

INFLUENCE OF AI TOOLS ON STUDENTS' CRITICAL THINKING

BY

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fulfillment for the requirement of the degree of Bachelor's in Business
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DECLARATION

I hereby declare, the project report entitled “INFLUENCE OF AI TOOLS ON STUDENTS’ CRITICAL THINKING” is my original work and has been prepared solely for academic purposes and submitted in partial fulfillment for the requirement of the degree of Bachelor of Business Administration to Nepal Tourism and Hotel Management College. All the information used in this study has been collected from reliable sources and duly acknowledged. This research has not been submitted in any other institutions.

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Signature

NIRAJAN KAFLE

Date: July, 2026

CERTIFICATE

This is to certify, the project work entitled “INFLUENCE OF AI TOOLS ON STUDENTS’ CRITICAL THINKING” submitted by Nirajan Kafle for the partial fulfillment of the requirement of Bachelor of Business Administration embodies Bonafide work carried out under my supervision and guidance. The work is found to be satisfactory and suitable for submission.

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CHAPTER 1

INTRODUCTION

1.1 Background of the study

Artificial Intelligence (AI) has rapidly become a part of everyday life, especially in education. What once seemed like a futuristic technology is now easily accessible to students through tools such as ChatGPT, Google Gemini, Microsoft Copilot, Grammarly, and other AI-powered learning platforms. These tools can generate ideas, explain difficult concepts, summarize lengthy articles, solve mathematical problems, assist with coding, and even help students prepare assignments and presentations within a few minutes. As a result, AI is changing not only how students learn but also how they approach academic tasks. Instead of relying solely on textbooks, teachers, and traditional search engines, many students now turn to AI for quick and personalized assistance.

The growing use of AI in higher education has created new opportunities for improving learning experiences. Students can receive instant feedback, explore different perspectives on a topic, and access explanations that match their level of understanding. AI can reduce the time spent searching for information and help learners focus on understanding concepts rather than memorizing facts. For students who struggle with complex subjects or language barriers, AI tools can make learning more accessible and engaging. When used thoughtfully, these technologies can encourage curiosity, creativity, and self-directed learning.

Despite these advantages, the increasing dependence on AI has also raised important concerns among educators and researchers. One of the most frequently discussed issues is its potential influence on students' critical thinking. Critical thinking refers to the ability to analyze information, evaluate evidence, question assumptions, solve problems logically, and make informed decisions. It is a fundamental skill that enables students to distinguish reliable information from unreliable sources, develop original ideas, and justify their conclusions with evidence. These skills are essential not only for academic success but also for professional and personal decision-making.

Although AI tools provide quick answers and ready-made solutions, there is concern that excessive reliance on them may reduce students' willingness to think independently. When learners accept AI-generated responses without questioning their accuracy, comparing different viewpoints, or verifying information from credible sources, they may miss opportunities to strengthen their reasoning and analytical abilities. At the same time, it is also possible that AI can support critical thinking by encouraging students to ask better questions, compare alternative explanations, and explore issues in greater depth. Therefore, the influence of AI on critical thinking is not necessarily positive or negative; it depends on how students use these technologies.

In recent years, the use of AI tools has increased significantly among university students in Nepal. Many students use AI for report writing, brainstorming ideas, preparing presentations, solving numerical problems, translating content, and studying for examinations. However, there is still limited research that specifically examines how these tools influence the critical thinking skills of undergraduate students in the Nepalese context. As educational institutions continue to integrate digital technologies into teaching and learning, understanding this relationship has become increasingly important.

This study therefore aims to examine the influence of AI tools on students' critical thinking. It seeks to understand students' patterns of AI use, the purposes for which they use these tools, their level of dependence on AI, and their awareness of responsible and ethical AI practices. The findings are expected to provide valuable insights for students, teachers, educational institutions, and policymakers regarding the effective integration of AI into higher education. Ultimately, the study hopes to contribute to promoting a balanced approach in which AI serves as a supportive learning tool while students continue to develop independent thinking, analytical reasoning, and sound decision-making skills.

1.2 Objectives of the Study

1.2.1 General Objective

- To examine the influence of AI tools on students' critical thinking

1.2.2 Specific Objectives

- To explore the pattern and purpose of AI tool usage among undergraduate students for academic activities.
- To examine the effect of AI-assisted learning on students' ability to analyze and evaluate information.
- To investigate whether dependence on AI tools affects students' independent thinking.
- To evaluate students' awareness of the responsible and ethical use of AI tools in academic learning.

1.3 Statement of Problem

The rapid advancement of Artificial Intelligence (AI) has transformed the educational landscape by providing students with easy access to intelligent tools such as ChatGPT, Google Gemini, Microsoft Copilot, and Grammarly. These technologies have become increasingly popular among university students because they offer instant answers, generate ideas, summarize information, and assist with assignments, presentations, and research. While AI has undoubtedly improved access to information and made learning more convenient, its growing use has also raised concerns about its influence on students' ability to think critically. As AI tools become more integrated into academic activities, it is important to understand whether they are enhancing students' thinking abilities or encouraging dependence on technology.

Critical thinking is one of the most important learning outcomes in higher education. It enables students to analyze information, evaluate evidence, solve problems logically, make informed decisions, and develop independent opinions. These skills are essential not only for academic success but also for future professional and personal life. However, the availability of AI-generated responses may reduce the need for students to engage deeply with learning

materials. Instead of analyzing different perspectives or constructing their own arguments, some students may simply accept AI-generated content without verifying its accuracy or credibility. Such practices may weaken analytical reasoning, creativity, and independent thinking over time.

Although previous studies have examined the role of AI in education, their findings remain inconsistent. Some researchers argue that AI supports critical thinking by providing personalized learning experiences, encouraging exploration of new ideas, and improving access to knowledge. Others suggest that excessive dependence on AI may reduce students' cognitive engagement and discourage independent problem-solving. These mixed findings indicate that the relationship between AI tool usage and critical thinking is still not fully understood. Furthermore, most existing studies have been conducted in developed countries, while empirical evidence from developing countries such as Nepal remains limited.

In Nepal, the use of AI tools among undergraduate students has increased significantly in recent years due to improved internet accessibility and the widespread availability of free AI applications. Many students now rely on these tools for completing assignments, preparing reports, studying for examinations, and generating academic content. However, there is limited research examining how this increasing use of AI influences students' critical thinking skills, their level of dependence on AI, and their awareness of the responsible and ethical use of these technologies. This lack of evidence makes it difficult for educators and educational institutions to develop effective strategies that encourage the productive use of AI while preserving students' independent thinking abilities.

Therefore, this study seeks to examine the influence of AI tools on students' critical thinking. Specifically, it aims to explore students' patterns and purposes of AI tool usage, examine the effect of AI-assisted learning on analytical and evaluative thinking, investigate whether dependence on AI affects independent thinking, and assess students' awareness of the responsible and ethical use of AI in academic learning. The findings of this study are expected to provide valuable insights for students, educators, educational institutions, and policymakers in promoting the effective and responsible integration of AI into higher education while strengthening students' critical thinking skills.

This study aims on covering and answering the following questions:

- What are the patterns and purposes of AI tool usage among undergraduate students for academic activities?
- How does AI-assisted learning affect students' ability to analyze and evaluate information?
- Does dependence on AI tools affect students' independent thinking?
- What is the level of students' awareness regarding the responsible and ethical use of AI tools in academic learning?

1.4 Organization of the study

This report is organized in five parts: Introduction, Literature Review, Research methodology, Data Analysis and Presentation, and Summary and Conclusions.

- Introduction: The first chapter of this study includes Background, Objectives of the study, Statement of problem, Organization of the study, Significant of the study and Limitation of the study.
- Literature review: Literature review is the study of already published reports and work that helps to fulfill research gap and build a framework for the study. This chapter includes review of research and conceptual framework.
- Research Methodology: This chapter explains the research methodology employed to conduct the study and techniques used in analysis of data. The research design, data collection procedures and processing and analysis procedures are mentioned in this section.
- Data analysis and presentation: In this part, all the findings regarding the research are presented with reference to charts and diagrams and explained using statistical tools.
- Summary and conclusion: The final chapter of this report consists of summary of the whole report, recommendations and references.

1.5 Significance of the study

Significance of the Study

Artificial Intelligence (AI) has become an integral part of modern education, changing the way students access information, complete assignments, conduct research, and prepare for examinations. As AI-powered tools continue to gain popularity among undergraduate students, it has become increasingly important to understand how these technologies influence students' critical thinking skills. This study is significant because it explores whether AI tools serve as a means of enhancing students' analytical and reasoning abilities or whether excessive reliance on these technologies discourages independent thinking. The findings of this research will provide valuable insights into students' patterns of AI usage, their dependence on AI for academic tasks, and their awareness of the responsible and ethical use of these tools. By examining these aspects, the study will contribute to a better understanding of how AI can be integrated into education in a way that supports learning while preserving the development of essential cognitive skills.

The findings of this study will be beneficial to several stakeholders in the education sector. For students, the research will increase awareness of the importance of balancing the use of AI with independent thinking, encouraging them to use AI as a learning assistant rather than as a replacement for their own judgment and problem-solving abilities. For educators, the study will provide a clearer understanding of how students use AI in their academic activities and how this may influence their ability to analyze, evaluate, and interpret information. Such insights can help teachers adopt appropriate teaching methods, learning activities, and assessment strategies that promote critical thinking while making effective use of emerging technologies. Similarly, educational institutions may use the findings to develop policies, guidelines, and academic practices that encourage the ethical and responsible use of AI, ensuring that technological advancements support educational quality rather than undermine it.

Furthermore, this study is expected to contribute to the existing body of knowledge on AI in education, particularly within the Nepalese higher education context, where empirical research on this topic remains limited. As AI technologies continue to evolve rapidly, understanding their educational implications has become increasingly important for

policymakers, educational authorities, and future researchers. The findings may assist policymakers in developing appropriate frameworks for integrating AI into higher education while maintaining academic integrity and fostering students' intellectual development. In addition, the study will serve as a useful reference for future researchers who wish to explore related topics involving AI, digital learning, and critical thinking among different groups of students. Ultimately, this research seeks to encourage the responsible use of AI in education by demonstrating that while AI can significantly improve learning experiences, it should complement rather than replace students' ability to think critically, solve problems independently, and make informed decisions.

1.6 Limitations of the Study

Limitations of the Study

This study has several limitations that should be considered while interpreting its findings. The research is limited to undergraduate students of a selected college; therefore, the findings may not be representative of all undergraduate students in Nepal. Students from different universities, academic programs, or geographical regions may have different levels of exposure to AI tools and different critical thinking abilities. In addition, the study uses a quantitative research design and relies on primary data collected through a structured questionnaire. Since the data are based on self-reported responses, there is a possibility of response bias, where participants may overstate or understate their actual use of AI tools and their critical thinking skills. Furthermore, the study examines only the influence of AI tools on students' critical thinking and does not include other factors such as teaching methods, academic performance, learning environment, digital literacy, or personal motivation, which may also influence critical thinking.

Another limitation is that the study adopts a cross-sectional research design, meaning that data are collected at a single point in time. As a result, the findings reflect students' perceptions and experiences only during the period of the survey and cannot establish long-term effects or definite cause-and-effect relationships between AI tool usage and critical thinking. The study is also conducted within the limitations of available time, resources, and sample size, which may restrict the scope of data collection and analysis. Despite these limitations, the research is expected to provide meaningful insights into the influence of AI

tools on students' critical thinking and contribute to the growing body of knowledge on the use of AI in higher education. It may also serve as a useful reference for educators, policymakers, and future researchers who wish to explore this topic in greater depth using larger samples, different research designs, or additional variables.

CHAPTER 2

LITERATURE REVIEW

2.1 Literature Review

Artificial Intelligence (AI) has become one of the most influential technological advancements in the field of education, transforming the way students learn, access information, and complete academic tasks. According to Russell and Norvig (2021), *Artificial Intelligence: A Modern Approach*, "Artificial intelligence is the study of intelligent agents that receive percepts from the environment and perform actions that maximize their chances of achieving their goals." This definition highlights AI as a system capable of performing tasks that normally require human intelligence, including learning, reasoning, problem-solving, and decision-making. The rapid advancement of AI technologies has resulted in the development of various educational tools such as ChatGPT, Google Gemini, Microsoft Copilot, Grammarly, and Perplexity AI, which are increasingly being used by students for academic purposes. These tools assist learners in generating ideas, improving writing quality, summarizing academic content, solving complex problems, and obtaining immediate explanations, thereby making the learning process more efficient and accessible.

UNESCO (2023), in *Guidance for Generative AI in Education and Research*, states that "Generative AI has enormous potential to support teaching, learning and research, but it also raises concerns about human agency, equity, transparency and academic integrity." This statement indicates that although AI provides significant educational benefits, its use should be carefully managed to ensure that technology complements rather than replaces students' intellectual efforts. UNESCO further emphasizes that educational institutions should promote responsible AI practices by encouraging students to verify AI-generated information, acknowledge AI assistance where appropriate, and maintain academic honesty. Consequently, the role of AI in education should focus on enhancing learning experiences while preserving the development of independent thinking and ethical decision-making.

Critical thinking is considered one of the most essential competencies that students are expected to develop during higher education. Facione (2020), in *Critical Thinking: What It Is and Why It Counts*, defines critical thinking as "purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation, inference, and explanation." This definition emphasizes that critical thinking is not limited to acquiring knowledge but involves the ability to examine information carefully, evaluate evidence objectively, and make logical decisions based on sound reasoning. Similarly, Paul and Elder (2020), in *The Miniature Guide to Critical Thinking Concepts and Tools*, explain that "Critical thinking is the art of analyzing and evaluating thinking with a view to improving it." Their perspective suggests that students become effective learners when they continuously question assumptions, assess different viewpoints, and reflect on their own thinking processes. Therefore, higher education institutions consider critical thinking a fundamental skill that prepares students to solve real-world problems, make informed decisions, and become lifelong learners.

The growing availability of AI-powered learning tools has generated increasing interest among researchers regarding their influence on students' critical thinking. Kasneci et al. (2023) argued that generative AI systems such as ChatGPT provide students with immediate explanations, personalized feedback, and learning support, enabling them to understand difficult concepts more effectively. However, the authors also caution that excessive dependence on AI-generated responses may reduce students' cognitive engagement if learners accept answers without questioning their accuracy or evaluating alternative sources of information. Similarly, Crompton and Burke (2023) reported that AI technologies positively influence learning when integrated into student-centered teaching approaches that encourage inquiry, discussion, and reflection. According to the authors, AI should be viewed as a supportive educational technology that enhances students' reasoning and problem-solving abilities rather than replacing their independent thinking. These findings indicate that the educational value of AI depends largely on how students use these technologies and whether they remain actively engaged in the learning process.

Recent studies further suggest that responsible and ethical use of AI plays a significant role in determining its impact on students' critical thinking. According to the International Society for Technology in Education (ISTE, 2023), students should develop AI literacy by

understanding the strengths, limitations, and potential biases of AI systems while critically evaluating AI-generated information before using it in academic work. Similarly, UNESCO (2023) recommends that educational institutions integrate AI literacy into higher education curricula to ensure that students use AI responsibly, protect academic integrity, and continue developing independent reasoning skills. These recommendations demonstrate that AI should not be considered a substitute for students' intellectual effort but rather a learning companion that supports creativity, problem-solving, and reflective thinking when used appropriately. Therefore, understanding students' patterns of AI use, their dependence on AI technologies, and their awareness of responsible AI practices has become increasingly important in evaluating the influence of AI tools on students' critical thinking.

2.2 Conceptual Framework

Conceptual framework shows the relationship between dependent and independent variables. According to the research “Influence of AI tools on students’ critical thinking”, students’ critical thinking is a dependent variable and pattern of AI tool usage, purpose of AI tool usage, dependence on AI tools and awareness of responsible and ethical AI use are independent variables.

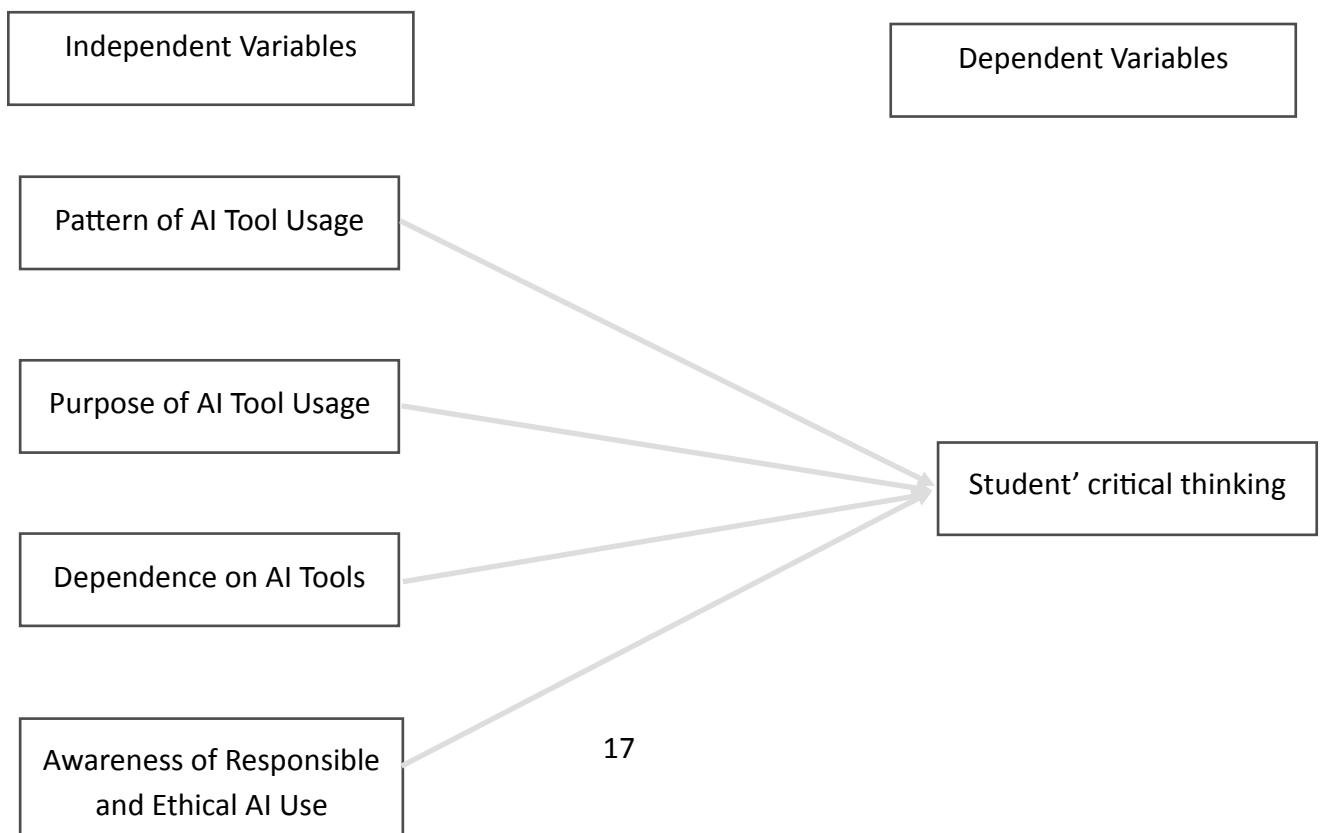


Figure 1: Conceptual Framework

Operational Explanation of Decision Making

In this study, students' critical thinking refers to the ability of undergraduate students to analyze information, evaluate evidence, make logical judgments, solve problems, and think independently while performing academic tasks. It also includes students' ability to question the accuracy and reliability of AI-generated information rather than accepting it without verification.

Students' critical thinking will be measured using structured questionnaire items based on the following observable dimensions:

- Frequency of AI tool usage
- Enhancement of academic performance
- Preference for AI over independent thinking
- Responsible use of AI in academic work

Responses will be collected using a Likert scale (e.g., strongly agree to strongly disagree) and analyzed in percentage form to determine the overall influence of AI tools on students' critical thinking.

- **Pattern and purpose of AI Tool Usage**

The pattern and purpose of AI tool usage refer to how frequently students use AI tools, the types of AI applications they use, and the academic purposes for which these tools are utilized. With the increasing availability of generative AI tools such as ChatGPT, Google Gemini, Microsoft Copilot, and Grammarly, students use AI for a wide range of activities, including completing assignments, conducting research, generating ideas, improving writing, solving problems, and preparing for

examinations. According to UNESCO (2023), AI tools can enhance students' learning experiences by providing timely information, personalized support, and interactive learning opportunities. However, the educational outcomes largely depend on the frequency, purpose, and manner in which these tools are used. Students who use AI as a learning aid may develop deeper understanding and improve their academic performance, whereas those who rely on AI primarily to complete tasks without active engagement may experience reduced learning opportunities.

- **AI-Assisted Learning**

AI-assisted learning refers to the use of Artificial Intelligence technologies to support and improve students' learning experiences through personalized guidance, immediate feedback, adaptive instruction, and problem-solving assistance. AI tools enable students to receive explanations tailored to their learning needs, clarify difficult concepts, generate examples, and obtain instant responses to academic questions. According to Kasneci et al. (2023), generative AI has the potential to enhance learning by promoting personalized education and supporting students in understanding complex subjects. Similarly, Crompton and Burke (2023) reported that AI applications can improve student engagement, self-directed learning, and academic performance when integrated effectively into educational practices. Therefore, AI-assisted learning is expected to influence how students acquire knowledge and develop higher-order thinking skills.

- **Dependence on AI Tools**

Dependence on AI tools refers to the extent to which students rely on AI technologies to complete academic tasks rather than applying their own knowledge, reasoning, and problem-solving abilities. While AI provides convenient access to information and learning support, excessive dependence may reduce students' motivation to think independently and critically evaluate information. Kasneci et al. (2023) emphasized that although generative AI offers significant educational benefits, overreliance on

AI-generated responses may decrease cognitive engagement if students accept information without questioning its accuracy. UNESCO (2023) also highlighted that students should avoid using AI as a substitute for independent thinking and instead use it as a supportive learning resource. Therefore, the level of dependence on AI is considered an important factor in determining its influence on students' critical thinking.

- **Awareness of Responsible and Ethical Use of AI Tools**

Awareness of responsible and ethical use of AI tools refers to students' understanding of the appropriate, honest, and accountable use of AI technologies in academic settings. It includes awareness of academic integrity, plagiarism, proper citation practices, verification of AI-generated information, and recognition of the limitations and potential biases of AI systems. UNESCO (2023) emphasized that responsible AI use requires students to critically evaluate AI-generated content, acknowledge AI assistance when appropriate, and maintain ethical standards in their academic work. Similarly, the International Society for Technology in Education (ISTE, 2023) recommends that students develop AI literacy by understanding both the opportunities and limitations of AI technologies. A higher level of ethical awareness is expected to encourage students to use AI as a learning support tool while maintaining independent thinking, originality, and academic honesty.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter deals with the methods and techniques that were used in the study. It includes research design, nature and sources of data, population and the sample, and data analysis and presentation. Below is the procedure that was adopted to meet the research questions and accomplish the objectives of the research.

3.1 Research Design

This study adopts a descriptive research design to examine the influence of AI tools on students' critical thinking. Descriptive research design is used to systematically describe the characteristics, behaviors, and perceptions of a population as they exist, without manipulating any variables. The purpose of this design is to provide an accurate and detailed picture of how AI tools influence students' critical thinking.

The descriptive design is appropriate for this study because it allows the researcher to observe and record respondents' experiences, opinions, and attitudes regarding students' critical thinking in a natural setting. Data are collected using structured questionnaires to measure levels of influence of AI tools on students' critical thinking. This design helps in identifying trends, frequencies, and relationships among variables.

Furthermore, descriptive research enables the study to cover a relatively large sample within a limited time frame, making it suitable for cross-sectional data collection. By summarizing responses through tables, percentages, and charts, the design provides clear and meaningful insights into the nature and extent of AI tools influence. Overall, the descriptive research design supports a comprehensive understanding of the phenomenon under study while maintaining objectivity and neutrality.

3.2 Nature and sources of data

The study is based on both primary and secondary data, ensuring a comprehensive understanding of the influence of AI tools on students' critical thinking. Primary data are quantitative in nature and were collected directly from the respondents for the specific purpose of this study. The primary data were obtained through a structured questionnaire designed to gather information on students' patterns and purposes of AI tool usage, AI-assisted learning, dependence on AI tools, awareness of responsible and ethical use of AI, and their critical thinking abilities in academic contexts. The questionnaire used close-ended questions and Likert scale to ensure uniformity, consistency, and ease of analysis.

Secondary data were collected to support and strengthen the theoretical foundation of the study. These data were obtained from published sources such as academic journals, research articles, textbooks, research reports, university publications, and online scholarly databases including Google Scholar. Secondary sources were used to review existing literature on Artificial Intelligence, AI tools in education, students' critical thinking, AI-assisted learning, and the responsible and ethical use of AI. These sources also helped in identifying the existing research gap and developing the research objectives, variables, questionnaire, and methodology of the study.

Overall, the combination of primary and secondary data enhances the reliability and validity of the study by integrating firsthand responses from undergraduate students with established academic findings. The primary data provide direct insights into students' experiences and practices regarding the use of AI tools, while the secondary data provide the theoretical and empirical foundation necessary to understand their influence on students' critical thinking.

3.3 Population and Sample of the Study

The population of the study comprises undergraduate students who are currently enrolled in undergraduate programs and have experience using or are familiar with AI tools for academic purposes. Undergraduate students are considered an appropriate population for this study because they increasingly use AI-powered tools such as ChatGPT, Google Gemini, Microsoft Copilot, Grammarly, and other AI applications for various academic activities. These

activities may include preparing assignments, conducting research, generating ideas, understanding difficult concepts, improving written work, and preparing for examinations. As AI tools are becoming increasingly accessible to students, this population provides a suitable basis for examining how the use of such technologies may influence students' critical thinking, including their ability to analyze and evaluate information and think independently. From this population, a sample was selected to represent the larger group of undergraduate students. The sample consists of a limited number of students who were selected based on their accessibility, availability, and willingness to participate in the study. A non-probability sampling technique, specifically convenience sampling, was used due to limitations related to time, resources, and accessibility of respondents. This method allowed the researcher to collect the required data within the available period while reaching students who were relevant to the study. The selected respondents were provided with a structured questionnaire to obtain information regarding their pattern and purpose of AI tool usage, AI-assisted learning, dependence on AI tools, awareness of responsible and ethical AI use, and their critical thinking abilities. The sample was considered appropriate for obtaining firsthand information about students' experiences and perceptions regarding the use of AI tools in academic learning. The collected responses were then used for analysis to examine the influence of AI tools on students' critical thinking.

3.4 Data Analysis and Presentation

The data collected through the structured questionnaire were analyzed using descriptive statistical tools to achieve the objectives of the study. The collected responses were carefully checked, organized, coded, and tabulated to ensure accuracy and consistency before analysis. Since the study is quantitative in nature, the data were analyzed using simple statistical techniques such as frequency, percentage, mean, and other appropriate measures of central tendency to summarize respondents' views and experiences regarding the use of AI tools and their critical thinking. The analysis focused on students' patterns and purposes of AI tool usage, AI-assisted learning, dependence on AI tools, awareness of responsible and ethical use of AI, and their critical thinking abilities in academic activities.

The analyzed data were presented in an organized and systematic manner using tables and charts to enhance clarity and understanding. Tables were used to present the frequency and percentage distribution of respondents' responses, while charts were used to visually represent important findings related to the use of AI tools, purposes of AI usage, AI-assisted learning, dependence on AI, responsible and ethical use of AI, and students' critical thinking. These visual tools helped in comparing responses and identifying patterns and trends in the collected data more easily. The interpretation of the findings focused on explaining the results in relation to the research objectives and questions without making unsupported causal conclusions. The results were discussed in a neutral and objective manner so that they accurately reflected the responses provided by the participants.

Overall, the use of descriptive statistical analysis and graphical presentation helped to organize the collected information in a clear, understandable, and meaningful manner. The analysis provided a systematic basis for examining the influence of AI tools on students' critical thinking and helped identify patterns in how undergraduate students use AI for academic purposes. The findings obtained from the analysis were then used to draw conclusions and provide recommendations based on the objectives of the study.

CHAPTER 4

DATA PRESENTATION AND ANALYSIS

The data collected through the questionnaire were first carefully reviewed and organized for analysis. After checking for completeness and accuracy, the responses were coded and entered into a spreadsheet to make the analysis easier and more systematic. Simple descriptive methods were used to interpret the information collected from the respondents.

To make the findings easy to understand, the data were presented using tables, percentages, pie charts, and bar diagrams. Percentage analysis was mainly used to summarize the responses and highlight the major patterns among the students. The graphical presentations helped to visually show how AI influences students' critical thinking in a clear and simple way.

The analysis covered both the demographic characteristics of the respondents and the key variables related to influence of AI tools on students' critical thinking. Based on the results obtained, meaningful interpretations were made to support the objectives of the study and to draw practical conclusions.

4.1 Demographic Profile of Respondents

A total of 50 undergraduate students from Nepal Tourism and Hotel Management College were selected as respondents for this study using the convenience sampling method. The selection was made considering the accessibility and willingness of students to participate in the survey. The demographic profile of the respondents is important as it provides a clear overview of the background characteristics of the sample group and helps in better interpretation of the research findings. The collected demographic information is presented below with the help of tables and simple graphical representations for easy understanding and analysis.

4.1.1 Age of respondents

Table 1

Age Distribution	Percentage (%)
Below 18	0
18-20	28.6%
21-23	71.4%
24-26	0
Above 26	0

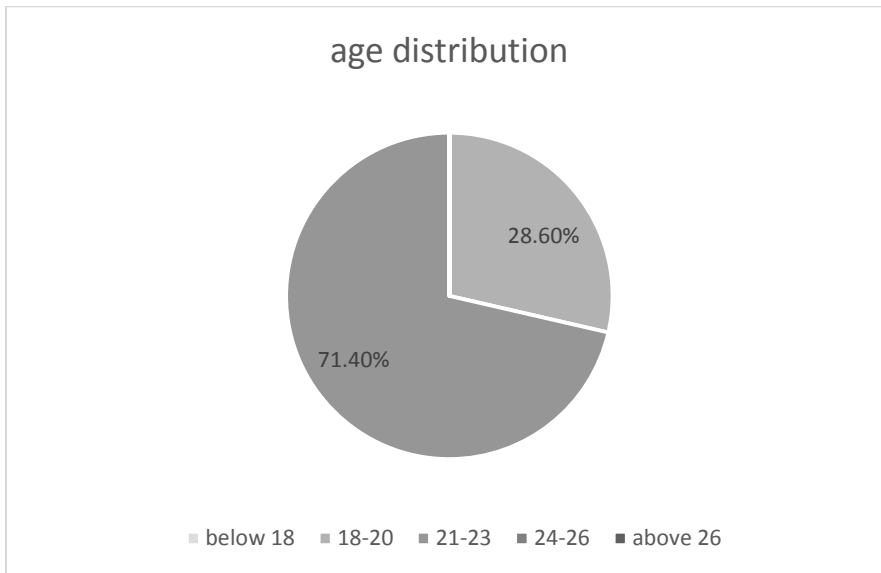


Figure 2: Age Distribution

The above table shows the age distribution of the respondents. Among the total participants, the majority (71.4%) fall within the age group of 21-23. About 28.6% of the respondents are above 18-20 years.

4.1.2 Gender distribution

Table 2

Gender distribution	Percentage (%)
Male	64.3%
Female	35.7%
Prefer not to say	0

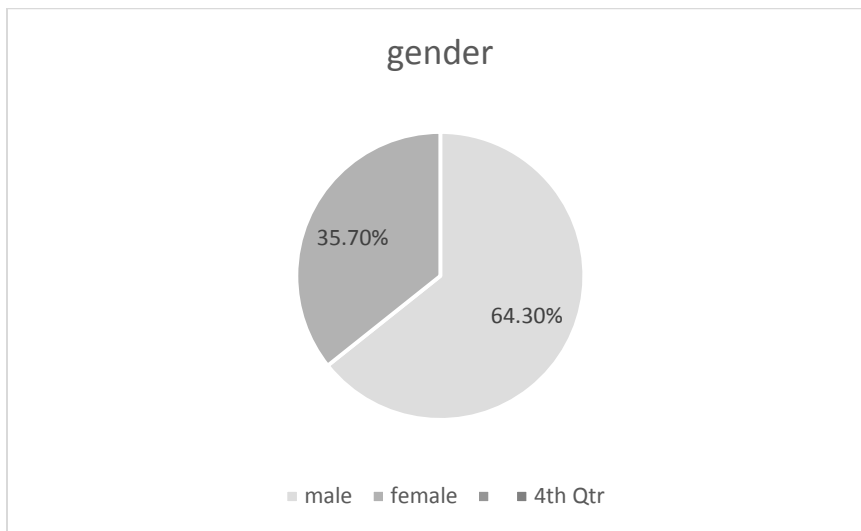


Figure 3: Gender Distribution

The gender distribution of the respondents shows that the majority of participants were male, accounting for 64.3% of the total sample. Female respondents made up 35.7%, while no participants identified under the others category.

4.1.3 Faculty

Table 3

Faculty	Percentage (%)
BBA	57%
BBA Finance	14%
BSc IT	10%
BBS	12%
BHM	7%

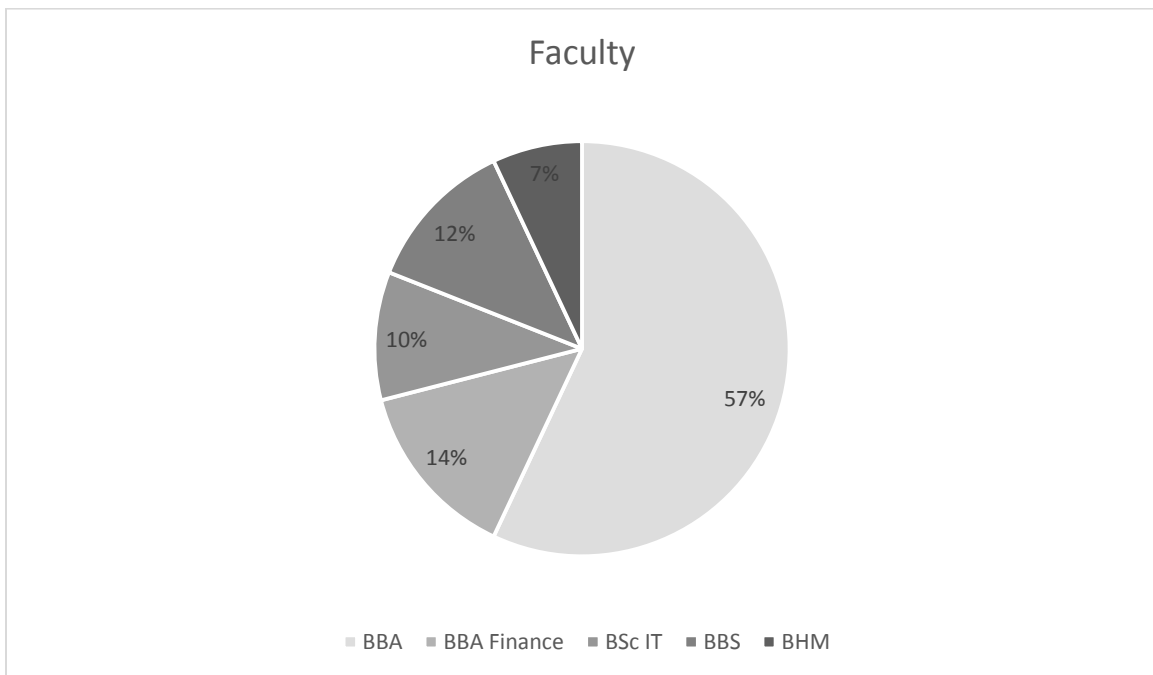


Figure 4: Faculty distribution

The chart shows the distribution of respondents by faculty. Out of the total participants, the majority were from BBA, making up 57% of the sample. BBA Finance and BBS accounted for 14%, and 12% while BSc IT represented 10%, respectively and BHM 7%.

4.2 Critical Thinking and Use of AI tools

The growing use of Artificial Intelligence (AI) has changed the way students approach their academic work. Students now use AI tools for activities such as finding information, generating ideas, preparing assignments, summarizing study materials, and understanding topics that they find difficult. When used properly, these tools can support critical thinking by exposing students to different explanations and viewpoints and helping them explore a topic more deeply. However, simply using AI does not automatically improve a student's ability to think critically. The way students interact with the information provided by AI is more important. Students who use AI to support their learning and then question, compare, and verify the information can develop stronger analytical and reasoning skills. In contrast, students who regularly depend on AI to provide ready-made answers may put less effort into thinking through problems on their own. This can gradually affect their ability to evaluate information, form their own opinions, and make independent decisions. Therefore, the relationship between AI use and critical thinking depends on factors such as the purpose and frequency of AI use, the level of dependence on these tools, and students' willingness to evaluate AI-generated information. Using AI as a supporting tool rather than as a replacement for personal effort can help students gain the benefits of technology while continuing to develop their own critical thinking abilities.

4.2.1 Pattern of AI tool use

Table 4: Pattern of AI tool use

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I use AI tools regularly for academic purpose.	7.14%	7.14%	28.57%	50.00%	7.14%
AI tools are part of my daily study routine.	0.00%	28.57%	28.57%	35.71%	7.14%
I use AI tools before consulting textbooks or teachers.	21.43%	7.14%	42.86%	7.14%	21.43%
I frequently use AI tools to complete assignments.	7.69%	7.69%	23.08%	53.85%	7.69%
I use AI tools for learning new concepts beyond classroom teaching.	0.00%	7.14%	35.71%	21.43%	35.71%
Total (Topic Average)	7.25%	11.54%	31.76%	33.63%	15.82%

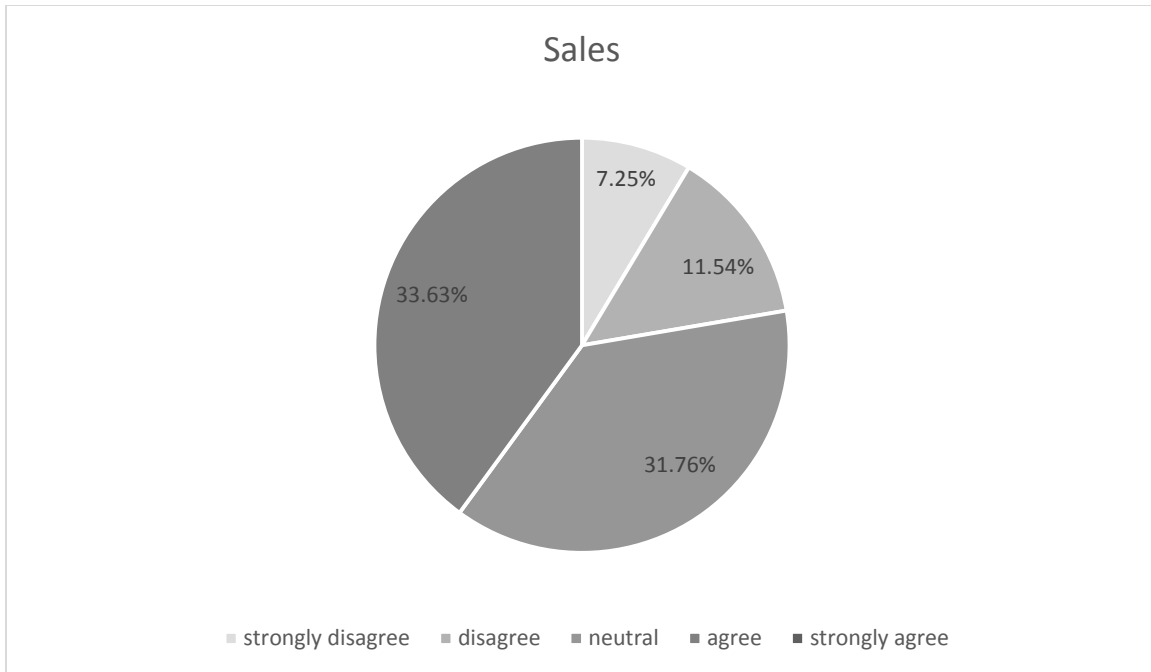


Figure 5: Pattern of AI tool usage

The pie chart shows that students generally have a positive pattern of AI tool usage for academic purposes. The highest average response is Agree (33.63%), followed by Neutral (31.76%), while 15.82% of the responses are Strongly Agree. A considerable proportion of students agree that they use AI tools regularly and frequently for completing assignments. However, the relatively high neutral response indicates that AI has not yet become an equally strong part of every student's daily academic routine. Overall, the findings suggest that AI tools are increasingly being incorporated into students' academic activities, particularly for assignments and learning new concepts.

4.2.2 Purpose of AI Tool Usage

Table 5: Purpose of AI Tool Usage

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I use AI tools to understand difficult topics.	0.00%	0.00%	35.71%	28.57%	35.71%
I use AI tools to generate ideas for assignments and projects.	0.00%	14.29%	28.57%	35.71%	21.43%
AI tools help me save time while studying.	0.00%	7.14%	35.71%	21.43%	35.71%
I use AI tools to improve the quality of my academic work.	0.00%	7.14%	28.57%	50.00%	14.29%
I use AI tools to prepare for examinations.	0.00%	21.43%	28.57%	21.43%	28.57%
Total (Topic Average)	0.00%	10.00%	31.43%	31.43%	27.14%

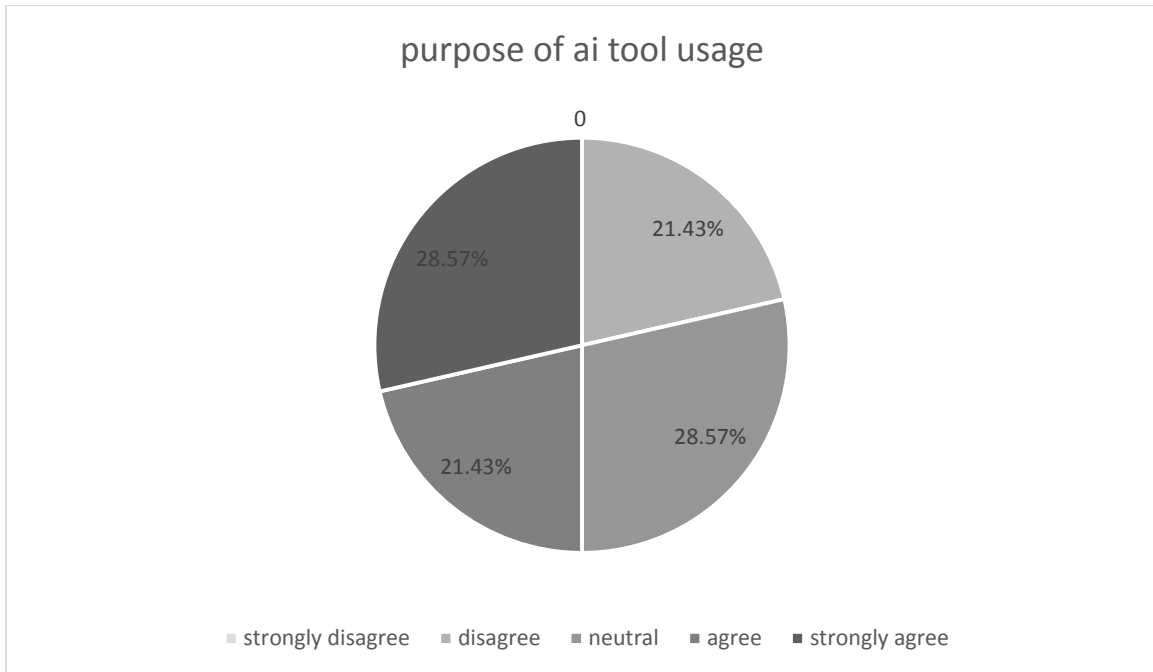


Figure 6: Purpose of AI tool usage

The findings indicate that students mainly use AI tools for academic learning and improving their academic work. The highest average response is equally distributed between Agree (31.43%) and Neutral (31.43%), while 27.14% of responses are Strongly Agree. Students particularly reported using AI to understand difficult topics and save time while studying. Half of the respondents agreed that AI tools help improve the quality of their academic work. This suggests that students primarily view AI as a supportive academic tool rather than using it for only one specific purpose.

4.2.3 Dependence on AI Tools

Table 6: Dependence on AI Tools

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I rely on AI tools for most of my academic tasks.	14.29%	14.29%	50.00%	14.29%	7.14%
I find it difficult to complete assignments without AI tools.	7.14%	7.14%	57.14%	28.57%	0.00%
I often accept AI-generated answers without verifying them.	14.29%	42.86%	21.43%	21.43%	0.00%
I depend on AI more than textbooks or library resources.	14.29%	0.00%	50.00%	28.57%	7.14%
My dependence on AI tools has increased over the past year.	0.00%	7.14%	28.57%	42.86%	21.43%
Total (Topic Average)	10.00%	14.29%	41.43%	27.14%	7.14%

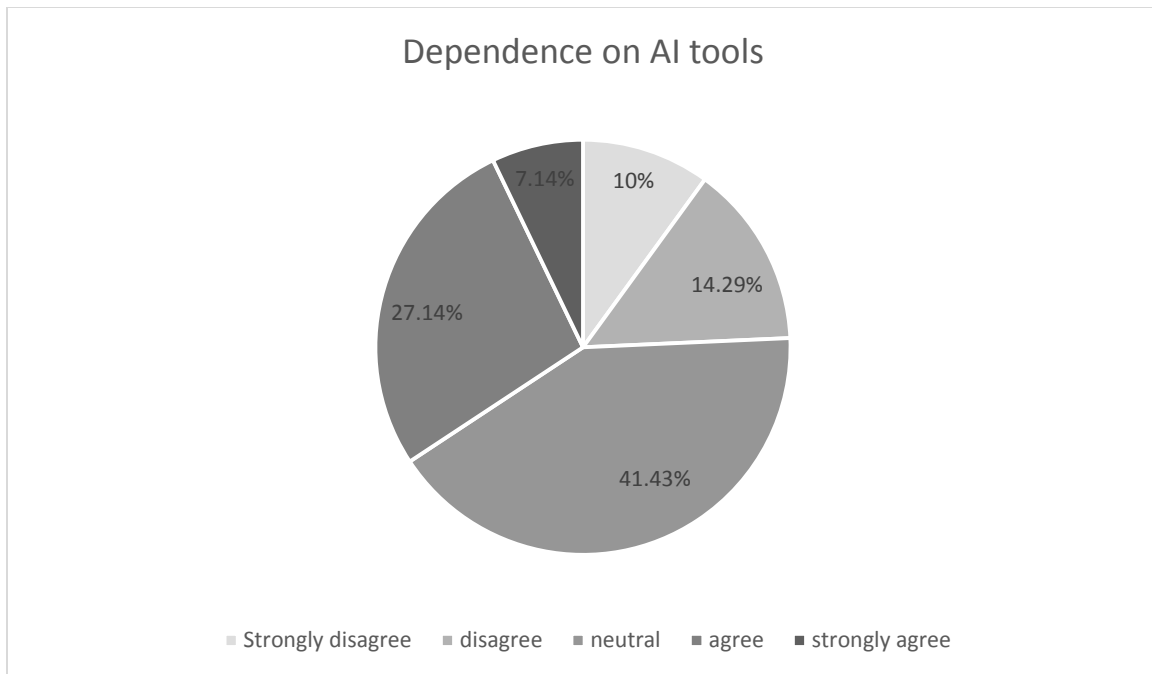


Figure 7: Dependence on AI Tools

The chart indicates that students show a moderate level of dependence on AI tools. The largest average response is Neutral (41.43%), suggesting that many students do not consider themselves highly dependent on AI. However, 27.14% of the responses are Agree and 7.14% are Strongly Agree. Notably, 42.86% of students agreed that their dependence on AI has increased over the past year. At the same time, most students disagreed with the statement that they accept AI-generated answers without verification. This suggests that although students' use of AI is increasing, they do not necessarily rely on it blindly for all academic tasks.

4.2.4 Awareness of Responsible and Ethical AI Use

Table 7: Awareness of Responsible and Ethical AI Use

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I understand the ethical use of AI in education.	0.00%	0.00%	14.29%	64.29%	21.43%
I verify AI-generated information before using it in my academic work.	14.29%	7.14%	14.29%	50.00%	14.29%
I avoid presenting AI-generated work as entirely my own.	0.00%	16.67%	41.67%	25.00%	16.67%
I am aware of my institution's policies regarding AI use.	0.00%	0.00%	50.00%	40.00%	10.00%
I use AI tools responsibly and ethically.	0.00%	7.14%	14.29%	50.00%	28.57%
Total (Topic Average)	2.86%	6.19%	26.90%	45.86%	18.19%

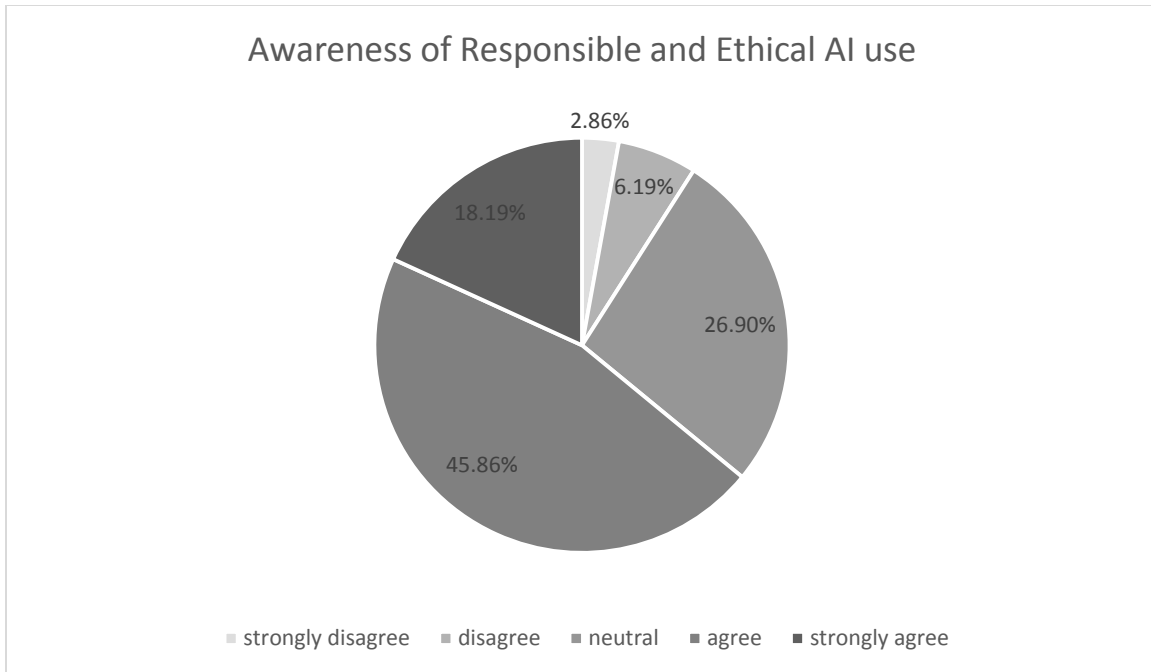


Figure 8: Awareness of Responsible and ethical use

The findings show that students have a generally positive level of awareness regarding responsible and ethical AI use. The highest average response is Agree (45.86%), followed by Neutral (26.90%) and Strongly Agree (18.19%). A majority of students agreed that they understand the ethical use of AI and that they verify AI-generated information before using it in academic work. However, awareness of institutional policies appears comparatively weaker, with half of the responses remaining neutral. Overall, the results indicate that students generally recognize the importance of using AI responsibly, although there is still room for greater awareness of institutional guidelines and academic policies.

4.3 Students' Critical Thinking

Table 8: Students' Critical Thinking

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
AI tools encourage me to analyze information from different perspectives.	0.00%	14.29%	21.43%	35.71%	28.57%
I critically evaluate AI-generated information before accepting it.	0.00%	14.29%	35.71%	35.71%	14.29%
AI tools have improved my problem-solving abilities.	0.00%	7.69%	23.08%	61.54%	7.69%
I question the accuracy of AI-generated responses instead of accepting them immediately.	0.00%	21.43%	28.57%	35.71%	14.29%
AI tools help me develop independent and logical thinking skills.	0.00%	0.00%	50.00%	50.00%	0.00%
Total (Topic Average)	0.00%	11.54%	31.76%	43.74%	12.97%

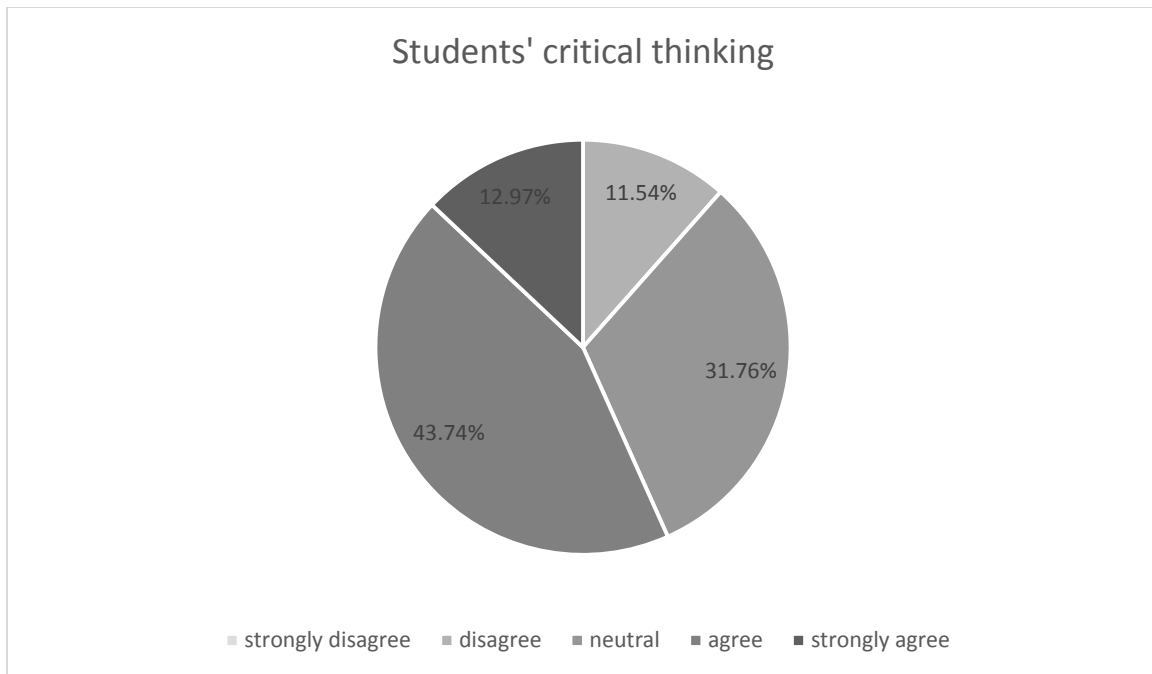


Figure 9: Students' Critical Thinking

The chart shows a generally positive relationship between AI tool use and students perceived critical thinking abilities. The highest average response is Agree (43.74%), while 31.76% of responses are Neutral and 12.97% are Strongly Agree. A particularly high proportion of students agreed that AI tools have improved their problem-solving abilities. Students also reported that AI encourages them to analyze information from different perspectives and question the accuracy of AI-generated responses. However, the relatively high neutral response suggests that not all students are certain that AI has strengthened their independent and logical thinking. Overall, the findings suggest that students perceive AI tools as having a generally positive influence on aspects of their critical thinking, particularly analysis and problem-solving.

4.4 Major Findings

1. The study found that students generally use AI tools regularly for academic purposes. A considerable proportion of respondents agreed that AI tools are part of their academic activities, particularly for completing assignments and learning concepts beyond classroom teaching. However, the relatively high neutral responses indicate that AI has not become an equally regular part of every student's daily study routine.
2. Students mainly use AI tools as a source of academic support. The findings show that students use AI particularly to understand difficult topics, generate ideas for assignments and projects, save time while studying, improve the quality of academic work, and prepare for examinations. This indicates that students generally view AI as a convenient learning assistant that can make academic tasks easier and more efficient.
3. Students demonstrated a moderate level of dependence on AI tools. Although many respondents reported that their dependence on AI has increased over the past year, most students did not strongly agree that they rely on AI for all academic tasks or accept AI-generated answers without verification. This suggests that students are increasingly using AI but have not completely replaced their own efforts or traditional academic resources with AI.
4. Students showed a generally positive awareness of responsible and ethical AI use. Most respondents agreed that they understand the ethical use of AI, verify AI-generated information before using it, and try to use AI responsibly. However, awareness of institutional policies regarding AI use was comparatively weaker, suggesting that students may require clearer guidance from their colleges regarding acceptable AI use in academic activities.
5. The findings indicate a generally positive perceived influence of AI tools on students' critical thinking. A large proportion of respondents agreed that AI tools encourage them to analyze information from different perspectives, improve their problem-solving abilities, and question the accuracy of AI-generated responses. This suggests

that when used appropriately, AI can support certain aspects of students' critical thinking rather than simply providing ready-made answers.

6. Students' critical thinking was particularly associated with analysis and problem-solving. Among the critical-thinking statements, students showed strong agreement that AI tools have helped improve their problem-solving abilities and encouraged them to consider information from different perspectives. However, responses regarding the development of independent and logical thinking were more evenly divided, indicating that the effect of AI on independent thinking may not be equally experienced by all students.
7. Overall, the study suggests that the influence of AI tools depends on how students use them. The findings do not indicate that AI is entirely beneficial or harmful to critical thinking. Rather, responsible use, verification of information, appropriate academic purpose, and avoiding excessive dependence appear to be important in ensuring that AI supports students' thinking instead of replacing it. This interpretation is consistent with recent higher-education research showing that AI's cognitive effects are strongly dependent on whether its use is structured around inquiry, reflection, and critical evaluation.

In summary, the major finding of the study is that students generally perceive AI tools as a useful academic support that can contribute positively to aspects of critical thinking, while moderate dependence and gaps in awareness of institutional AI policies remain areas of concern.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Summary

The study entitled “Influence of AI Tools on Students’ Critical Thinking” was conducted to examine how the increasing use of Artificial Intelligence (AI) tools affects the critical thinking abilities of undergraduate students. With the rapid development of AI technologies, tools such as ChatGPT, Google Gemini, Grammarly, and other AI-based applications have become increasingly common in students’ academic lives. Students use these tools for different purposes, including understanding difficult topics, generating ideas, preparing assignments, improving academic work, saving study time, and preparing for examinations. While AI provides convenient and useful academic support, its increasing use has also raised concerns about students' dependence on technology and its possible effect on independent thinking and decision-making.

The main objective of the study was to examine the influence of AI tools on students’ critical thinking. The study focused on four major aspects of AI tool usage: pattern of AI tool usage, purpose of AI tool usage, dependence on AI tools, and awareness of responsible and ethical AI use. Students’ critical thinking was considered the dependent variable and was examined in terms of their ability to analyze information from different perspectives, evaluate AI-generated information, solve problems, question the accuracy of information, and develop independent and logical thinking skills. The study was based on both primary and secondary data. Primary data were collected through a structured questionnaire from undergraduate students, while secondary data were obtained from academic journals, research articles, textbooks, reports, and scholarly sources.

A quantitative research approach was used for the study, and convenience sampling was adopted to select respondents based on their accessibility and willingness to participate. The collected data were organized, tabulated, and analyzed using descriptive statistical techniques

such as frequency and percentage. The findings showed that students generally use AI tools regularly for academic purposes, particularly for completing assignments, understanding difficult topics, generating ideas, and improving the quality of their academic work. The results also indicated that students' dependence on AI was moderate, with many students reporting that their dependence had increased over time. However, most respondents did not strongly agree that they accept AI-generated information without verification, suggesting that students still make some effort to evaluate the information provided by AI.

The study also found that students demonstrated a generally positive level of awareness regarding the responsible and ethical use of AI. Many students reported that they understood the ethical use of AI, verified AI-generated information before using it, and tried to use AI responsibly. However, awareness of institutional policies regarding AI use appeared comparatively limited, indicating a need for greater guidance from educational institutions. Regarding critical thinking, the findings showed that students generally perceived AI tools as having a positive influence on their ability to analyze information, solve problems, evaluate AI-generated responses, and consider different perspectives. At the same time, some students remained neutral about whether AI helped them develop independent and logical thinking, suggesting that the effect of AI may depend on how students use these tools.

Overall, the study indicates that AI tools can serve as a useful academic support system when students use them appropriately and critically. AI can help students understand concepts, explore ideas, and improve problem-solving, but excessive dependence may reduce opportunities for students to think and work independently. Therefore, students should use AI as a supporting tool rather than a replacement for their own thinking. The study highlights the importance of developing responsible AI use, information verification, academic integrity, and AI literacy among students so that the benefits of AI can be gained without weakening their critical thinking abilities.

5.2 Conclusion

The study on “Influence of AI Tools on Students’ Critical Thinking” concludes that Artificial Intelligence has become an increasingly useful part of students’ academic activities. The

findings show that students use AI tools for a variety of purposes, particularly to understand difficult topics, generate ideas, complete assignments, improve academic work, and save time while studying. This indicates that AI has become more than just a source of information for students and is gradually becoming a regular part of their learning process.

The study also shows that the influence of AI on critical thinking depends largely on how students use these tools. The findings indicate that students generally perceive AI as helpful in analyzing information, considering different perspectives, solving problems, and evaluating AI-generated responses. At the same time, the moderate level of dependence found among students suggests that excessive use of AI could become a concern if students begin to rely on it instead of using their own reasoning and problem-solving abilities. Therefore, AI should be used to support students' thinking rather than replace it.

Furthermore, the study found that students have a generally positive awareness of the responsible and ethical use of AI. Many students reported verifying AI-generated information and understanding the importance of using AI appropriately in academic work. However, the relatively lower awareness of institutional AI policies suggests that educational institutions need to provide clearer guidance on the acceptable and ethical use of AI. Overall, the study concludes that AI tools can have a positive influence on students' critical thinking when they are used responsibly, critically, and as a supplement to independent learning. Encouraging students to question, verify, analyze, and reflect on AI-generated information can help them gain the benefits of AI while continuing to develop the independent and critical thinking skills that are essential for their academic and future professional lives.

5.3 Recommendations

Based on the findings of this study, several practical recommendations can be made to promote the responsible use of AI tools and support the development of critical thinking among undergraduate students:

- 1. Implement AI Awareness Programs:** Colleges should organize workshops, seminars, and awareness programs focused on the proper use of AI tools in academic learning. These

programs can help students understand the benefits and limitations of AI and encourage them to use AI as a learning support rather than relying on it completely.

2. Promote Critical Evaluation of AI-Generated Information: Students should be encouraged to critically evaluate and verify information provided by AI tools before using it in their academic work. Comparing AI-generated information with textbooks, academic articles, and other reliable sources can help students develop stronger analytical and evaluation skills.

3. Establish Clear AI Use Guidelines: Colleges should develop clear guidelines regarding the acceptable and ethical use of AI in assignments, projects, research, and other academic activities. Students should be made aware of academic integrity, plagiarism, proper acknowledgment of AI assistance, and the importance of maintaining originality in their work.

4. Encourage Independent Learning and Thinking: Teachers should design activities such as discussions, case studies, presentations, debates, and problem-solving exercises that require students to use their own reasoning and judgment. AI tools can be used as supporting resources while students are encouraged to develop their own ideas and conclusions.

5. Provide Guidance from Faculty: Teachers should guide students on how to use AI tools effectively and responsibly for academic purposes. Regular interaction between students and faculty can help students understand when AI can be useful and when they should rely on their own knowledge, reasoning, and critical thinking abilities.

By implementing these recommendations, students can make more responsible and meaningful use of AI tools while continuing to develop the independent thinking, analytical abilities, and problem-solving skills necessary for their academic and future professional development.

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APPENDIX

SURVEY QUESTIONNAIRE

Dear respondents,

I am conducting a research study as part of my Bachelor of Business Administration (BBA) program. The purpose of this questionnaire is to examine the influence of AI tool usage on students' critical thinking. Your participation is voluntary, and all information you provide will remain confidential and will be used solely for academic purposes.

Name: Nirajan Kafle

Program: BBA

College: NTHMC

Instructions: Please tick (✓) the option that best represent your option.

Section A

Demographic information

1. Age

- Below 18
- 18-20
- 21-23
- 23-26
- 26 and above

2. Gender

- Male
- Female
- Prefer not to say

3. Faculty

- BBA
- BBA Finance
- BSc IT
- BBS
- BHM

Section B

- Use of AI Tools

Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. I use AI tools regularly for academic purposes.	☐	☐	☐	☐	☐
2. AI tools are part of my daily study routine.	☐	☐	☐	☐	☐
3. I use AI tools before consulting textbooks or teachers.	☐	☐	☐	☐	☐
4. I frequently use AI tools to complete assignments.	☐	☐	☐	☐	☐
5. I use AI tools for learning new concepts beyond classroom teaching.	☐	☐	☐	☐	☐

- **Purpose of AI Tool Usage**

Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. I use AI tools to understand difficult topics.	☐	☐	☐	☐	☐
2. I use AI tools to generate ideas for assignments and projects.	☐	☐	☐	☐	☐
3. AI tools help me save time while studying.	☐	☐	☐	☐	☐
4. I use AI tools to improve the quality of my academic work.	☐	☐	☐	☐	☐
5. I use AI tools to prepare for examinations.	☐	☐	☐	☐	☐

- **Dependence on AI Tools**

Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. I rely on AI tools for most of my academic tasks.	☐	☐	☐	☐	☐
2. I find it difficult to complete assignments without AI tools.	☐	☐	☐	☐	☐
3. I often accept AI-generated answers without verifying them.	☐	☐	☐	☐	☐
4. I depend on AI more than textbooks or library resources.	☐	☐	☐	☐	☐
5. My dependence on AI tools has increased over the past year.	☐	☐	☐	☐	☐

- **Awareness of Responsible and Ethical AI Use**

Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. I understand the ethical use of AI in education.	☐	☐	☐	☐	☐
2. I verify AI-generated information before using it in my academic work.	☐	☐	☐	☐	☐
3. I avoid presenting AI-generated work as entirely my own.	☐	☐	☐	☐	☐
4. I am aware of my institution's policies regarding AI use.	☐	☐	☐	☐	☐
5. I use AI tools responsibly and ethically.	☐	☐	☐	☐	☐

• **Students' Critical Thinking**

Statement	1 Strongly Disagree	2 Disagree	3 Neutral	4 Agree	5 Strongly Agree
1. AI tools encourage me to analyze information from different perspectives.	☐	☐	☐	☐	☐
2. I critically evaluate AI-generated information before accepting it.	☐	☐	☐	☐	☐
3. AI tools have improved my problem-solving abilities.	☐	☐	☐	☐	☐
4. I question the accuracy of AI-generated responses instead of accepting them immediately.	☐	☐	☐	☐	☐
5. AI tools help me develop independent and logical thinking skills.	☐	☐	☐	☐	☐