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Influence of Generative Ai on Students Academic Productivity and Learning Behaviour

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ABSTRACT

Generative AI has gained substantial popularity in recent times within education. Various tools, including ChatGPT, Google Gemini, Claude and Microsoft Copilot, can be used by students to aid with idea development, summarization, comprehension, and content production. However, with Generative AI becoming more popular in education, concerns have risen with regards to critical thinking ability, independent learning, study methods, and academic integrity.

Within the context of this research project, 'Influence of Generative AI on Students' Academic Productivity and Learning Behavior', we have aimed to understand how Generative AI tools are being used by university students in an academic setting, and what effect they are having on academic productivity. Furthermore, we aim to understand how these tools may change learning experiences and behaviors for students.

Primary data was collected from 52 students through a questionnaire, which was created using Google Forms. Information was then processed using tables, percentages and graphs to understand students' opinions, experiences and perceptions of Generative AI in education.

This research explores benefits of Generative AI in learning, but also the issues with using Generative AI in learning, including dependency, accuracy of information, and possible negative effects on independent thinking. As a result, this research aims to give a balanced view of how Generative AI is starting to play a larger role in student's academic lives.

We would like to thank everyone who completed this survey. We greatly appreciate you giving us your opinions that have allowed us to gain valuable insight on how Generative AI is influencing students' academic productivity and learning behaviors. We hope that this research is of benefit to students, teachers, and those interested in understanding how AI is changing higher education.

Chapter 1
Introduction

1.1 Background

Students have begun using generative AI within their studies. This includes understanding complex content, generating ideas, summarizing content, completing assignments, conducting research and practicing exam questions. Many benefits can come from students using generative AI within education. It can increase efficiency of tasks, increase learning efficiency, increase learning and allow students to quickly gather information. If students struggle with academic content within their learning, generative AI can be used as a supplementary source. However, there are concerns around students becoming too dependent on generative AI within education. This may affect students' ability to think critically and independently. There may also be issues with the reliability of information given by generative AI,

personal understanding and academic integrity.

To understand the effects of generative AI on students, both positive and negative effects should be found. In this investigation, the effects of generative AI on academic productivity and learning behaviors of students will be looked at.

1.2 Research Gap

Although there are many benefits to students using generative AI, it may affect students' learning behaviors with regard to understanding content, thinking independently and preparing for exams.

It is important to investigate whether students are using generative AI in a supportive way, or if they are becoming too dependent. Although generative AI provides quick answers, students must be able to understand content for themselves and analyses information.

Students' experiences and attitudes towards generative AI will be investigated. Benefits of generative AI in increasing academic productivity will be found. However, issues with critical thinking skills, personal understanding and responsible use of AI will be identified.

1.3 Relevance and Importance

This research is relevant as generative AI is highly relevant to students in academic learning. Knowing the impact of generative AI will allow students to make informed decisions on whether to incorporate AI in their studies.

Significance of research

1. Understand how generative AI can improve academic productivity (save time, complete tasks, improve quality).
2. Understand how generative AI can improve learning experiences (understand complex content and create study resources)
3. Understand changes in learning behavior (study habits and exam preparation).
4. Understand concerns with critical thinking (over-reliance on AI, personal understanding and critical thinking skills).
5. Encourage responsible use of AI. Ensure students are using AI as a supporting tool but are still able to understand content, make judgements and solve problems.

Therefore, educators/institutions in educational environments may benefit from this research as it gives them insight into students' experiences with generative AI in education and encourages appropriate use.

1.4 Research Scope

This research investigates how generative AI is affecting academic productivity and learning behaviors in students.

- **Areas of interest in this research include:**

1. Use of generative AI tools in education.
2. Identification of commonly used tools (ChatGPT, Google Gemini, Claude, Microsoft Copilot).
3. Use of AI tools to complete assignments, conduct research, gather information and understand complex content.
4. Perceived impact of AI on academic performance and quality of assignment.
5. Saves time in study/research.
6. Creation of study resources and practice questions using AI.
7. Impact on students' learning and exam preparations.
8. Concerns with over-reliance on AI, personal understanding and critical thinking.

9. Overall student opinions on the impact of generative AI in education.

This research has been carried out using primary data collection via a structured questionnaire. 52 Student responses were gathered and analyzed. Findings therefore reflect student opinions and experiences in the sample of 52 students. Findings however may not reflect the opinions of all students.

1.5 Expected Findings

This study gives an understanding of how students are using generative AI in their studies and their perceptions of the impact of generative AI in learning.

Finding expected

1. identify commonly used generative AI platforms.
2. identify key reasons students are using generative AI in academic context.
3. Understand student opinions of generative AI and its impact on academic productivity and quality of assignments
4. Understand how generative AI is aiding students to understand complex content and create practice questions.
5. Understand perceived impact of generative AI on students' learning and exam preparation.
6. identify concerns in relation to over-reliance, personal understanding and critical thinking.
7. Encourage students to responsibly and effectively use generative AI in education.

1.6 Research Problem

As students are increasingly using generative AI tools within education, opportunities and challenges may arise. Generative AI can be a useful tool in completing academic tasks, understanding complex content, creating study resources and saving time. It can also be useful for conducting research, completing assignments and practicing for exams.

However, if students become too dependent on generative AI, they may struggle to understand content in an independent manner, develop critical thinking skills and may struggle with personal understanding. In addition, students may face issues with inaccurate information provided by AI and making appropriate academic decisions.

- **Problem to be investigated**

To understand the impact of generative AI on academic productivity and learning behaviors of students including perceived benefits, challenges and impacts on academic tasks.

1.7 Research Questions

1. Are Generative AI tools used by students? What generative AI tools are most used?
2. What academic tasks are students using generative AI tools for?
3. What are students' opinions on the impact generative AI has on their overall academic performance?
4. Does generative AI aid students to understand study resources and complex content?
5. Does generative AI improve the quality of students' academic work and save students time in studying/researching?
6. Do students use generative AI to create practice questions?
7. What impact does generative AI have on students' learning and exam preparation?
8. What are students' opinions on using generative AI answers without personal understanding?
9. Do students believe overuse of generative AI may reduce critical thinking skills?
10. What are students' opinions on the overall impact of generative AI in education?

1.8 Research Aims

- General Aim

1. To investigate the impact of generative AI on academic productivity and learning behaviors of students.

- Specific Aims

1. Identify commonly used generative AI tools by students in academic contexts.
2. Find out the reasons students are using generative AI in academic contexts.
3. Analyze student perception of the impact generative AI has on academic performance and quality of work.
4. Understand how generative AI is helping students understand complex content and create study resources.
5. Investigate how generative AI increases the efficiency of study.
6. Understand the impact generative AI has on students' learning and exam preparation.
7. Investigate concerns raised by students in relation to over reliance of AI, personal understanding and critical thinking.
8. Understand students' general perceptions of generative AI in education.

1.9 Research Hypotheses

1. H0: There is no significant relationship between students' use of generative AI and perceived increases in productivity in education and learning behaviours.
2. H1: There is a significant relationship between students' use of generative AI and perceived increases in productivity in education and learning behaviours.

CHAPTER 2
LITERATURE REVIEW AND LITERATURE SYNTHESIS MATRIX

Literature Review

Overview

Within Higher Education, Generative Artificial Intelligence (GenAI) systems, including ChatGPT, Google Gemini and Microsoft Copilot, are becoming increasingly popular amongst students. Students use AI within Higher Education to aid in producing work, understanding complex information, summarizing information, researching information and preparing for assessments.

Due to their ease of use and ability to provide quick answers, simplify complex information and aid in multiple academic tasks, Generative AI tools have quickly become commonplace as a learning tool within Higher Education.

Studies have been conducted to understand the impact Generative AI tools have on student academic performance, efficiency, learning engagement and learning experiences. Although it appears that Generative AI tools can be used to aid learning and increase information accessibility, there are concerns surrounding student reliance, accuracy of information, critical thinking, cognitive offloading and academic integrity.

This literature review will identify research currently available in relation to Generative AI within education. Within the review, the ways Generative AI is being adopted by students, the impact it has on academic efficiency, student learning behaviors, benefits to students, issues faced by students and findings from previous studies will be discussed.

Adoption and accessibility in higher education

Students within higher education can easily access generative AI. They can use it to help students with many tasks including creating summaries, idea generation, creating an outline, understanding difficult concepts and improving writing.

Considerations such as perceived utility, ease of use, having a positive attitude towards technology, and digital ability can impact students' adoption of Generative AI. If students perceive the AI as useful and easy to use, they may be more likely to integrate Generative AI into their studies. Writing prompts and guidance can also affect how effectively students utilize Generative AI tools. Many students are using ChatGPT because it provides an easy conversational response. Google Gemini and Microsoft Copilot are also used to help students understand concepts, find information and complete academic tasks. However, the rapid adoption of these AI tools can cause issues in educational institutions. Policies may not be implemented as quickly as students begin using these tools in practice. Having awareness of these tools, having sufficient digital skills, and ensuring responsible use of Generative AI are important when implementing Generative AI into higher education.

Academic efficiency

Using Generative AI can help increase academic efficiency for learners. By using AI, learners can generate ideas for topics, structure work, translate, edit, summaries information, produce presentations and solve technical problems. Thus, learners can quickly receive explanations and summaries of information, meaning less time may be spent on simple research. In terms of cognitive load, by getting AI to undertake mechanical tasks, learners can reduce extraneous cognitive load and focus on understanding, analysis and evaluation. However, learners must still be highly engaged in the content created by the AI to improve it.

A systematic review and meta-analysis of experimental studies found that using ChatGPT in learning generally had positive impacts on academic outcomes, and affective-motivational outcomes. Higher order thinking was also positively impacted (Deng et al., 2025).

Similarly, a review of literature relating ChatGPT to Higher Education found positive benefits on efficiency, self-regulation and academic efficiency (Dos, 2025).

Despite this, efficiency in learning may not be directly correlated with learning. Just because a learner completes an assignment quickly, this does not necessarily mean they have understood or retained knowledge from within. Therefore, academic efficiency should focus on accurate, original and individually understood information in addition to saving time.

Learning behaviors, cognitive load & critical thinking

Learning behaviors include actions students take during learning. These may be in the form of problem-solving, understanding, exam preparation and studying. Using generative AI to help students in learning can change learning behaviors. For example, using generative AI can allow students to further understand concepts, by providing explanations, examples, summaries and practice questions.

- Cognitive Load
- Cognitive load occurs when the cognitive processes required to complete a task (such as recall, idea generation, analysis of information and problem solving) are moved onto an external source.
- Positive & Negative Effects

Using generative AI to explore ideas, ask questions, compare explanations and confirm information, may increase inquisitiveness within students and develop higher order thinking.

However, if used excessively, or without critical thinking, generative AI may encourage shallow learning. If students do not attempt to problem solve independently and instead rely on AI for answers, they may have incorrect knowledge of a topic. Similarly, students may gain a false sense of confidence in a topic, however, may not have accurate knowledge of the subject.

A literature review was conducted into ChatGPT and how it affects student engagement. Results found a mixture of increased and decreased student engagement. However, issues of over-reliance were raised (Lo et al., 2024).

- Conclusion

Depending on how generative AI is used by students, it can have either positive or negative impacts on learning behaviors. If generative AI is used as a learning aid, it can support understanding. However, if answers are copied directly without any effort from students, it can impact their ability to learn independently and critically.

Benefits of Generative AI

- **Quickly accessible information**
  Students will quickly be able to gain relevant information and explanations within academic content.
- **Understand complicated content**
  Students can form questions and receive simple explanations to understand difficult content.
- **Efficient time management**
  Students are able to create summaries, structure ideas and plan academic work more efficiently.
- **Creating assignments**
  Students can brainstorm ideas, create an outline, and improve clarity in writing.
- **. Revision for exams**
  Students can create practice questions, explanations and revise content.
- **Individualized support**
  Students can form further questions, and receive explanations tailored to their specific learning needs.
- **Research help**
  Students can identify ideas, structure information and understand concepts within research.
- **Instant feedback**
  Based on students' academic questions, students can receive explanations and suggestions.
  Therefore, Generative AI can be a useful support tool in education if used correctly alongside individual understanding.

Ethical issues and challenges

Challenges/ethical issues include:

1. Over-reliance on AI
2. Inaccurate information. It is important that key pieces of information are checked as AI can create inaccurate, outdated or misleading information.
3. May reduce independent thinking. If over-relied upon, students may be less able to independently analyses information and create solutions.
4. Plagiarism. If AI-generated content is used in student work but not properly acknowledged, or has very little contribution from the student, it can raise plagiarism issues.
5. No understanding. Students may complete tasks using AI without fully understanding the topic.
6. Concerns around data. Students should be cautious when inputting private, confidential or sensitive

data into AI systems.

7. Inequality. Depending on internet availability, knowledge of technology and availability of advanced features within AI systems, students may have different learning opportunities.
8. Bias. AI-created responses can be biased or incomplete, meaning students must carefully consider them.

To overcome these challenges, AI must be used responsibly. It is important to check information carefully. Clear guidelines should be put in place in educational institutions to ensure AI is used ethically. Within education, AI literacy and ethical knowledge should be promoted. Students should use AI as support only.

SWOT Analysis of Generative AI in Student Learning

Strengths:

1. Ability to quickly aid students with ideas, summarization, writing and coding.
2. Ability to provide quick feedback and explanations based on students' questions.
3. Aids routine academic work, and students in managing their time. Weaknesses:
1. May reduce independent working and lead to offloading cognitive processes.
2. May produce incorrect information and shallow thinking.
3. May create false understanding of a topic. Opportunities:
1. Supports guided learning, self-assessment and development of skills.
2. Improves AI skills and verification of information.
3. Encourages more in-depth assessment. Threats:
1. Concerns regarding academic integrity. May create issues around authorship. Students may become too reliant.
2. Unequal access to high level tools and support.
3. Privacy concerns. May reduce independent problem-solving skills.

Overall, this shows that Generative AI has many opportunities to aid student learning. However, to be effective it should be used responsibly, critically and with appropriate guidance from educational institutions.

Literature Review

(Deng et al., 2025)

This study investigated the impact of ChatGPT on student learning. It was found that using ChatGPT generally had a positive impact on academic achievement and affective-motivational outcomes. Higher-order thinking skills were also found to benefit.

(Lo et al., 2024)

This study looked at the impact of ChatGPT on student engagement. It was found that ChatGPT had a mixed impact on student engagement, with some positive and negative outcomes. In particular, there were concerns around over-reliance.

(Heung and Chiu, 2025)

This study looked at the impact of ChatGPT on student engagement. Overall, it was found to have a positive impact on student engagement; however, there were concerns around over-reliance and disengagement.

(Chen and Cheung, 2025)

This study looked at research examining the impact of Generative AI on the learning outcomes of

university students. A number of positive impacts on learning outcomes were found. However, no statistically significant impacts were seen on metacognition.

5 (Dos, 2025)

This study provided a systematic review of research surrounding ChatGPT in higher education. It was found that ChatGPT can be beneficial in improving learning efficiency, self-regulation and academic productivity. However, over-reliance, accuracy and academic integrity were also concerns.

(Chan and Hu, 2023)

This study looked at students' perspectives and advantages and challenges in the use of Generative AI in higher education. It was found that students found AI useful in generating ideas, writing and supporting learning; however, there were concerns around accuracy, over-reliance and ethical concerns.

(Darwin et al., 2024)

This study explored critical thinking in an AI-driven age. It was found that AI can be useful in supporting learning; however, over-reliance may limit critical thinking.

(Zhai et al., 2024)

This study looked at over-reliance on AI chat systems and its impact on cognitive ability. It was found that excessive over-reliance on chat AI may negatively impact cognitive engagement and the development of independent skills.

(Lee et al., 2025)

This study looked at the impact of Generative AI on critical thinking and cognitive effort. It explored how cognitive effort is applied in order to validate and critically analyse AI-generated information. Therefore, making judgements is important.

(Roy and Jony, 2026)

This study investigated cognitive offloading and critical thinking within higher education. Thematic analysis was carried out on student interviews. Findings suggested potential links between the use of Generative AI, shallow engagement, cognitive effort and reliance on AI in structuring reasoning.

(Wang and Zhang, 2026)

This study focused on learner agency, cognitive offloading and teacher-learner partnerships within higher education. It found that whilst cognitive offloading can have benefits, unreflected dependency can occur. Therefore, critical supervision and learner agency are key aspects.

In conclusion, Generative AI appears to assist with academic achievement, engagement and learning experiences. However, over-reliance, accuracy, academic integrity and independence of thought are important concerns.

Synthesis of Literature

The following table presents a synthesis of previous studies related to the use of Generative Artificial Intelligence (GenAI) in education. It highlights the research focus, methodology, major findings and relevance of each study to the present research.

Author(s) and Year	Research Focus	Methodology	Major Findings	Relevance to the Present Research
Deng et al. (2025)	Impact of ChatGPT on student learning	Systematic review and meta-analysis of experimental	ChatGPT was found to improve academic	Helps examine the relationship between

	and academic achievement.	studies.	performance, affective-motivational outcomes and higher-order . thinking. It also reduced mental effort, although the authors highlighted methodological limitations.	Generative AI, academic productivity and students' learning outcomes.
Lo et al. (2024)	Influence of ChatGPT on student engagement.	Systematic . literature review.	The study identified both increased engagement and disengagement in ChatGPT-supported learning.	Helps understand how AI use may influence students' learning behavior and engagement.
Heung and Chiu (2025)	Impact of ChatGPT on student engagement.	Systematic review and meta-analysis.	The study found an overall positive effect on behavioral, cognitive and emotional engagement. However, over-reliance on AI was identified as a potential concern.	Provides insights into student engagement and the possible risks of excessive dependence on AI.
Chen and Cheung (2025)	Effects of Generative AI on university . students' learning outcomes.	Systematic review and meta-analysis.	Generative AI showed positive . effects on academic achievement, language skills, motivation and higher-order thinking. However, no statistically significant effect was found on metacognition.	Helps evaluate the influence of Generative AI on academic performance and different aspects of learning.
Dos (2025)	Use of ChatGPT in higher	Systematic review of empirical	The draft identifies benefits such as improved efficiency and academic	Helps identify the potential benefits and challenges of using AI

	education.	research.	productivity, . alongside concerns about accuracy and academic integrity.	in higher education .
Chan and Hu (2023)	Students' perceptions of Generative AI in higher education.	Survey-based research.	Students perceived benefits in idea generation, writing assistance and learning support. Concerns about accuracy and ethical issues were also reported.	Helps understand students' perceptions, experiences and attitudes towards Generative AI.
Darwin et al. (2024)	Generative AI, critical thinking and students' perceptions.	Qualitative research and perception-based analysis, as described in the draft.	The draft highlights the benefits of AI as a learning-support tool while raising concerns about its limitations in developing critical thinking.	Provides a basis for examining students' learning behavior and critical-thinking practices.
Zhai et al. (2024)	Over-reliance on AI dialogue systems and their possible effects on cognitive skills.	Systematic review, as described in the draft.	The draft highlights possible effects of excessive AI dependence on cognitive engagement and the development of independent skills.	Helps examine cognitive offloading, independent learning and students' reliance on AI tools.

Lee et al. (2025)	Generative AI, critical thinking and cognitive effort.	Survey-based or empirical research, as described in the draft.	The draft focuses on changes in students' cognitive effort and their evaluation of AI-generated information.	Provides context for examining factchecking, independent judgement and cognitive effort.
Roy and Jony (2026)	Cognitive offloading and critical thinking in higher education.	Thematic analysis of university students' interviews, as described in the draft.	The draft examines the possible relationship between AI usage, shallow learning engagement and students' cognitive effort.	Helps understand the influence of AI use on learning behavior and responsible learning practices.
Wang and Zhang (2026)	Learner autonomy and cognitive offloading.	Conceptual review, as described in the draft.	The draft distinguishes between beneficial cognitive	Provides a balanced perspective for discussing responsible AI

			offloading and passive dependence on AI, highlighting the importance of learner autonomy.	use and independent learning.

Overall Synthesis

The reviewed literature indicates that Generative AI can support students' academic activities by improving efficiency, assisting with information gathering, supporting academic writing and helping students understand complex concepts. Research by Deng et al. (2025) and Chen and Cheung (2025) highlights positive effects on academic achievement and certain learning outcomes. Similarly, Lo et al. (2024) and Heung and Chiu (2025) demonstrate that AI-supported learning can influence student engagement.

However, the literature also highlights concerns related to excessive dependence on AI, accuracy of AI-generated information, academic integrity, cognitive offloading and the development of independent thinking skills. These concerns suggest that students should use Generative AI as a learning-support tool rather than depend entirely on it.

Therefore, the present research focuses on understanding university students' perceptions of Generative AI and examining how its use influences their academic productivity and learning behavior. It aims to explore both the advantages and challenges of AI use, including its role in improving study efficiency, supporting academic activities and influencing independent learning.

CHAPTER 3
RESEARCH DESIGN AND METHODOLOGY

Introduction

The research methodology explains how the research is carried out. It describes how data were collected, arranged, analyzed and interpreted so that the research questions could be answered.

This study, titled ‘Influence of Generative AI on Students’ Academic Productivity and Learning Behavior’, examines the ways students use Generative AI tools and the effect these tools have on their academic productivity and learning behavior.

This section covers the research strategy, design, data collection, sampling strategy, scales of measurement, data analysis and ethical considerations.

Research Strategy

This research employed a quantitative approach. Data can be collected in numerical form by means of a structured questionnaire. The data can then be analyzed using frequencies and percentages.

This made it possible to identify patterns in how students are using Generative AI tools, their views on academic productivity and their perception of changes in learning behavior.

Research Design

Descriptive research is used to offer insight into the characteristics, views, experiences and behaviors of a group of people.

In this research, descriptive research has been used to:
Understand: How students are using Generative AI tools. What AI is being used for within academic work.
Students' views on how AI affects academic productivity.
The role AI plays in students' understanding of concepts and in producing study resources.
The worries students hold about growing overly reliant on AI and losing their capacity for independent thought.
The data were collected at a single point in time.

Research Method

Primary data were collected through the survey method. A structured questionnaire was developed to collect information on students' awareness of Generative AI, how they use it, their experiences with it, and their opinions.
The survey method was selected so that information could be gathered from a large number of participants. It also enabled comparisons to be drawn and patterns in the responses to be identified.

Research Instrument

A structured questionnaire was created using Google Forms.
The questionnaire contained 14 questions. These questions were intended to explore various aspects of Generative AI and how it affects students' academic productivity and learning behavior.

- The questions cover:

1. Demographic information.
2. Awareness and use of Generative AI.
3. Common types of AI tools used – ChatGPT, Google Gemini, Microsoft Copilot.
4. How often Generative AI tools are used.
5. The purpose(s) for which AI tools are used in academic work.
6. Opinions on how AI affects students' academic productivity and achievement.
7. The use of AI to understand concepts and to create study resources.
8. Opinions on becoming overly dependent on AI and losing independent thinking.

Since the questionnaire was hosted on Google Forms, it was highly convenient for the participants. After completion, the data was automatically transferred into a spreadsheet.

Data Sources

Data were gathered from both primary and secondary sources.
1) Primary Data
Primary data means information gathered directly from participants.
For this study, primary data were gathered from university students through a structured questionnaire. The questionnaire was built with Google Forms, and 52 responses were gathered.
2) Secondary Data
Secondary data means information that other researchers or organizations have already collected and published.
For this study, secondary data was obtained from:

- Academic research papers.
- Published research papers.
- Earlier studies on Generative AI in education.

- Literature concerning academic productivity and learning behaviour.
- Relevant academic literature and online research.

Using secondary data in this study helped build a deeper understanding of the research topic. It was possible to compare the findings of this primary research with those of studies conducted previously.

Sampling Strategy

This section describes the sampling strategy, covering who was sampled, how many participants were sampled, and the method used to sample them.

1) Target Population
   University students who have used Generative AI tools for academic purposes or are aware of them.
2) Sample Size
   A total of 52 university students participated in this study.
3) Sampling Method

Non-probability sampling was employed, specifically convenience sampling. Students were selected as participants based on their availability, accessibility, and willingness to take part.

Given the time and resource limitations, this sampling method was suitable for this research.

4) Sampling Unit

The sampling units consisted of individual university students who participated in the online survey.

Scales of Measurement

Several scales of measurement were employed in this research.

1) Nominal

Nominal measurements are employed to create categories of responses. This measurement suits the categorization of demographic information as well as the names of Generative AI tools used by students.

2) Ordinal

Ordinal measurements are used when responses can be arranged in a particular order. This measurement is suitable for measuring how frequently Generative AI tools are used, along with other ordered responses.

3) 5-Point Likert Scale

A 5-Point Likert Scale was employed to measure the extent to which students agree with statements about Generative AI and its impact on academic productivity and learning behavior.

Scores are assigned to responses using the following values: Value of the Response

- Strongly Agree — 5
- Agree — 4
- Neutral — 3
- Disagree — 2
- Strongly Disagree — 1

This scale made it possible to identify attitudes and perceptions regarding the benefits and challenges of using Generative AI in education.

Data Collection

Primary data were gathered through a Google Forms questionnaire.

The questionnaire link was distributed to university students. After responses came in, the data were arranged in Google Forms and Google Sheets so that it could be analyzed. In total, 52 responses were received.

After being received, the responses were examined and sorted by the questions in the questionnaire.

Data Analysis

Basic statistical analysis and visual representation of the data were employed. The data were organized and visualized with Google Forms and Google Sheets.

- Frequency Analysis – Determines how many participants chose each option.
- Percentage Analysis – Computes the percentage of participants who selected each response.
- Percentage = (Number of participants selecting option / Total number of participants) x 100
- Pie Chart – Shows how responses are distributed across each category.
- Bar Graph – Where suitable, compares the number of responses among different categories.

The findings are presented in Chapter 4 through tables, visuals and explanations.

Ethical Issues

Throughout this research, basic ethical considerations were taken into account. Participation in the survey was voluntary, and participants' responses reflected their own views and experiences.

The information gathered was intended for academic purposes. Participants provided their responses honestly, and the findings have not been intentionally altered or misrepresented.

Limitations

This research has the following limitations:

The survey involved only 52 participants.

The findings reflect only the opinions and perceptions of the participants. Since this research relied on an online questionnaire, it is possible that only students who could access the questionnaire took part.

The findings may not reflect the views of all university students.

The findings reflect only the perceived influence of Generative AI on students, not actual changes in academic achievement.

The findings are based on the responses participants gave at the time of the survey.

Conclusion

This section has described the research methodology used to examine how Generative AI influences students' academic productivity and learning behavior. Quantitative research was carried out using a descriptive research design. Data were gathered through the survey method.

Primary data were gathered from 52 university students through a structured questionnaire distributed via Google Forms. The data were organized and analyzed using frequency analysis, percentage analysis, pie charts and bar charts.

This methodology will allow the findings to be presented and interpreted in the following chapter.

Chapter 4

Data Analysis, Findings, Discussion and Recommendations

Introduction

This section presents the data gathered for this study, ‘Influence of Generative AI on Students’ Academic Productivity and Learning Behaviors’. Analyzing the students’ responses will help show how students use Generative AI tools and how these tools are perceived to affect academic productivity, learning behaviors, study efficiency and academic performance.

Primary data were gathered through an online form built in Google Forms. A total of 52 students responded. The data were analyzed using frequency counts and percentages. Tables and graphical

representations have been used to present the responses.

The discussion will cover the key findings, comparisons between these findings and those in the literature reviewed in section 2. Recommendations for the responsible use of Generative AI in education.

Data Collection and Triangulation

1) Primary Data

Data were gathered using an online form created in Google Forms. It contained 14 questions posed to students. The aim was to understand age group, use of Generative AI tools, common tools used, purpose in academic use, academic productivity, learning, exam preparation and concerns about over-reliance on AI tools.

Responses were received. The data were moved to a spreadsheet and processed. The form and the anonymized data set should be added to the appendix so the research can be replicated.

2) Secondary Data

Secondary data were drawn from research articles, academic research and prior studies. This enables an understanding of the advantages, challenges and consequences of AI tools in higher education.

3) Triangulation

Triangulation in this research was accomplished by merging data from the primary survey with secondary literature. Survey data enables an understanding of individual student perceptions and experiences, while literature data offers a broader academic perspective. Since this research did not involve interviews or observation, data triangulation was achieved solely through the survey responses and secondary research.

4.1 Data Analysis and Key Findings

Frequency and percentage analysis was carried out on the survey data.

Percentage calculation: (Responses for a particular option / total number of valid responses for the question) x 100.

The survey received 52 responses in total. However, some questions had fewer valid responses because certain people left those questions blank. Consequently, the percentage for each question was calculated using the total number of valid responses for that question.

Respondent Demographics Q1) What age group are you in?

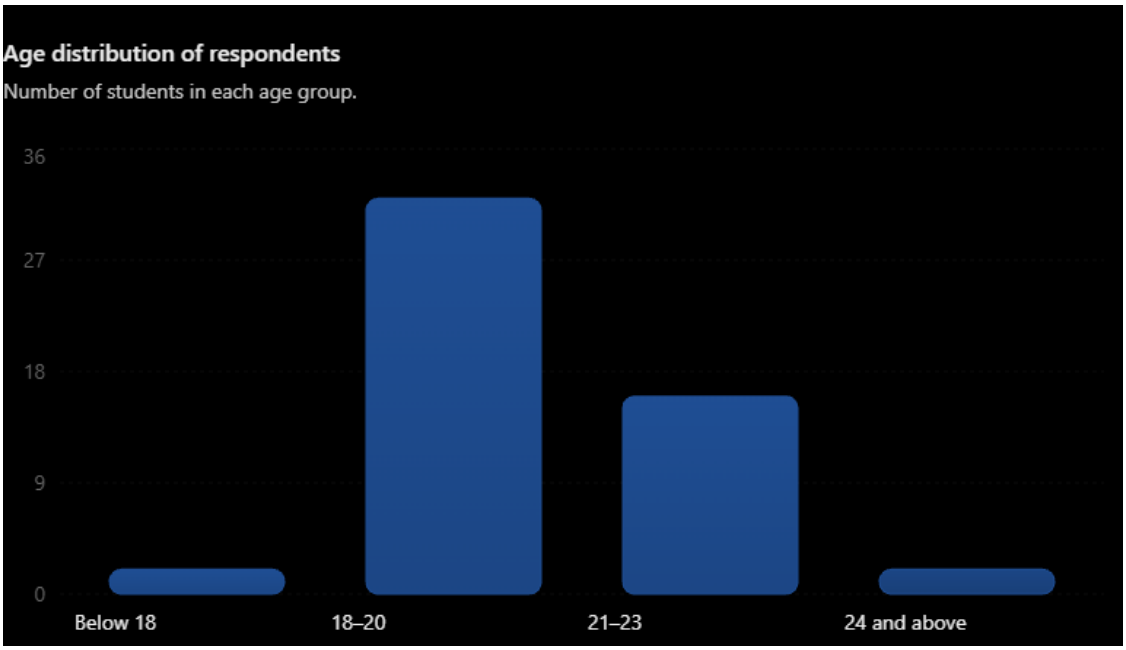

Table 4.1: Respondent age groups

Group	Students

Below 18	2
18-20	32
21-23	16
24 and above	2

Analysis: It is evident that most respondents (32 students, 61.5%) belong to the 18-20 age group. The 21-23 age group accounts for 30.8% (16 students). Just 3.8% of students were younger than 18 (2 students), and 3.8% were older than 24 (2 students). This indicates that most respondents were young students.

- **Awareness and Usage of Generative AI**

Q2) Do you use Generative AI tools in your studies?

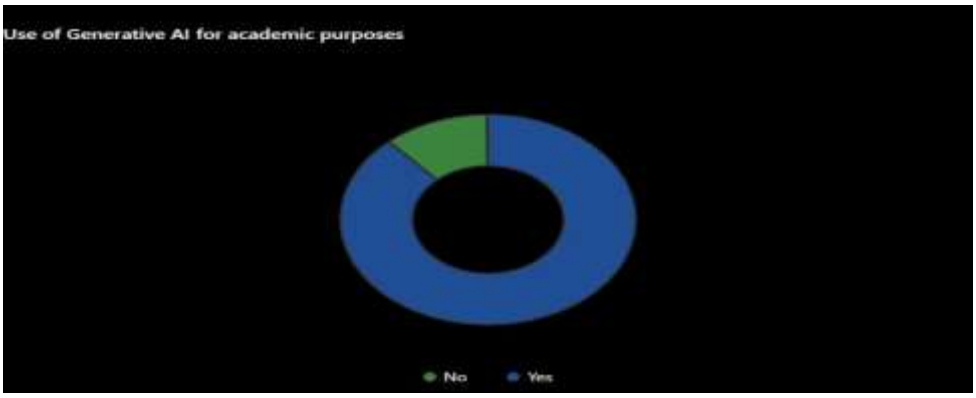

Table 4.2: Use of Generative AI tools in your studies

Responses	Student
Yes	46
No	6

Analysis: The data indicates that 88.5% of students (46 students) use generative AI tools in their studies, while 11.5% (6 students) do not. This indicates a high level of Generative AI adoption among the students surveyed.

- **Common AI Tools Used**

Q3) Which Generative AI tools do you use?

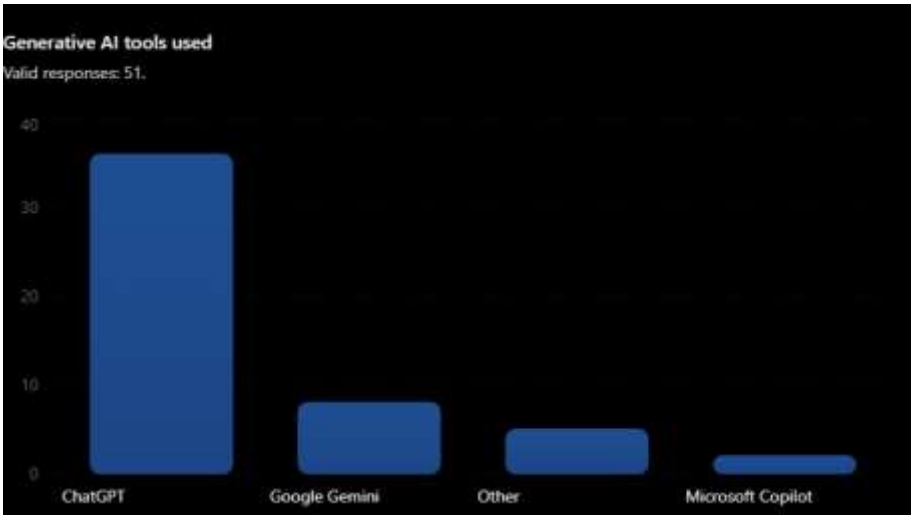

Table 4.3: Common Generative AI tools

Tool	Students
ChatGPT	36
Google Gemini	8
Other	5
Microsoft Copilot	3

Analysis: ChatGPT was the Generative AI tool used most often in this survey (70.6%, 36 students). Google Gemini was used by 15.7% (8 students), while 5 students used other Generative AI tools (9.8%). Microsoft Copilot was used by 3.9% (3 students). One student did not respond to this question. ChatGPT was therefore the most popular AI tool among students in this survey.

- **Purpose in Studies**

Q4) What do you mainly use Generative AI for?

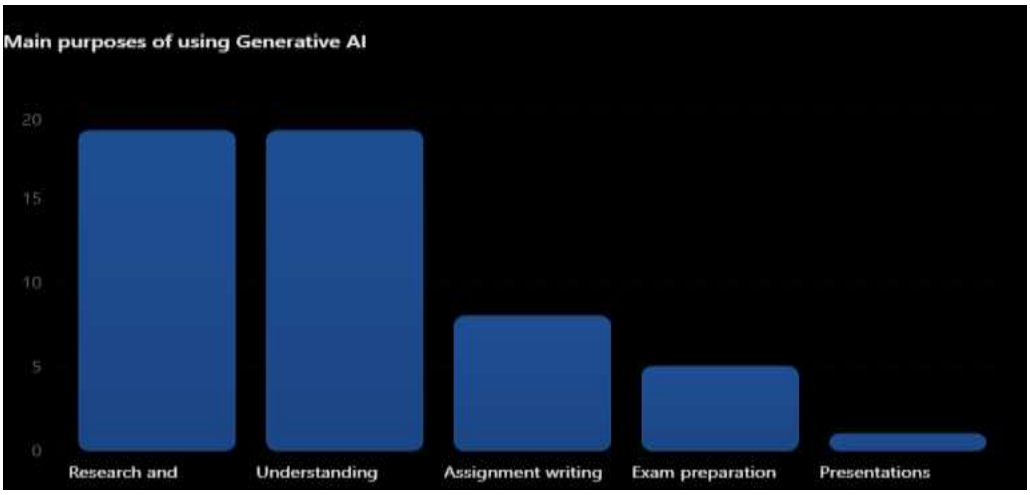

Table 4.4: Purpose of Generative AI in studies

Purpose	Students
Research and information	19
Understanding concepts	19
Assignment writing	8
Exam preparation	5
Presentations	1

Analysis: In this survey, the top two uses of Generative AI among students were research and information (36.5%, 19 students) and understanding difficult concepts (36.5%, 19 students). 8 Students (15.4%) used Generative AI for assignments. 5 Students (9.6%) used Generative AI for exam revision. Just 1 student (1.9%) used Generative AI to create presentations.

This indicates that students in this survey mainly use Generative AI to obtain information and understand difficult concepts.

- **Academic Productivity**

Q5) Overall, Generative AI tools have enhanced my academic performance.

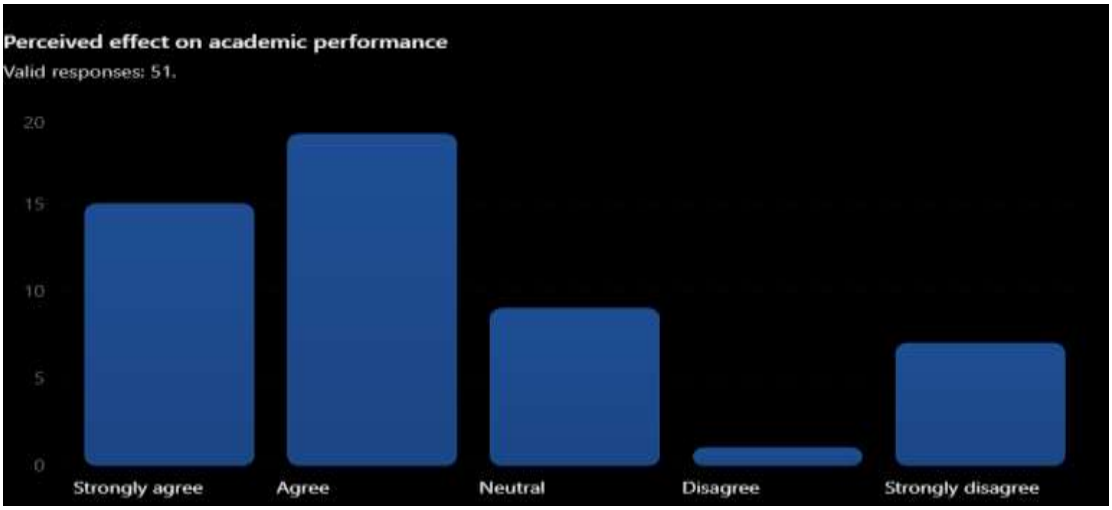

Table 4.5: Perceived improvement in academic performance due to Generative AI

Response	Students
Strongly agree	15
Agree	19
Neutral	9
Disagree	2
Strongly disagree	7

Analysis: 34 Students (66.7%) agree or strongly agree that Generative AI has improved their academic performance. 9 Students (17.6%) reported being neutral. 8 Students (15.7%) disagree to some degree. Overall, students appear to view Generative AI as having a beneficial effect on academic performance. Nevertheless, this rests on opinions rather than results that were objectively measured.

- **Q6) Compared to complex texts, I find study materials generated by AI easier to comprehend.**

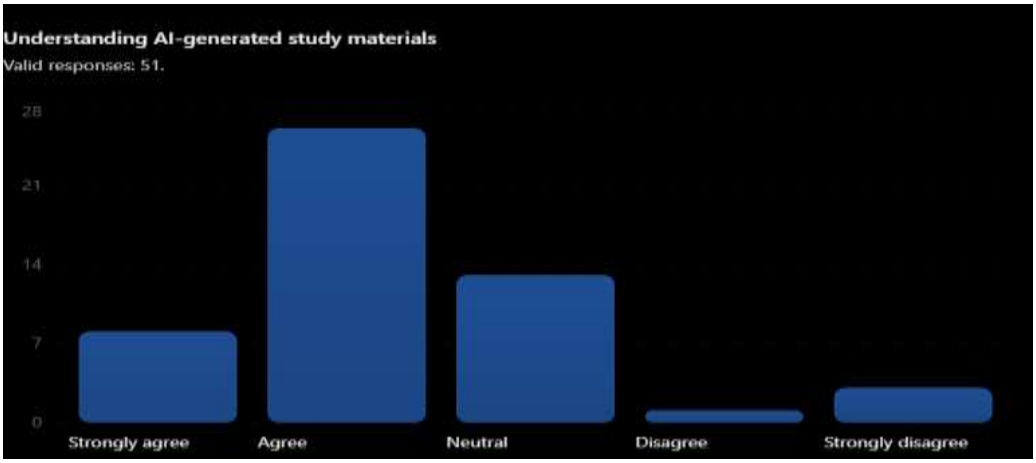

Table 4.6: Ease of understanding study materials generated by AI

Response	Students
Strongly agree	8

Agree	26
Neutral	13
Disagree	2
Strongly disagree	3

Analysis: 34 Students (66.7%) agree or strongly agree that study materials generated by AI are easier to understand than complex texts. 13 Students (25.5%) reported being neutral. 5 Students (7.9%) disagreed or strongly disagreed. This indicates that many students find AI-generated explanations helpful when learning complex academic information.

- **Q7) Do you use AI to generate practice questions for your subjects?**

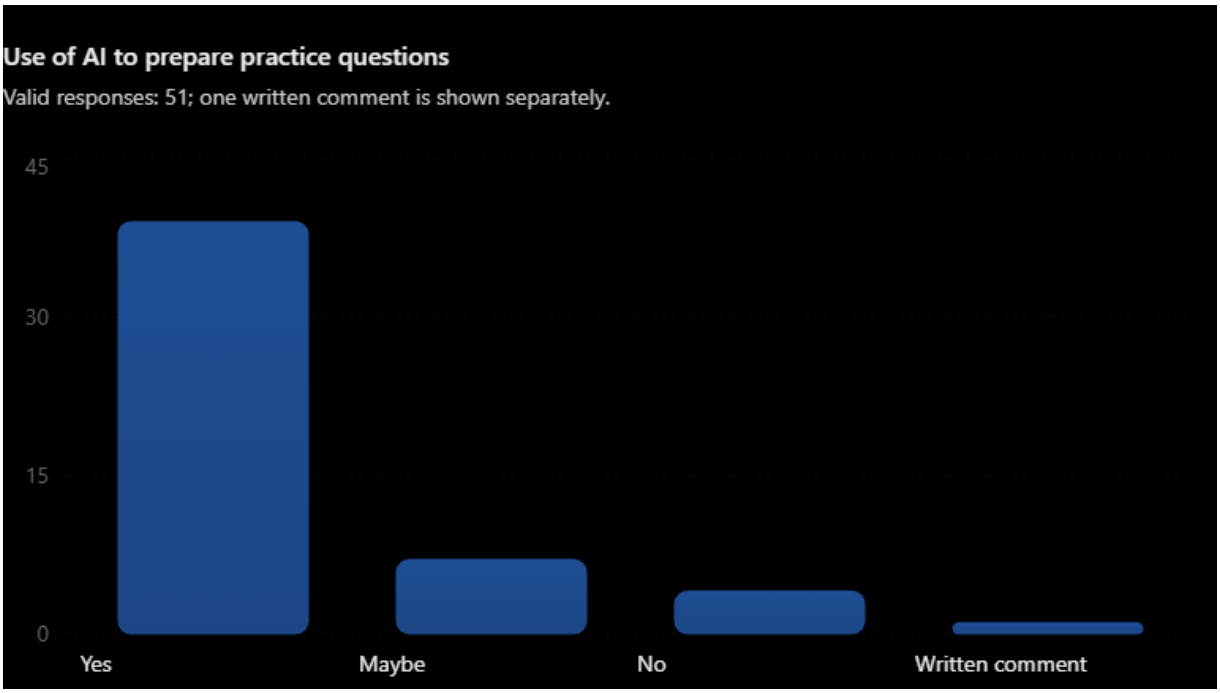

Table 4.7: Generate practice questions for subjects using AI

Response	Student
Yes	39
Maybe	8
No	4
Other (written comment)	1

Analysis: 39 Students (76.5%) use AI to generate practice questions for their subjects. 8 Students (13.7%) answered ‘maybe’. 4 Students (7.8%) answered no. 1 Student commented that they do practice questions, but that it would be preferable to complete questions from previous years and mock tests. Therefore, many students appear to use Generative AI as a supportive learning tool.

1. **Learning Behaviors**

- Q8) Overall, would you say that Generative AI has a positive effect on your learning?

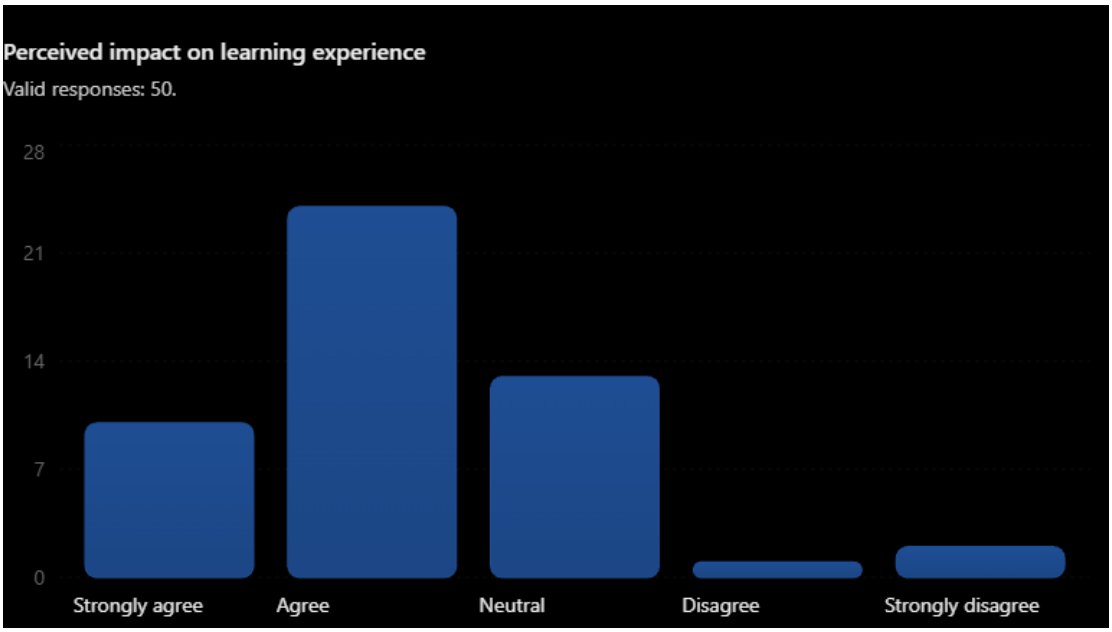

Table 4.8: Views on the positive influence of Generative AI

Response	Student
Strongly agree	10
Agree	24
Neutral	14
Disagree	2
Strongly disagree	2

Analysis: 34 Students (68.0%) agree or strongly agree that Generative AI has a positive influence on their learning. 14 students (26.0%) were neutral, while 4 students (6.0%) disagreed or strongly disagreed. Thus, overall, most students perceive Generative AI as having a positive influence on learning.

- **Q9) Generative AI improves the quality of my academic assignments?**

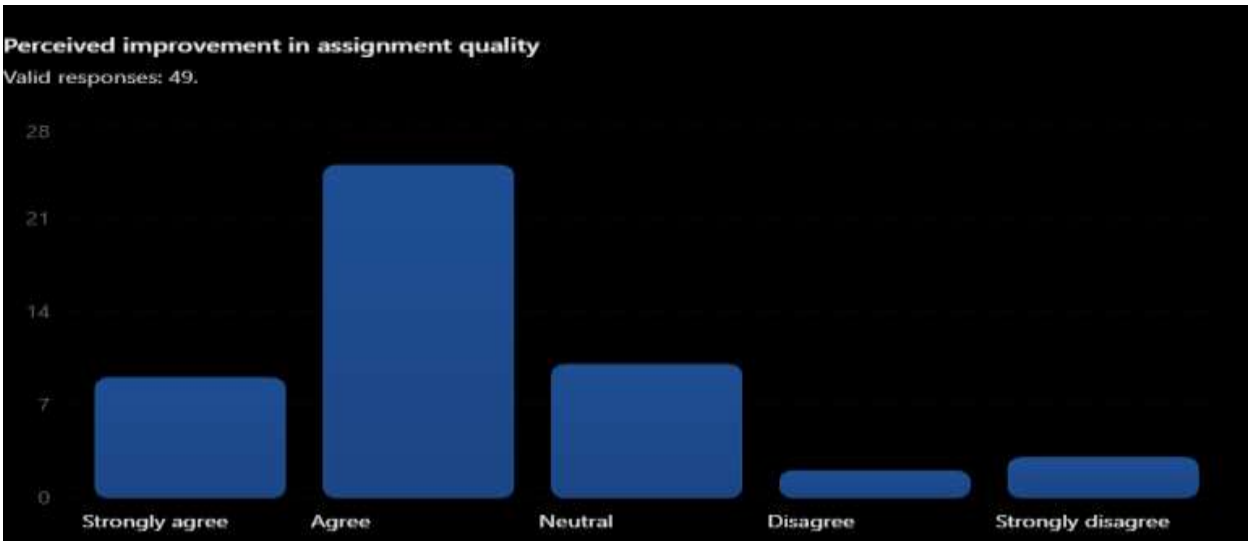

Table 4.9: Perception of improvement in quality of assignments due to Generative AI

Response	Students
Strongly agree	9
Agree	25
Neutral	10
Disagree	3
Strongly disagree	5

Analysis: 34 Students (69.4%) agree or strongly agree that Generative AI enhances the quality of academic assignments. 10 Students (20.4%) remained neutral. 8 Students (10.2%) expressed some level of disagreement. Thus, most students appear to view Generative AI as a useful tool for improving the quality of their academic assignments.

- **Q10) Generative AI saves me time in study/research.**

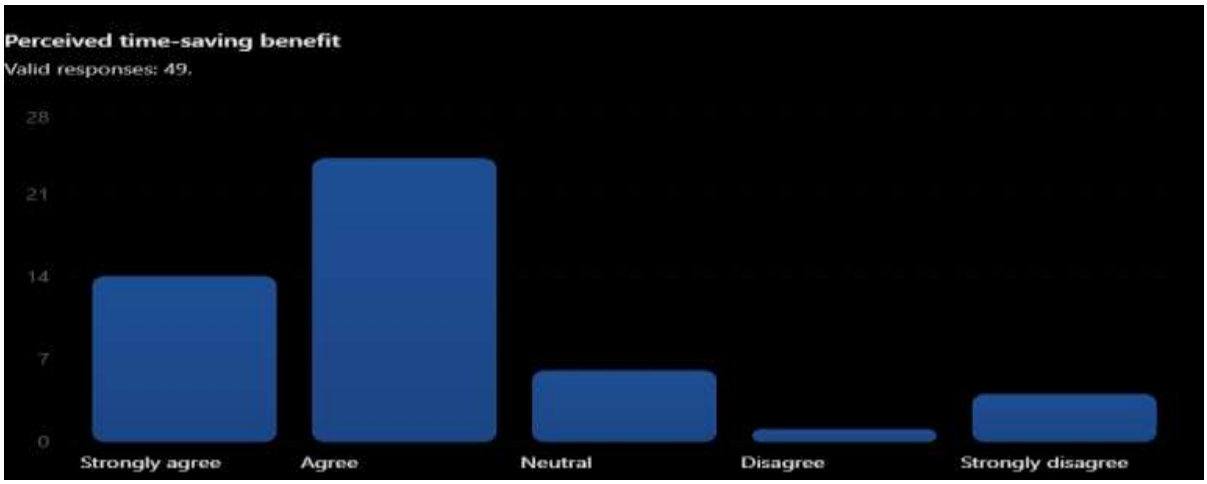

Table 4.10: Saving time in study/research with Generative AI

Response	Students
Strongly agree	14
Agree	26
Neutral	6
Disagree	1
Strongly disagree	5

Analysis: 40 Students (77.6%) agree or strongly agree that Generative AI saves time in study and research. 6 Students (12.2%) were neutral, while 6 students (10.2%) disagreed or strongly disagreed. As a result, saving time in study and research is seen as a major benefit by most students in this survey.

- **Q11) How do you perceive Generative AI in education?**

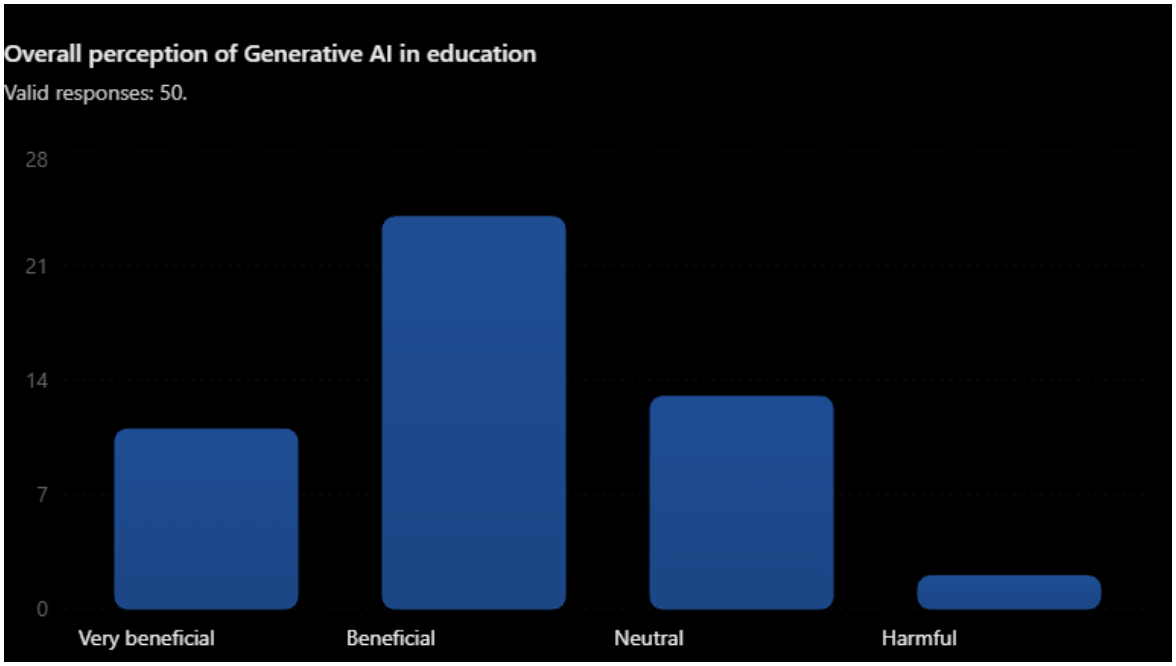

Table 4.11: Students' Views on Generative AI in Education

Response	Students
Very beneficial	12
Beneficial	24
Neutral	13
Harmful	3

Analysis: 36 students (70.0%) regard Generative AI as beneficial or very beneficial for education. 13 students (26.0%) are neutral, while 3 students (4.0%) consider Generative AI harmful. Overall, students in this survey hold a positive perception of Generative AI.

- **Q12) AI-generated answers should not be accepted without understanding.**

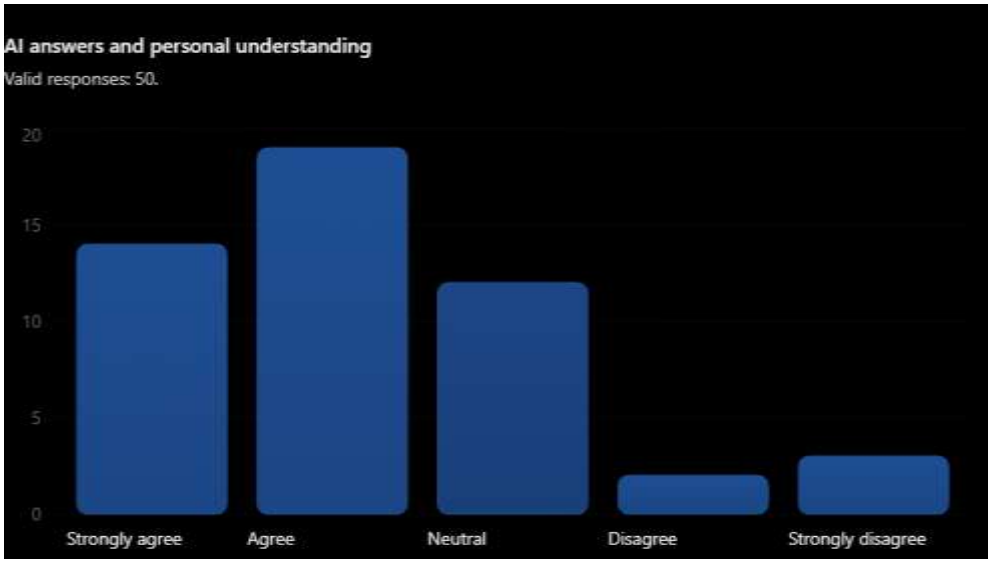

Table 4.12: Perception of the importance of understanding AI-generated answers.

Response	Students
Strongly agree	14
Agree	19
Neutral	13
Disagree	3
Strongly agree	3

Analysis: 33 students (66.0%) either agree or strongly agree that answers generated by AI should not be accepted without understanding. 13 students (24.0%) were neutral. 6 students (10.0%) either disagree or strongly disagree. It therefore seems that most students recognize the importance of understanding AI-generated information.

- Q13) Has Generative AI altered the way you study and revise for exams?

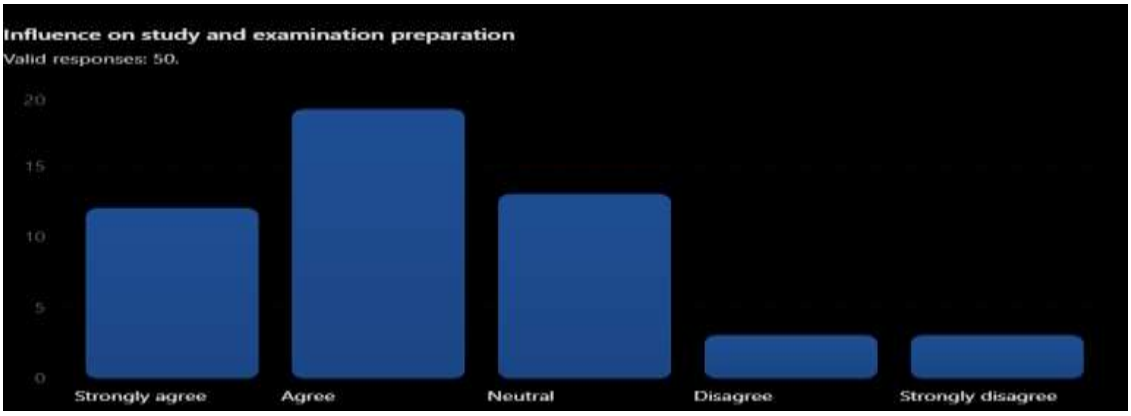

Table 4.13: Impact of Generative AI on study/revision

Response	Students
Strongly agree	12
Agree	19
Neutral	13
Disagree	4
Strongly disagree	4

Analysis: 31 students (62.0%) agree or strongly agree that Generative AI has altered the way they study and revise for exams. 13 students (26.0%) were neutral. 8 students (12.0%) either disagree or strongly disagree. Thus, Generative AI appears to have affected the study habits and exam revision methods of many students in this survey.

- **Q14: Overusing Generative AI may reduce your capacity for critical thinking.**

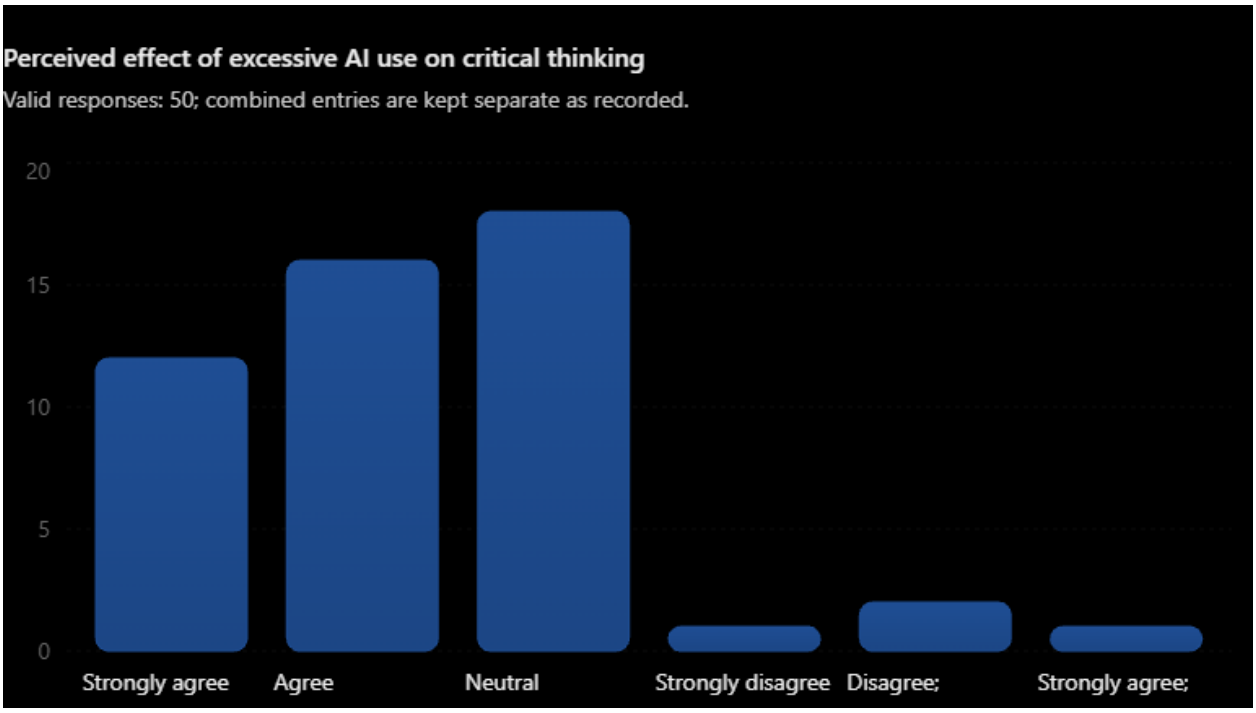

Table 4.13: Perception of the effect of overusing AI on critical thinking

Response	Students
Strongly agree	12
Agree	16
Neutral	18
Strongly disagree	3
Disagree	3

Analysis: 28 students (56.0%) selected either Agree or Strongly Agree, indicating concern that overusing Generative AI may reduce critical thinking. 18 students (36.0%) were neutral. 3 responses include multiple options from the spreadsheet selection. These have been separated because the data do not make clear which individual option the student intended. Overall, it appears that students do have some concerns about the effect of overusing AI on independent thinking.

4.2 Main Findings

Main findings drawn from the analysis of the 52 survey responses:

- Widespread adoption – 88.5% of students use Generative AI for their academic work.
- Most popular tool – ChatGPT was the top choice (70.6%).
- Primary uses – Research/Information and understanding complex concepts were the leading uses of Generative AI (36.5% each).
- Academic productivity – 66.7% of valid respondents agreed or strongly agreed that Generative AI has enhanced their academic performance.
- Understanding study material – 66.7% agreed or strongly agreed that AI-generated study material is easier to understand than complex study materials.
- Better assignments – 69.4% agreed or strongly agreed that Generative AI has raised the quality of assignments.
- Time savings – 77.6% agreed or strongly agreed that Generative AI saves them time in study and

research.

- Practice questions – 76.5% of students use AI to create practice questions.
- Learning – 68.0% agreed or strongly agreed that Generative AI has positively influenced learning.
- Individual understanding – 66.0% agreed or strongly agreed that AI-generated answers should not be accepted until they are understood.
- Critical thinking – 56.0% agreed or strongly agreed that excessive use of AI may weaken critical thinking skills.
- General perception – 70.0% viewed Generative AI as beneficial or very beneficial in education.

Overall, then, Generative AI is seen as a helpful tool for students' studies. Students do, however, recognize how important individual understanding and independent thinking are in their studies.

Discussion with Other Research

These findings can be discussed alongside the research reviewed in section 2.

.1) Academic productivity

In general, many students appear to see Generative AI as improving their academic performance and the quality of their assignments while saving them time. This is consistent with the main themes identified in the literature review in section 2. AI tools appear to benefit academic tasks by providing fast information and explanations.

In this study, however, it is student perceptions that have been measured, not actual improvements in exam scores, assignment scores or study time.

2) Learning behaviors

Students use Generative AI to understand complex concepts, generate practice questions and support exam preparation. Generative AI may therefore be shaping how students acquire and organize information for learning.

These findings should be compared with the other research in the literature synthesis matrix. Compare them with research on engagement, learning outcomes and the use of AI-aided learning resources.

3) Over-Reliance and Critical Thinking

While students generally view AI positively, many concur that answers produced by AI should not be accepted unless they are understood. In addition, more than half of the students voiced concern that excessive use of AI could weaken critical thinking skills.

This suggests that using AI should be balanced with independent study, decision-making, and verifying information.

4) Filling Research Gaps

This study offers primary evidence on how university students believe Generative AI affects academic productivity and learning behavior. A single survey captures the perceived benefits, learning styles, and concerns about over-reliance.

Connect this discussion to the specific findings of valid studies in the literature synthesis matrix in section 2. Note whether they support, contradict, or add to the findings of this research.

4.3 Evaluation of Solutions

Solutions to encourage responsible and effective implementation of Generative AI in education, based on findings from this survey:

Solution Cost Feasibility Scalability Impact on stakeholders Suggested Timeframe Workshops on AI literacy Low-Medium High Positive for students and teachers 1-2 months

Clear guidelines for use of AI in University Low High Positive for students and teaching staff 1-2 months

Training on verifying information Low High Improves evaluation of information 1-3 months Assignments to require independent explanations Low-Medium High-Medium/High

Chapter 5 Conclusion

Generative AI can offer considerable benefits to students. Research has shown that it helps with understanding challenging subjects, producing work, generating new ideas, and making studying more efficient. Additionally, AI can simplify studying and save student's precious time.

Nevertheless, the use of generative AI can affect students' productivity and study habits both positively and negatively. While generative AI can support learning, relying on it too heavily for tasks may weaken students' capacity for independent thinking and problem-solving.

To conclude, generative AI can positively influence students' academic progress when used appropriately. Students should treat generative AI as a study aid rather than using it in ways that restrict their creativity, knowledge, and critical thinking.

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