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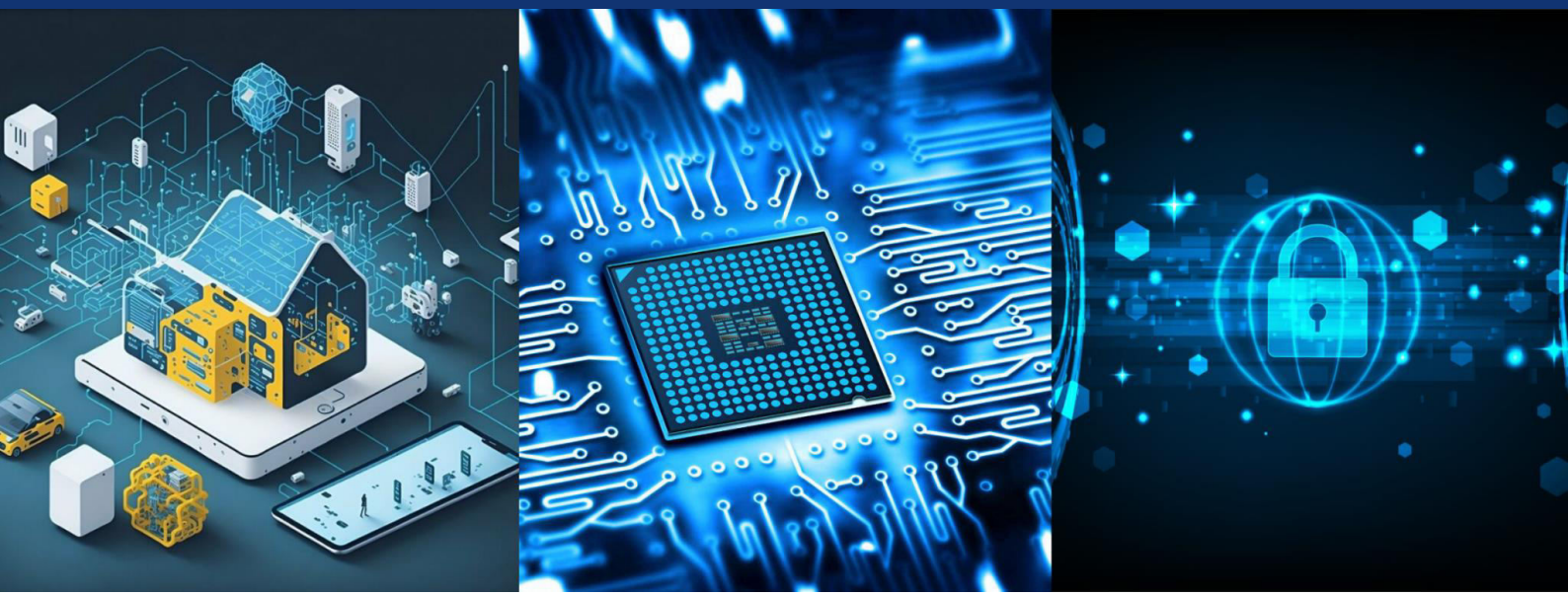

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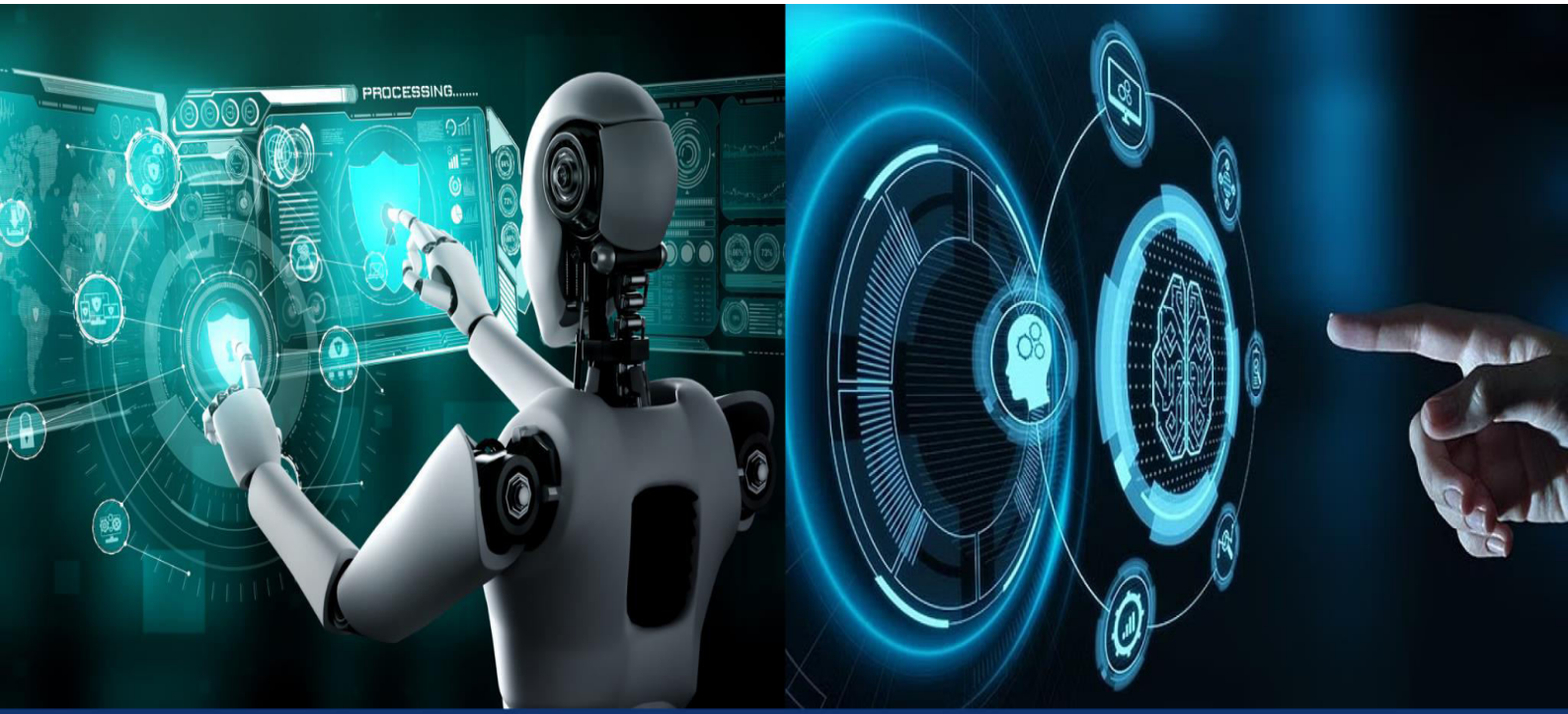

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Dependency on AI and Its Impact on Critical Thinking

SandeshGade

PG Student, Dept.of Siddhant Institute of Computer Application, Savitribai Phule, Pune University, Pune, India

ABSTRACT: Students' approaches to learning and problem-solving have changed dramatically as a result of the quick adoption of Artificial Intelligence (AI) tools in the classroom. This study looks into how much college students rely on AI technologies and how it affects their ability to think critically. Students are selecting automated solutions instead of conducting their own analysis since AI-powered tools are easier to use to finish coursework, code, and research.

To gather primary data on college students' usage habits, degree of dependency, and opinions regarding AI, we used a survey-based methodology. In the study, we examine whether regular usage of AI technologies increases productivity while decreasing the likelihood of cognitive effort and problem-solving abilities. The findings show that although AI increases efficiency and saves time, an over-reliance on technology may impede the growth of analytical and critical thinking abilities. Numerous students reported using AI-generated responses without carefully examining or verifying them.

According to the study, AI should enhance learning rather than take the role of critical thinking. AI can improve learning results when used properly, but overuse might impede decision-making and intellectual development.

KEYWORDS: Artificial Intelligence (AI), Critical Thinking, Student Dependency, AI Tools, Academic Performance, Cognitive Skills, Problem-Solving Ability, Learning Behavior, Automation in Education,

I. INTRODUCTION

Artificial intelligence (AI) has become a crucial component of contemporary education, revolutionising how students study, conduct research, and finish assignments. Chatbots, automated coding assistants, and content generators are examples of AI-powered tools that are already giving students instant answers to challenging issues. These technologies increase accessibility and efficiency, but they also raise questions about students' growing dependence on AI systems.

Critical thinking is a crucial educational ability that helps pupils analyse data, evaluate many points of view, and make informed decisions. However, as individuals depend more on AI technologies, their capacity for autonomous thought and problem-solving may decline. Students could prefer to ask the AI for the solution rather than delve deeply into the subject. This may

This study aims to investigate how much college students rely on AI and how it affects their ability to think critically. The study collects information on students' usage patterns, behaviours, and views of AI tools in academic tasks using a survey-based methodology. The study emphasises the benefits of using AI as well as any potential drawbacks, highlighting the significance of a balanced strategy in which AI enhances learning but does not take the place of human reasoning and analytical abilities.

1. Instantaneous solutions from AI technologies reduce the amount of time needed to solve problems, but they also limit analytical effort.
2. Relying too much on AI could lead to shallow learning rather than in-depth conceptual understanding.
3. Students may develop the habit of accepting responses without challenging their veracity.
4. It's crucial to have critical evaluation abilities because AI can occasionally produce inaccurate or biased information.
5. Regular use of AI may have an impact on originality and creativity in academic work.
6. Students can increase efficiency and production by using AI ethically.
7. AI literacy—the capacity to apply AI in an ethical and successful manner—is becoming more and more important.

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8. While using AI in moderation can improve learning, relying too much on it can hinder one's capacity for autonomous thought.

II. HYPOTHESIS OF THE STUDY

The research is based on the hypothesis that:
"The increasing dependency on Artificial Intelligence (AI) tools among college students is influencing their critical thinking abilities. While AI helps in completing tasks efficiently, excessive reliance on it may reduce independent problem-solving and analytical skills."

III. SIGNIFICANCE OF THE STUDY

This study is important because it looks into how college students' critical thinking skills are affected by their growing reliance on Artificial Intelligence (AI) tools. In today's digital learning environment, artificial intelligence is ubiquitous and helps with problem solving, assignment completion, and quick knowledge retrieval. Although these tools increase productivity and save time, they may also hinder students' capacity for independent thought and analytical problem-solving. This study aids in determining whether artificial intelligence is being utilised to enhance learning or to replace critical thinking.Additionally, the study makes students aware of the necessity to balance their usage of AI with their own analytical abilities. Additionally, it gives teachers useful information for developing instructional practices that integrate contemporary technologies and promote autonomous thought.

IV. STATEMENT OF THE PROBLEM

College students can now easily access Artificial Intelligence (AI) tools for academic tasks like content creation, assignment solving, coding help, and rapid information retrieval. Although these tools certainly make life easier and more productive, there is growing concern that an over reliance on AI could harm students' critical thinking abilities.The primary issue addressed by this study is whether students' capacity for independent thought, problem analysis, and rational decision-making is diminished by regular use of AI tools. However, a lot of students frequently employ AI-generated responses without analysing or comprehending the underlying ideas, which may have an impact on their analytical abilities and depth of learning.

V. RELATED WORK/LITERATURE REVIEW

Due to its quick adoption in academic contexts, artificial intelligence has drawn a lot of attention in the field of education. The benefits and drawbacks of employing AI with pupils have been covered by a number of writers.Previous research has demonstrated how AI tools, such chatbots, intelligent tutoring systems, and content creators, improve learning by providing immediate answers and individualised assistance. Students who frequently utilise AI-based systems are likely to finish assignments more quickly and accurately, according to studies on the use of educational technology. Other studies, however, suggest that an over-reliance on these technologies may reduce autonomous thought and active engagement.

Reduced Active Engagement and Independent Thinking

The **World Economic Forum (2023)** reports that recent studies have shown that the usage of AI tools in education is having an increasing impact on students' learning. According to the survey, about **65%** of students use digital tools and artificial intelligence to assist them with their academic projects. Reduced active participation in analytical and problem-solving tasks results from this reliance. Fast AI-generated responses are typically preferred by students over conversations, investigation, or independent thought. Implication: An excessive dependence on AI weakens the capacity for independent thought and decreases active learning. likely to be laid off. Implication: Automation may make traditional career paths less accessible, which is especially risky for entry-level IT positions. .

AI Dependency and Cognitive Skill Decline

For instance, automation and AI tools are lowering the demand for human cognitive effort, particularly in repetitive and analytical jobs, according to research from the **McKinsey Global Institute (2021).** According to the study, using AI technologies cuts down on critical thinking and problem-solving time by about **30 to 40 percent**. Over time, this decrease in mental effort may have an impact on cognitive growth, particularly for kids who are still honing their

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analytical skills. Implication: An excessive reliance on AI may cause cognitive abilities like reasoning, logical thought, and decision-making to deteriorate.

Surface Learning vs Deep Learning

The OECD (2021) claims that learning patterns have changed from deep learning to surface-level learning due to the growing use of AI tools. According to the survey, just **30–35% of students** concentrate on grasping fundamental concepts, while **about 70%** of students rely on AI for immediate answers. Students that prioritise speed above comprehension suffer from decreased conceptual clarity and poor knowledge retention as a result of this behaviour.
Implication: Reliance on AI encourages surface-level learning, which has a detrimental effect on long-term academic progress and the evolution of critical thinking.

AI Accuracy, Bias, and Lack of Verification

According to a **Stanford HAI study from 2024**, AI systems—particularly generative AI—can generate biased or erroneous data. According to the study, **between 50% and 55% of consumers** do not check content produced by AI, and around **25%** accept AI responses without question. Inaccurate learning outcomes and false information may arise from this absence of critical checking.
Implication: Students may accept false information if they lack the necessary evaluation abilities, which could result in subpar academic choices and a decrease in critical thinking.

Positive Role of AI in Learning Support

When applied properly, AI offers substantial advantages despite its difficulties. AI tools enhance efficiency, accessibility, and customised learning, according to **UNESCO (2023).** According to the survey, about **75%** of students reported completing tasks more quickly, and about **60%** said that utilising AI technologies effectively improved their academic performance. Implication: When utilised as a supplementary tool rather than as a substitute for independent thought, AI can improve learning outcomes.

Human-AI Collaboration and Skill Development

AI is predicted to change the nature of employment in the future by generating new opportunities, according to **Gartner (2023).** According to reports, AI will replace **about 85 million** jobs worldwide while creating about **97 million** new ones. This change emphasises how crucial it is for humans and AI systems to work together, particularly in jobs demanding critical thinking and creativity. Implication: To collaborate with AI effectively, students need to acquire both technical and analytical skills.

Skill Shift and Importance of Critical Thinking

Critical thinking, problem-solving, and analytical reasoning are among the top three skills for future employment, according to the **World Economic Forum (2020).** Furthermore, more than half of employers give critical thinking skills top priority when hiring. Implication: Human cognitive abilities are still crucial and cannot be replaced by technology, even in a society powered by artificial intelligence.

VI. RESEARCH METHODOLOGY RESEARCH DESIGN

The research is descriptive in nature and follows a survey-based approach. The aim is to study how technology is influencing employment and to understand the perceptions of students, employees, and job seekers regarding the possibility of jobs being replaced by machines or artificial intelligence.

Population and Sample

The population for this study includes young learners, working professionals, and job seekers. A sample of 64 respondents was chosen using convenience sampling. The sample size is kept moderate to ensure responses can be collected within the available time frame.

Data Collection Method

Primary data was collected through a structured questionnaire designed in **Google Forms**. The questionnaire consists of multiple-choice, Likert-scale, and open-ended questions to capture both quantitative and qualitative insights. The link to the form was shared through email, WhatsApp, and other social media platforms for easy access.

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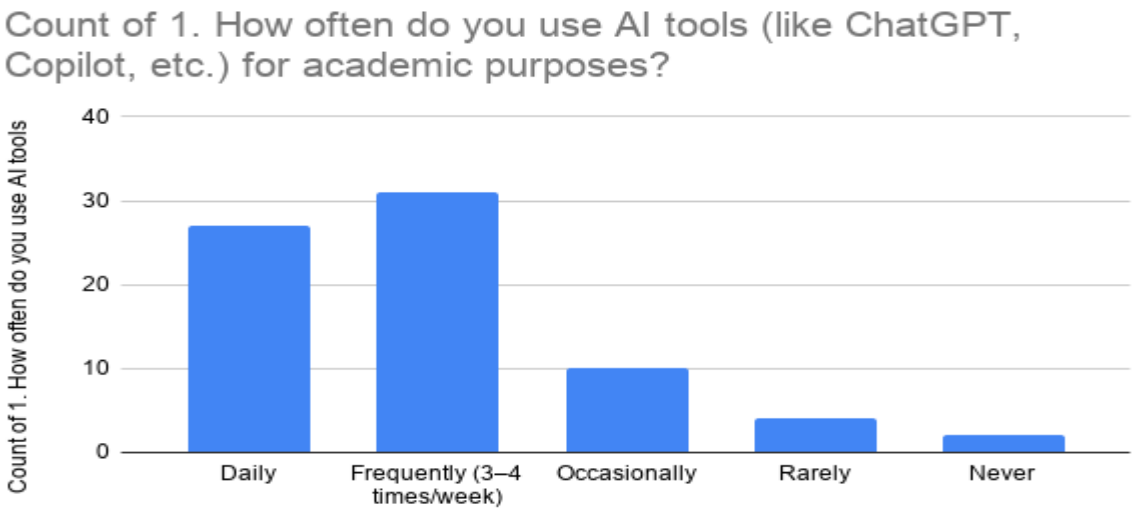
Data Analysis Techniques

Collected data was compiled and analyzed using percentage methods, frequency tables, and graphical representation (bar charts, pie charts). For open-ended questions, common themes were identified and summarized to present the respondents' views.

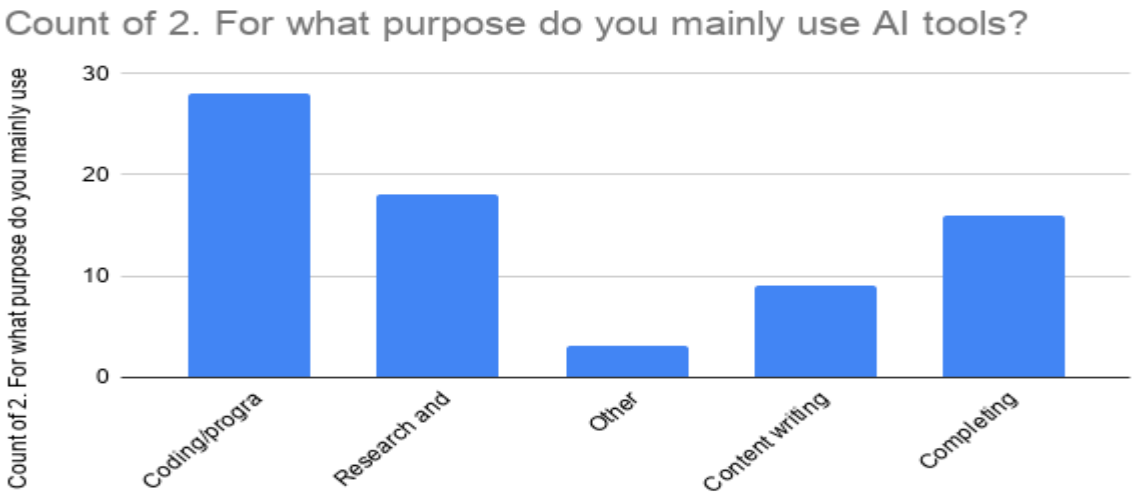
V. RESULT AND DISCUSSION

This chapter presents the results of the survey conducted through Google Forms. The data is displayed using tables and charts for each question, followed by interpretation.



1. How often do you use AI tools (like ChatGPT, Copilot, etc.) for academic purposes?

Interpretation: The chart shows that **31 respondents** use AI tools **frequently (3–4 times/week)**, while **27 respondents** use them **daily**, making these the largest groups. Around **10 respondents** use AI **occasionally**, whereas only **4 respondents** use it **rarely** and **2 respondentsnever** use it. This indicates that the majority of users rely on AI tools regularly for academic purposes, with very few using them infrequently or not at all.



2. For what purpose do you mainly use AI tools?

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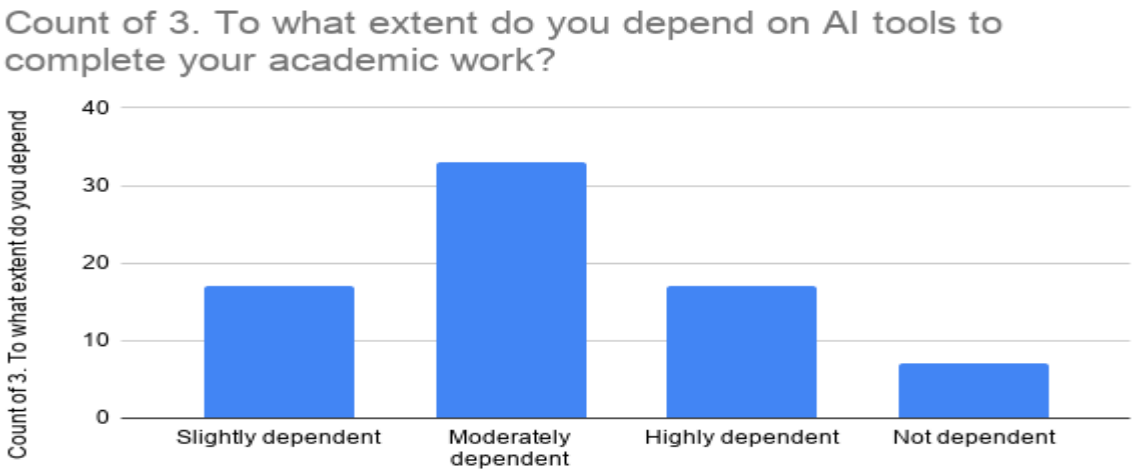
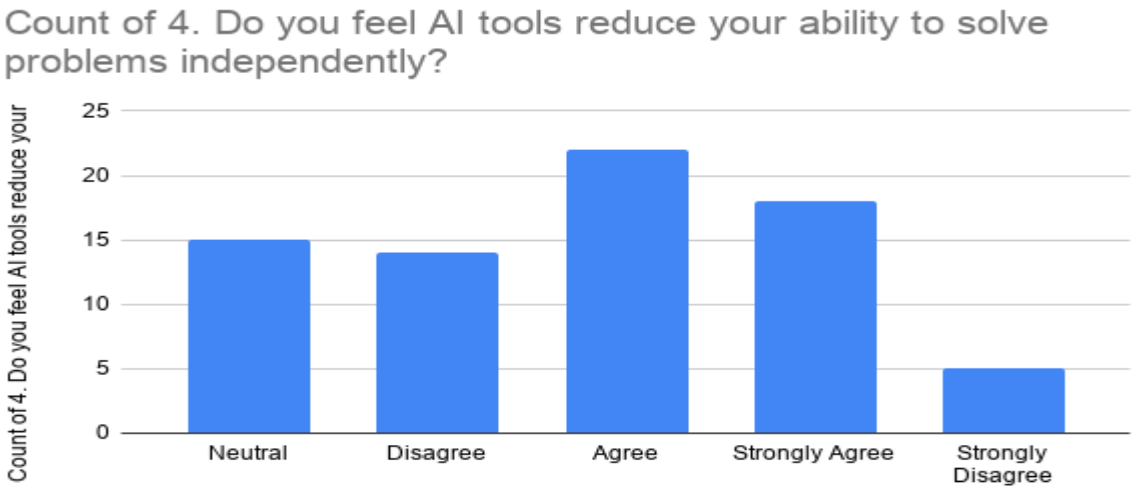
Intetpretations: The chart shows that the primary use of AI tools is for **coding/programming (28 respondents)**, making it the most common purpose. This is followed by **research and analysis (18 respondents)** and **completing tasks (16 respondents)**, indicating significant use in academic and practical work. A smaller number of users utilize AI for **content writing (9 respondents)**, while very few (**3 respondents**) use it for **other purposes**.



3. To what extent do you depend on AI tools to complete your academic work?

Interpretations: The chart shows that the majority of respondents are **moderately dependent** on AI tools for completing their academic work (33 respondents), making it the most common level of dependency. This is followed by **slightly dependent** users (17 respondents) and **highly dependentusers (17 respondents),** indicating a balanced distribution between low and high reliance on AI tools. A smaller number of users are **not dependent** on AI tools (7 respondents), showing that only a few students completely avoid using them.



4. Do you feel AI tools reduce your ability to solve problems independently?

Inerpretations:The chart indicates that most respondents **agree (22)** and **strongly agree (18)**that AI tools reduce independent problem-solving ability. A mixed response is seen **with neutral (15) and disagree (14),** showing divided opinions. Very few **strongly disagree (5),** suggesting limited belief that AI tools do not affect independent thinking.

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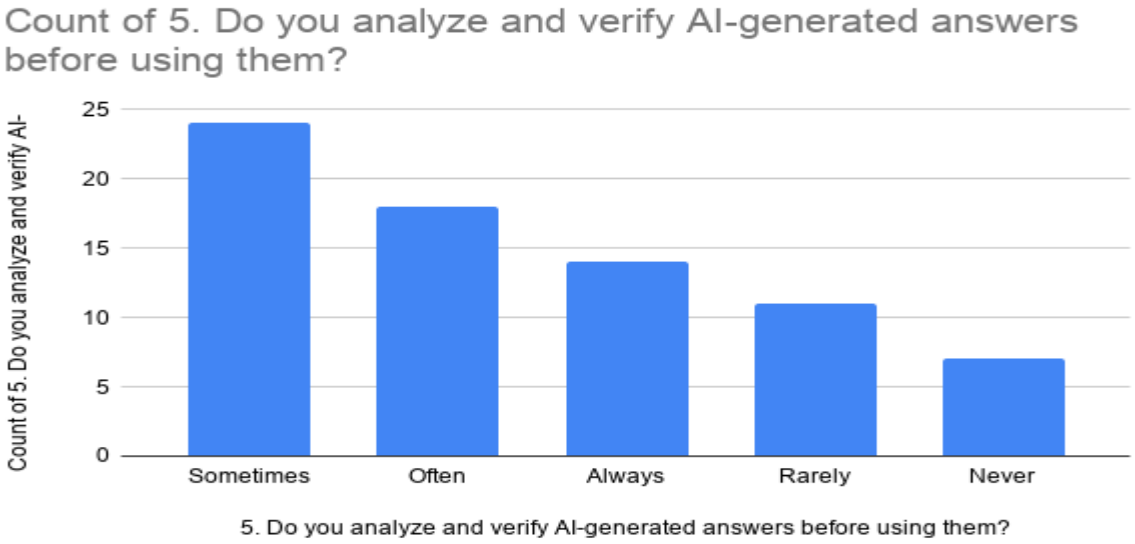
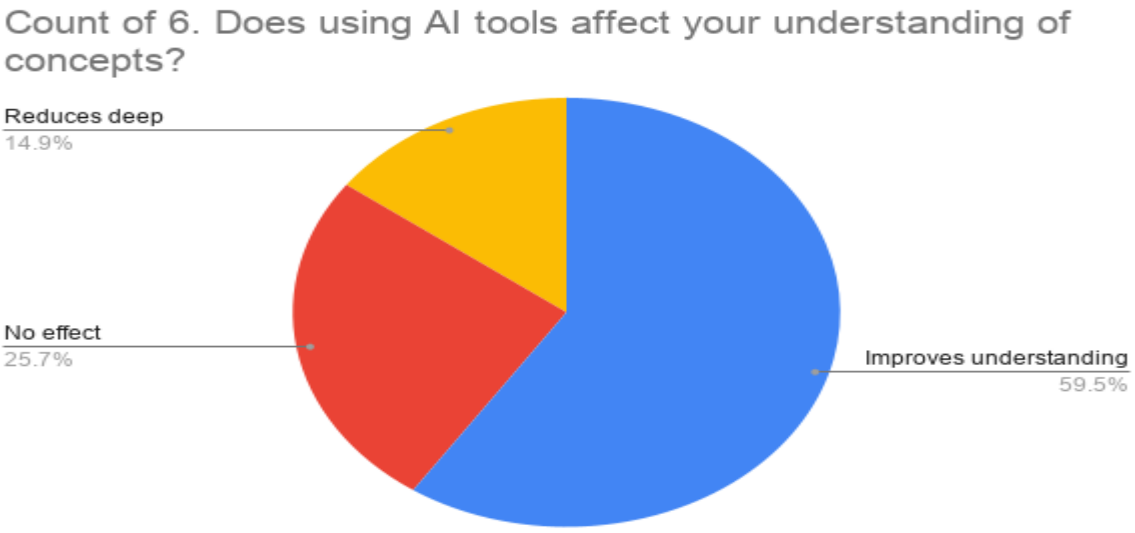


Interpretation: The chart shows that the majority of respondents verify AI-generated answers sometimes (24 respondents), making it the most common behavior. This is followed by those who verify often (19 respondents) and always (15 respondents), indicating a balanced distribution between moderate and strong verification habits. A smaller number of respondents verify rarely (12) or never (8), showing that only a minority completely avoid checking AI outputs.



Interpretation The chart shows that the majority of respondents believe using AI tools **improves their understanding of concepts** (59.5%), making this the most common perception. This is followed by those who feel AI tools have **no effect** on their understanding (25.7%), indicating a neutral stance among a significant portion of users. A smaller group reports that AI tools **reduce deep understanding** (14.9%), showing that only a minority perceive a negative impact.

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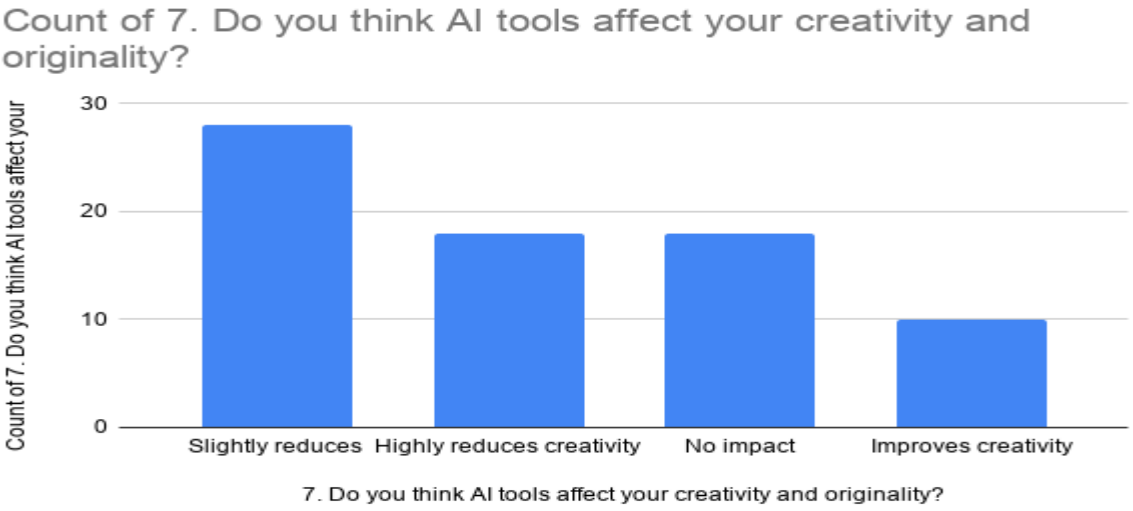
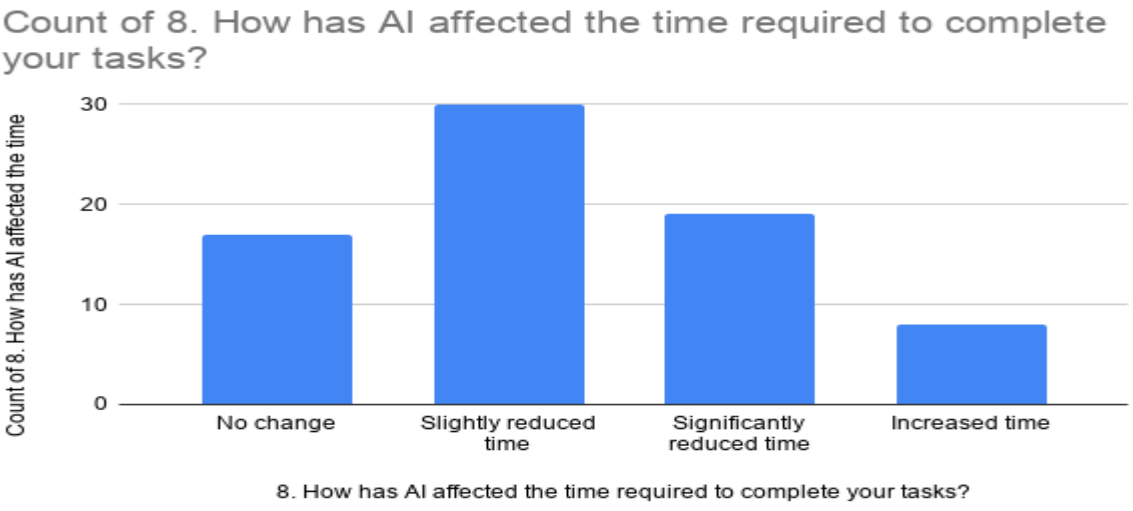


Interpretation: The majority of respondents (28) feel AI tools **slightly reduce creativity**, making this the most common view. A significant portion (22) believe AI tools **highly reduce creativity**, showing strong concern about originality. Meanwhile, 18 respondents see **no impact**, reflecting neutrality. Only 10 respondents feel AI tools **improve creativity**, indicating that positive perceptions are the least common.



Interpretation: The majority of respondents (30) reported that AI tools **slightly reduce the time** required to complete tasks, making this the most common outcome. A notable group (20) experienced a **significant reduction in time**, highlighting strong efficiency gains for some users. Meanwhile, 15 respondents saw **no change**, suggesting AI had little impact on their workflow. Only 8 respondents felt AI tools **increased the time** needed, showing that negative effects are relatively rare.

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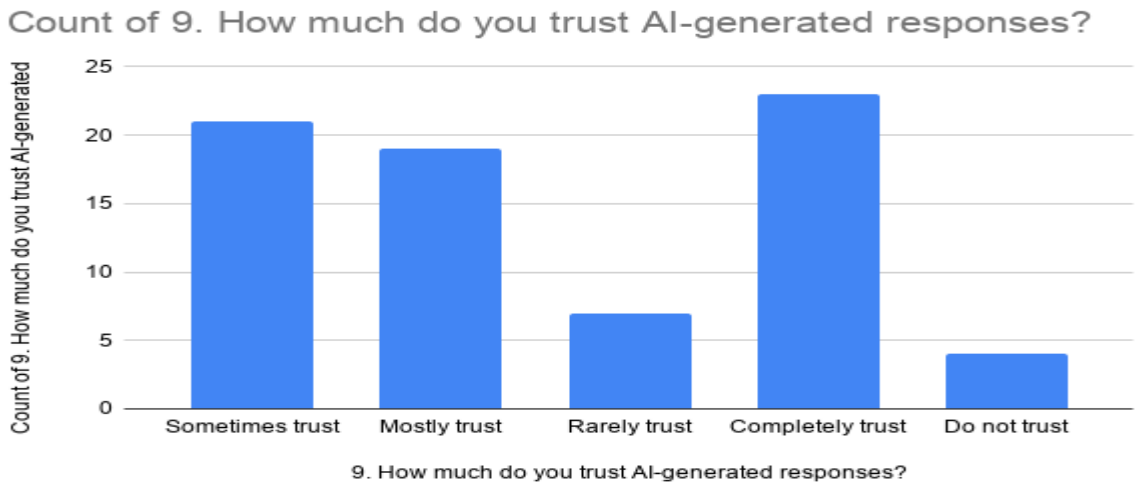
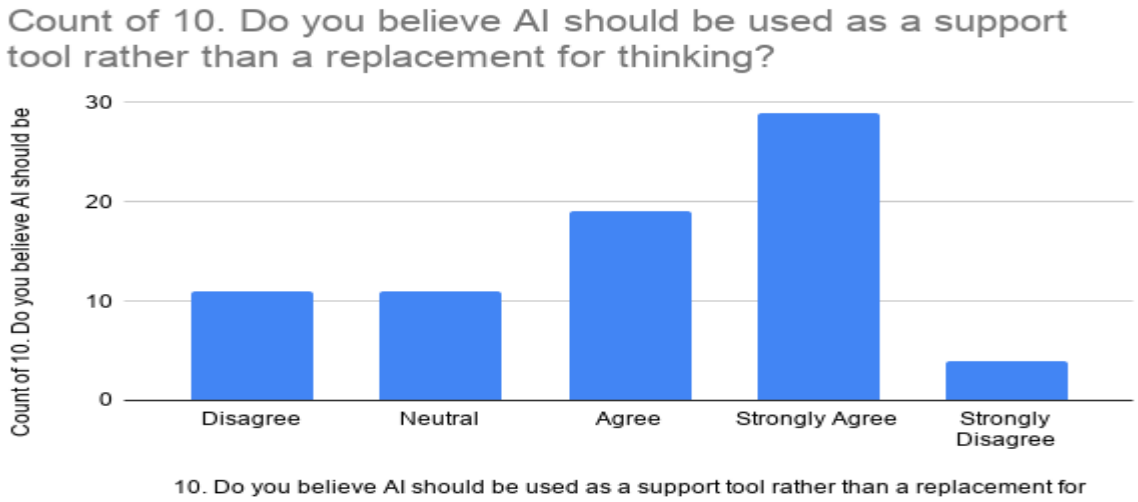


Interpretation: The largest group (23) reported that they **completely trust AI-generated responses**, showing strong confidence among many users. A significant portion (20) said they **sometimes trust**, and 18 respondents **mostly trust**, together indicating that most respondents lean toward trusting AI to varying degrees. On the other hand, only 7 respondents**rarely trust** and 4 respondents **do not trust**, showing that skepticism is present but limited.



Interpretation: The majority of respondents (29) **strongly agree** that AI should be used as a support tool rather than a replacement for thinking, making this the dominant view. Another 20 respondents **agree**, reinforcing strong overall support. Meanwhile, 13 respondents are **neutral**, showing some uncertainty. A smaller group disagrees (12), and only 5 respondents **strongly disagree**, indicating limited opposition.

VI. CONCLUSION

Artificial Intelligence (AI) has become a crucial component of contemporary education, profoundly altering the ways in which students study, evaluate, and finish assignments. The study's conclusions unequivocally show that AI tools increase productivity, lessen workload, and offer rapid information access. A lot of students use AI for research, coding, and assignments since it saves time and increases productivity. But the study also highlights a number of important issues. Over-reliance on AI technologies diminishes students' capacity for autonomous thought, problem-solving, and active involvement. Many students have a tendency to accept AI-generated responses without conducting

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adequate analysis, which results in learning that is superficial rather than profound. Overuse of AI can also have a detrimental effect on the development of cognitive skills, creativity, and uniqueness.

The study emphasises that although AI is a useful and potent tool, it shouldn't take the place of human thought. Rather, it ought to be employed as a system of support that improves education and fosters critical and analytical thinking. In order for students to use these tools in an ethical, responsible, and efficient manner, it is imperative that they acquire AI literacy.

In conclusion, preserving a balance between the use of AI and human intellect is crucial for the future of education. Students will learn more effectively and be better equipped to handle challenges in the future if they mix AI technologies with autonomous thought, creativity, and analytical abilities.

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