted learning. Researchers have observed improvements in student engagement, conceptual understanding, academic performance, and learning productivity. AI-based educational platforms also provide immediate feedback and learning support, enabling students to access resources more efficiently and learn at their own pace. In engineering education, AI tools are particularly valued for assisting with coding tasks, technical documentation, simulations, and concept clarification, thereby supporting both learning and academic productivity. Despite these benefits, researchers have expressed concerns regarding the growing dependence on AI technologies. While AI can simplify academic tasks, excessive reliance on AI-generated content may reduce opportunities for independent thinking, creativity, and problem-solving. Concerns related to academic integrity, plagiarism, misinformation, and reduced cognitive engagement have also been highlighted in recent studies. These issues have prompted educators

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and policymakers to advocate for responsible AI use and the development of AI literacy among students. Recent empirical studies further support the growing role of AI in higher education. Evidence from multiple survey-based investigations involving more than 1,200 participants indicates that AI tools are widely accepted and are positively influencing learning experiences. Jain (2026) reported that 84.8% of students actively used AI tools, while 93.8% were aware of their educational applications. Similarly, Ghaffar et al. (2025) found a significant positive relationship between the frequency of AI usage and academic performance across different disciplines. Mallillin (2024) observed that AI-assisted learning effectively addresses individual learning needs and enhances student motivation. Despite these advantages, researchers have also identified several challenges associated with AI integration in education. Kulkarni (2026) highlighted concerns related to excessive dependency, reduced critical thinking, and academic dishonesty. Likewise, Vieriu and Petrea (2025) reported that over-reliance on AI tools may weaken students' analytical abilities and independent thinking. Sharma (2026) further noted that many students recognize the risk of surface-level learning when AI is used as a substitute for active engagement with course content. These findings suggest that while AI offers substantial educational benefits, its effectiveness depends on responsible and balanced use.

Overall, the literature presents a balanced perspective on AI in education. Although AI offers significant opportunities to enhance learning experiences and academic performance, its effectiveness depends largely on how it is used. The existing body of research emphasizes the importance of integrating AI in ways that support learning while preserving students' creativity, critical thinking, and intellectual independence. Although previous studies have examined the educational benefits and challenges of AI, limited research has explored the academic usage patterns and perceptions of engineering students in the Indian context. The present study attempts to address this gap by examining how engineering students use AI tools and perceive their impact on learning.

3. Objectives of the Study

1. To study the frequency of AI tool usage among engineering students.
2. To identify the major academic purposes for which AI tools are used.
3. To analyze students' perceptions regarding the educational benefits of AI tools.

4. Methodology

The present study was conducted to understand how engineering students use Artificial Intelligence (AI) tools in their academic activities and how these tools influence their learning experiences. A descriptive survey approach was adopted as it allowed the researcher to gather information about students' actual experiences, opinions, and patterns of AI usage in a natural educational setting. The study included 96 engineering students from different branches of engineering colleges in Aurangabad district, Maharashtra, who were selected through purposive sampling because they regularly used AI-based applications for academic purposes. Data were collected using a structured questionnaire, namely the AI Academic Usage and Impact Scale (AAUIS), which covered aspects such as frequency of AI usage, educational benefits, ethical concerns, creativity, and independent thinking. The tool was reviewed by

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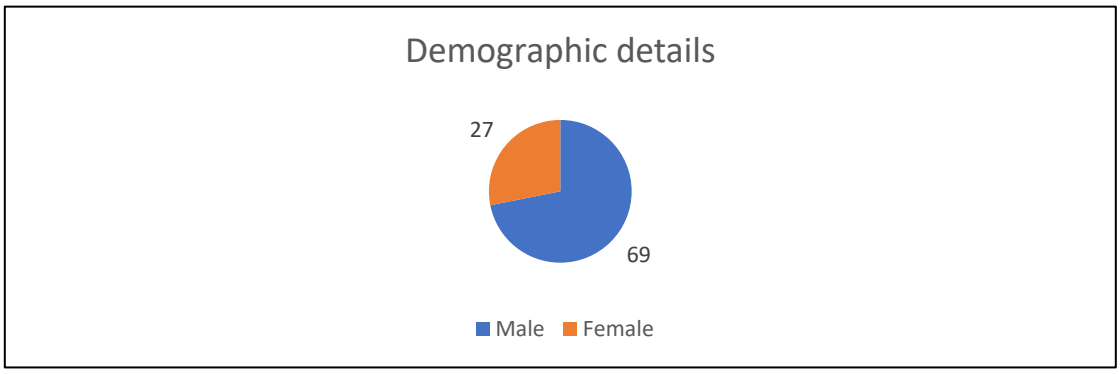

experts in educational technology and pilot tested to ensure its suitability for the study. The reliability of the AI Academic Usage and Impact Scale (AAUIS) was established using Cronbach's Alpha was 7.5 and found to be satisfactory. The questionnaire was administered online through Google Forms, and participation was voluntary. Students were informed about the purpose of the study, and the confidentiality of their responses was maintained throughout the research process. The collected data were analyzed using frequency, percentage, and mean statistics, while qualitative responses were examined through thematic analysis to gain deeper insights into students' experiences and perceptions regarding the use of AI in education.

5. Data Analysis and Interpretation

5.1 Demographic details of respondents:

Table 5.1: Demographic details

Gender	Frequency	Percentage
Male	69	71.9%
Female	27	28.1%
Total	**96**	**100%**

Table 5.1 presents the gender-wise distribution of the respondents included in the study. Out of the total 96 participants, 69 students (71.9%) were male and 27 students (28.1%) were female.

Graph 5.1 showing demographic details of respondents

The data indicate that the majority of the respondents were male engineering students. This distribution reflects greater participation of male students in the present study compared to female students.

5.2 Frequency of Artificial Intelligence Usage

Table 5.2: Frequency of AI Tool Usage

Usage Frequency	Frequency	Percentage
Daily	43	44.8%
Few times a week	39	40.6%
Occasionally	8	8.3%
Rarely	6	6.3%
Total	**96**	**100%**

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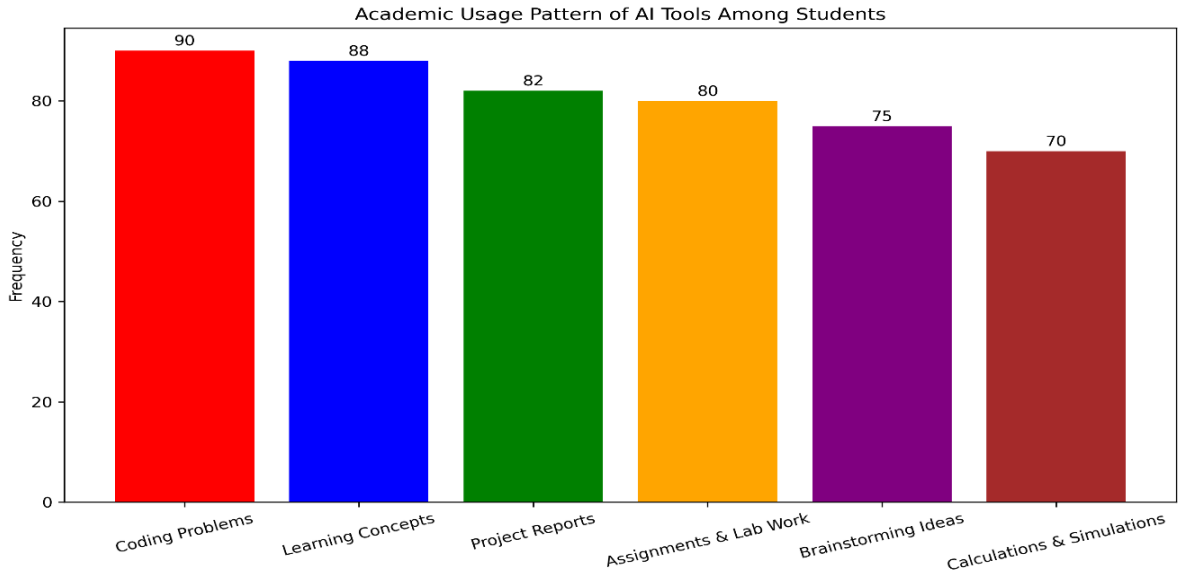

Table 5.2 presents the frequency of AI tool usage among the respondents. The findings show that 43 students (44.8%) use AI tools on a daily basis, while 39 students (40.6%) use them a few times a week. In comparison, only 8 students (8.3%) reported occasional usage and 6 students (6.3%) indicated that they rarely use AI tools. The results clearly suggest that the majority of students frequently rely on AI-based applications for academic purposes, indicating the major role of Artificial Intelligence into students' learning and educational activities.

5.3 Academic Usage of AI Tools

Table 5.3 Shows the Academic Usage pattern

Category	frequency
Coding Problems	90
Project Reports	82
Learning Concepts	88
Brainstorming Ideas	75
Assignments & Lab Work	80
Calculations & Simulations	70

Table 5.3 reveals that students use AI tools for a variety of academic purposes. The major applications include solving programming and coding problems, preparing project reports and technical documentation, learning new technical concepts, brainstorming project ideas, completing assignments and laboratory work, and automating calculations and simulations. Most respondents reported that AI tools help them understand difficult concepts more quickly and improve overall academic efficiency. The findings indicate that AI technologies have become important supportive tools in engineering education, contributing significantly to both students' learning experiences and academic productivity.

Figure 5.2: Showing Academic usage pattern of AI tools Among Students.

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5.4 Perception Toward AI Usage

Table 5.4: Students' Perceptions Regarding AI Usage

Statement	Response
AI helps me learn faster and better	78.1%
AI saves time in documentation or coding tasks	74.0%
I critically check AI-generated output	72.9%
AI tools are making me less creative	57.3%
I understand topics better without AI first	63.5%

Table 5.4 presents students' perceptions regarding the use of AI tools in academics. The findings show that 78.1% of the respondents agreed that AI helps them learn faster and more effectively, while 74.0% reported that AI saves time in documentation and coding-related tasks. Additionally, 72.9% of students stated that they critically evaluate AI-generated outputs before using them. However, 57.3% of the respondents believed that excessive use of AI tools may reduce creativity and originality. Further, 63.5% of students felt that they understand topics better when they first learn without depending entirely on AI tools. Overall, the findings suggest that students perceive AI as a beneficial academic support system, though concerns regarding overdependence and reduced creativity remain significant.

5.5 Independent Thinking and Creativity:

A significant number of respondents expressed concern that excessive dependence on AI tools may reduce independent thinking abilities. Some students mentioned that AI provides ready-made answers, reducing the need for deep analytical thinking.

Table 5.5: showing thematic representation of Independent Thinking and Creativity

Theme No.	Theme Title	Description
Theme 1	Reduction in Independent Thinking	Many respondents believed that excessive dependence on AI tools may reduce students' independent thinking and analytical abilities.
Theme 2	Dependence on Ready-Made Answers	Students reported that AI often provides direct solutions, which may discourage deep thinking and problem-solving efforts.
Theme 3	AI as a Supportive Learning Tool	Some respondents viewed AI as a supportive educational aid that enhances understanding when used responsibly rather than replacing human intelligence.
Theme 4	Improvement in Confidence and Concept Clarity	Several students stated that AI helps improve confidence and understanding when used for clarification and guidance purposes.

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Several students also reported that AI improves confidence and understanding when used for clarification rather than direct copying of solutions.

5.6 Ethical Concerns Regarding AI Usage

Students identified several ethical concerns related to AI in education:

Table 5.6 showing Thematic representation of Ethical Concerns Regarding AI Usage

Theme No.	Theme Title	Description
Theme 1	Academic Dishonesty and Plagiarism	Students expressed concern that AI tools may encourage plagiarism and unethical academic practices.
Theme 2	Overdependence on AI	Many respondents highlighted the risk of becoming overly dependent on AI-generated content for academic tasks.
Theme 3	Decline in Originality and Creativity	Students believed that frequent AI usage may reduce originality and creative thinking in assignments and projects.
Theme 4	Spread of Inaccurate Information	Some respondents pointed out that AI tools can sometimes generate incorrect or misleading information.
Theme 5	Lack of Critical Verification	Students reported that many users fail to critically evaluate or verify AI-generated responses before using them.
Theme 6	Misuse During Examinations	Respondents identified the unethical use of AI tools during examinations and assessments as a major concern in education.

These concerns suggest the need for ethical AI policies and awareness programs in educational institutions.

6. Major Findings of the Study

The findings of the study indicate that AI tools have become a regular part of students' academic activities. Most respondents reported using these tools either daily or several times a week, reflecting their growing importance in engineering education. Students commonly use AI for coding assistance, project documentation, understanding technical concepts, generating ideas, completing assignments, and supporting simulation-based tasks. The responses suggest that AI tools are increasingly being viewed as practical learning aids that help students manage academic work more efficiently and enhance their understanding of complex subjects.

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A common observation was that students perceive AI tools as highly beneficial for improving learning efficiency, saving time, and enhancing understanding of complex technical concepts. Most respondents acknowledged that AI-assisted learning supports academic productivity and facilitates quicker access to information. However, the study also identified several concerns associated with excessive AI usage. A considerable number of students believed that overdependence on AI tools may negatively affect creativity, originality, independent thinking, and analytical abilities. Ethical issues such as plagiarism, academic dishonesty, misinformation, and lack of verification of AI-generated outputs were also reported as significant concerns.

Overall, responses from students showed that they prefer to use AI as a supportive educational aid rather than a complete substitute for traditional learning methods. The study highlights the importance of responsible and ethical integration of AI technologies within educational environments.

7. Educational Implications

The findings of the present study highlight the increasing importance of Artificial Intelligence in engineering education and emphasize the need for its responsible and ethical integration into academic environments. Educational institutions should create awareness among students regarding the appropriate and ethical use of AI-based technologies in learning and assessment processes.

Since most participants reported using AI tools frequently for coding and concept clarification, engineering institutions may consider integrating AI literacy modules into the curriculum. Such initiatives could help students develop responsible usage habits while maintaining critical thinking skills. The study further suggests that teachers and institutions should encourage critical thinking, originality, and analytical problem-solving skills to minimize excessive dependence on AI-generated content. There is also a growing need to develop AI literacy among both students and educators so that AI tools can be used effectively and responsibly within the teaching-learning process.

In addition, institutions should promote project-based, inquiry-based, and analytical learning approaches that strengthen creativity and independent thinking among students. The findings indicate that AI should be viewed as a supportive educational technology that enhances learning experiences rather than a replacement for human intelligence, creativity, and critical reasoning abilities.

8. Conclusion

Artificial Intelligence has become an important component of modern engineering education. The findings of the study indicate that students extensively use AI tools to improve learning efficiency, solve technical problems, and complete academic tasks. AI technologies positively influence conceptual understanding, productivity, and accessibility to academic resources. Similar findings were reported by Holmes, Bialik, and Fadel (2019), who emphasized that AI-supported educational systems enhance personalized learning and academic engagement.

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Likewise, UNESCO (2023) highlighted the transformative role of generative AI in modern teaching-learning environments.

However, the study also reveals that excessive dependence on AI tools may negatively affect creativity, originality, critical thinking, and independent problem-solving abilities. These findings are supported by Selwyn (2022), who warned that uncontrolled reliance on AI may reduce authentic learning experiences and cognitive engagement among students. Bernstein et al. (2025) also identified ethical risks such as plagiarism, misinformation, and academic dishonesty associated with AI-integrated education.

The study demonstrates that AI has become a routine part of academic work for many engineering students. Participants appreciated its ability to simplify technical tasks and support learning. At the same time, concerns regarding originality, independent thinking, and ethical use were repeatedly expressed. These findings suggest that the value of AI in education depends not only on the technology itself but also on how students and institutions choose to use it. Future studies may examine the impact of AI on academic achievement, critical thinking, creativity, and problem-solving skills using larger samples from different disciplines and institutions.

Limitations of the Study

The study was limited to 96 engineering students from colleges in Aurangabad district. Therefore, the findings may not be generalized to all engineering students. Future studies may include larger and more diverse samples.

Research Ethics:

Participation in the study was voluntary. Students were informed about the purpose of the research before completing the questionnaire. Confidentiality and anonymity of responses were maintained throughout the study, and the collected information was used solely for academic purposes.

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