Analyzing the Factors that Make AI a Revolutionary Tool in Student Learning.

A Dissertation Submitted for Fulfillment for the Requirement of the Degree of Bachelor of Science in Statistics

Bachelor of Science (Honors) in Statistics

Department of Statistics

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Session: 2018-19
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Date of Submission: 10th July, 2025

Dedicated

To

Our parents and Honorable Teachers

Abstract

This cross-sectional study explores higher-education students' adoption of artificial intelligence (AI) tools and the variables that shape whether they perceive AI as "revolutionary technology." We analyse survey responses from 360 students across eight academic fields to characterize tool preferences, usage length, and perceived advantages, and we develop a binary-logistic model to predict revolutionary perception. Results showed that AI-powered tutoring applications and AI-assisted research tools were the most popular (each with a 22% share), while ChatGPT and Google Bard accounted for 18% and 17%, respectively. A majority of respondents engaged with AI between two and four hours daily (28%) or more than six hours (23%). Logistic regression analysis (R^2 = 0.27) indicates that students utilizing AI for rapid responses (OR = 2.14, $p < 0.05$) or for generating ideas for assignments (OR = 1.86, $p < 0.05$) are more inclined to perceive AI as transformative, while its use for in-depth understanding of intricate subjects is negatively correlated (OR = 0.53, $p < 0.05$). Teacher encouragement (OR = 2.47, $p < 0.01$) and moderate dependency on AI (OR = 1.59, $p < 0.05$) further raised revolutionary perceptions, while believing that AI decreases human interaction reduced them (OR = 0.46, $p < 0.05$). The output indicated that pedagogical framing and purposeful integration drive optimistic attitudes toward AI and pointed out the importance of balanced guidance to avoid over-reliance.

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Chapter One

Introduction

1.1 Background of the Study

Artificial intelligence (AI) is now a part of our everyday lives, shaping many areas, including education. The use of AI in schools has shifted the focus from traditional teaching methods to more adaptive, student-centric, and technology-driven learning experiences. According to UNESCO (2021), AI can increase access to quality education, improve teaching methods, and promote lifelong learning. Tools like intelligent tutoring systems, adaptive learning platforms, and AI-based evaluation tools are increasingly common in educational institutions around the world. This digital change accelerated during the COVID-19 pandemic when students and teachers transitioned to remote learning. Tools like ChatGPT, Grammarly, DeepSeek, and Google Bard became vital for many students. These platforms simplify complicated topics, assist with writing and research, and support learning in various languages. Today, university students regularly incorporate these tools into their study routines (Luckin et al., 2016; Zhang et al., 2023). However, this new approach to learning raises important questions. Are students relying too much on AI? Is it affecting their creativity or critical thinking skills? What happens to peer collaboration and personal interaction when digital tools take care of so much? Scholars are voicing these concerns, noting that while AI can be helpful, it also challenges traditional educational values, such as originality, deep thinking, and ethical responsibility (Selwyn, 2019; Williamson & Eynon, 2020). Additionally, the shift to remote and hybrid learning after COVID-19 has accelerated the use of AI-enhanced learning technologies. Governments and institutions have created AI policy frameworks and ethical guidelines to make sure that the integration of AI in education is fair, transparent, and inclusive (OECD, 2021). Nevertheless, research on the actual effects of AI on student learning, academic success, and autonomy is still limited, especially in developing countries. This study aims to explore how students perceive AI-powered tools in their academic journeys. This research focuses on how university students are dealing with these changes. By examining students from Gopalganj Science and Technology University, the study looks at how they use AI tools, what they think of them, and whether they believe these tools are changing their education.

1.2 Statement of the Problem

Despite the growing use of AI in education, we know little about how students view its impact on their learning. While AI-powered tools are common, especially in higher education, we don't fully understand their effects on academic performance, critical thinking, mental well-being, and learning independence. Additionally, overreliance on AI raises concerns about academic honesty, originality, and reduced student effort. This study seeks to determine whether students view AI as a ground breaking force in education and what factors shape that perspective. While AI tools are becoming standard in academia, we still don't fully grasp how students are using them or what they think. Do these tools genuinely improve learning, or do they merely make things easier without depth? Some students claim AI saves them time and enhances their performance, while others worry it may foster dependency on automation. We also need a closer look at how students in certain regions, like Bangladesh, are adapting to this change. Access to technology, digital skills, and learning environments differ greatly across countries and institutions. This study aims to investigate how students at one university are using AI in their studies, how they assess its benefits and challenges, and their thoughts on its long-term effects on education.

1.3 Objectives of the Study

- To investigate how frequently students use AI tools, their academic purposes, and how such usage shapes their academic experience.
- To assess students' perceptions of AI's impact on their academic performance, creativity, and human interaction in learning environments.
- To examine the relationship between the perceived benefits of AI (e.g., time efficiency, comprehension) and students' dependency on these tools, in order to understand whether they view AI as a revolutionary force in education.

1.4 Significance of the Study

This study is important for educators, policymakers, and technology developers navigating the intersection of AI and education. By providing evidence on student

perceptions and use of AI-powered tools, the study helps shape better, more ethical, and inclusive strategies for adopting AI in educational settings. It also sheds light on how students balance AI's advantages with potential cognitive and behavioural trade-offs, which can inform curriculum development and digital literacy programs. Furthermore, it can guide AI developers in creating tools that encourage deeper learning rather than replace student effort. This research amplifies students' voices, focusing on those most directly impacted by the rise of AI in education. By examining their views and experiences, the study offers insights that can shape how educators and institutions approach AI use. It can guide teachers on supporting responsible AI practices in classrooms, help policymakers develop fair and ethical AI strategies, and provide developers with insight into what students need. The local focus of this study gives it particular importance. By concentrating on students from Gopalganj Science and Technology University, it provides real-world perspectives from a specific context, which can be valuable for other institutions facing similar challenges and opportunities.

Chapter Two
Methodology

2.1 Introduction

This chapter explains how the study was carried out—from how students were selected to how their responses were collected and analysed. It gives a clear picture of the research design, sampling method, the tools used for collecting data, and the techniques applied to understand what students think and experience when they use AI-powered tools in their learning.

2.2 Literature Review

Artificial Intelligence (AI) has quickly become a vital side of today's worlds, specially, in modern education systems. Its appearance in both online and offline classrooms has changed the academic experience for students. It provides tools like easy, intelligent tutoring systems, instant feedback generators, adaptive learning platforms, and writing assistants. Around the world, educational institutions are adopting AI to personalize instruction, improve efficiency, and support varied learning needs (Luckin et al., 2016; Chen et al., 2020). According to UNESCO (2023), nearly half of all higher education institutions have incorporated AI technologies into their teaching methods. However, differences remain in developing countries like Bangladesh (Rahman et al., 2022).

 AI tools like ChatGPT, Grammarly, and Quilbot are used by students to summarize content, draft assignments, and translate complex topics. Some studies show that students mainly use AI for quick answers or to complete homework. Others indicate that AI can encourage deeper involvement when it helps clarify concepts or develop skills (Gao & Liu, 2021; Wang et al., 2023). Research reveals that students appreciate AI for its time-saving features and clear explanations, especially when preparing for exams or tackling large projects (Holmes et al., 2022; Al-Adwan et al., 2022). These benefits are strengthened by the personal touch that AI allows. Adaptive systems provide customized feedback, and AI-driven platforms often change content difficulty based on student performance, encouraging self-regulated learning and cognitive growth (Roll & Wylie,

2016; Xie et al., 2023). When using these resources, students frequently experience an increase in motivation and self-assurance. But there are now worries about reliance. Students run the risk of losing their ability to think critically, be creative, and be original as they depend increasingly on AI to generate ideas and fix language (Selwyn, 2019; Williamson & Eynon, 2020).

The fact that AI is reducing human interaction raises additional concerns. According to studies, AI can decrease student interaction and the requirement for teacher-student contact. This could make it more difficult to learn collaboratively and build interpersonal skills (Alhumaid et al., 2022). Institutions are also rethinking how to use AI in schools because of moral problems like cheating, private information, and algorithm prejudice (Tuomi, 2018; Holmes, 2021).

Teachers' views on AI can change student's perspective. When educators encourage and guide the use of AI, students tend to engage more and reflect deeper (Chou et al., 2022; Zhai & Zhang, 2022). Yet, challenges like restricted infrastructure, unclear institutional policies, and a lack of professional training in AI-based teaching methods are the major concern of lower and middle income countries (British Council, 2022). Additionally, most existing research comes from Western and high-income countries, leaving a gap in understanding how students in areas like South Asia perceive and interact with AI tools (OECD, 2021; Popenici & Kerr, 2017).

This study helps to fill that gap by examining student's behavior and attitudes at a university in Bangladesh. It looks at how factors like perceived benefits, purpose of using AI, teacher influence, and ethical concerns shape whether students view AI as a revolutionary change in education. The existing literature point out that while AI conceive alternative potential, its karma vastly depends on how it is utilized or used, and the institutional and cultural context in which it is adorned.

2.3 Research Design

To understand students' experiences with AI in education, this study used a quantitative approach. This means we focused on collecting numbers and patterns from the students' responses, which could then be analysed statistically. This method helped in identifying general trends, relationships, and meaningful insights about how AI is impacting student learning.

2.4 Population and Sample

A mathematician defines a population as the universal set and a sample as a sub-set. It should be noted that from a research point of view, the term population is not only applicable to human beings but also to any case of interest in a study. Population is the totality of objects under investigation. Specific respondents were involved in the study. The study was conducted among students of Gopalganj Science and Technology University. These students came from different academic years and departments, and all had some level of interaction with AI-powered tools. In total, 360 students took part and their responses formed the basis of the study.

2.5 Sampling Techniques and Sample Size

Sampling Techniques

To ensure a representative sample that accurately reflects the diverse subjective students of Gopalganj Science and Technology University, simple random sampling technique was employed where each member has an equal chance of being chosen to select a sample from a population. In this case, the students of GSTU of many fields of study or disciplines were randomly chosen corresponding to the eight subjects of GSTU: Engineering, Social Science, Science, Business Studies, Life Science, Law, Humanities, and Agriculture.

By combining the individual samples from each field where the probability of selecting students were random or equal to any. The selection process is random, meaning there is no systematic pattern or bias involved which make the result more trustworthy.

Sample Size

The sample is a subset taken from the population to be studied. It represents the number or wider area of the population. It is the specific number of items or informants to be selected into the sample from the population. The sample size is calculated by using the formula

$$n_0 = \frac{Z^2 * p * (1 - p)}{E^2}$$

Were,

n_0 = Sample size (infinite population)

Z = Z-value (based on confidence level, e.g., 1.96 for 95% confidence)

p = Estimated population proportion (0.6)

$q = 1 - p = (1 - 0.6) = 0.4$

E = Margin of error (e.g., 5% = 0.05)

Using those we calculate our sample size

$$n_0 = \frac{(1.96)^2 * 0.6 * (1 - 0.6)}{(0.05)^2}$$

$$= \frac{3.8416 * 0.6 * 0.4}{0.0025}$$

$$= \frac{0.921984}{0.0025}$$

$$= 368.7$$

Again,

n= sample size (finite population)

N= population size (approximately)

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

$$n = \frac{368.79}{1 + \frac{(368.79 - 1)}{9500}}$$

$$n = \frac{368.79}{1.0387}$$

$$n = 355.04$$

Instead of sample size 355 we take sample size 360 in our study. Then we decided to use simple random sampling technique.

2.6 Data Collection Instruments

To gather information, we used a questionnaire. It included a variety of questions about students' backgrounds (like age, gender, academic level, and CGPA), their use of AI tools, and how they felt AI was helping or not helping them in their studies. The questions were mostly multiple choices. Before sharing the final version, we tested it with a few students to make sure everything was clear and made sense.

2.7 Data Collection Procedure

The questionnaires were shared both online and in person. Some students received the link digitally, while others filled it out on paper during class or campus visits. Students were told the purpose of the study and were free to take part or not. We made sure to protect their privacy—no names or personal details were collected. Only completed responses were included in the final analysis.

2.7 Data Analysis Techniques

Once all the responses were collected, they were entered into Microsoft Excel and SPSS software for analysis. Here's how we analysed the data:

- **Descriptive Statistics** were used to show general trends, like how many students use AI daily or what tools they prefer. We used pie charts and bar graphs to make the results easy to understand.
- **Chi-square Tests** helped us see if there were meaningful connections between certain factors—for example, whether students who use AI for assignments also view it as revolutionary.

- **Binary Logistic Regression** was used to dig deeper and find out what factors best predicted whether a student sees AI as a game-changer in education.

These methods allowed us to draw meaningful conclusions from the students' experiences.

Chapter Three
Result and Discussion

3.1 Univariate Analysis

The methods of data gathering and computerization are covered in the preceding chapter. In general, before conducting analysis, it is critical to understand the properties or nature of the data. The frequency distribution and graphical representation's subjects could be extremely. A few of the graphs are shown in this chapter.

Table 1: Descriptive Statistics

Descriptive Statistics				
	Age	Academic Year	Previous CGPA	Current CGPA
Mean	2.91	3.08	2.38	2.49
Median	3.00	3.00	2.00	2.00
Std. Deviation	1.413	1.421	1.110	1.112
Variance	1.998	2.019	1.232	1.237

Looking at this table, we're getting a snapshot of students' academic journey. Most of our students are third-years, which we can see from both the age and academic year numbers hovering around 3. When it comes to grades (CGPA), there's actually a bit of good news - students are showing some improvement! Their previous CGPA around 2.38, and they've bumped that up to 2.49. While this might seem like a small jump, it's still progress. Here's something interesting: while the average grades are around 2.4-2.5, the middle point (median) sits at 2.0, which tells us we've got some high achievers pulling up the average. The spread of ages and academic years is fairly diverse (shown by their higher standard deviations around 1.4), but when it comes to grades, students are performing more similarly to each other (standard deviation around 1.1). Think of it like this: while students might be from different age groups and years, they're all performing within a similar academic range, with some steady improvement happening across the board. It's like watching a group of runners who, despite starting at different points, are maintaining a similar pace with a slight acceleration.
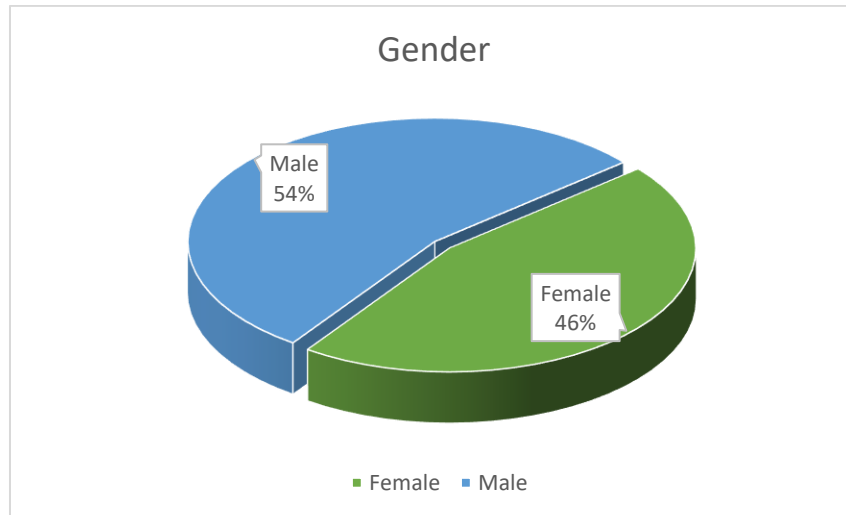
Figure 1: Graphical representation of the respondents by gender.

This pie chart, titled "Gender," visually represents the gender distribution within a group, showing two categories: Male (54%), and Female (46%), indicating a slight male majority where males constitute 8% more of the group than females from the 360 respondents.
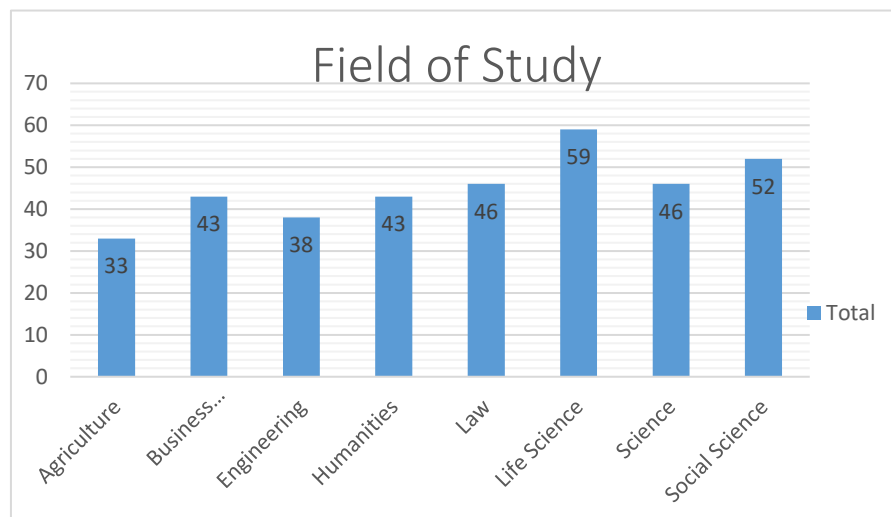
Figure 2: Graphical representation of the respondents by Field of Study.

The percentage distribution of people across different academic disciplines is shown in this bar chart, "Field of Study." Every bar denotes a distinct field, and the height of the bar shows how many people are in that field overall. As we can see, "Life Science" has

the most people (59), followed by "Social Science" (52). There are as many people in "Law" and "Science" (46), as there are in "Business Studies" and "Humanities" (43). "Agriculture" has the fewest people (33), and "Engineering" has (38). All things considered, the chart offers a clear comparison of the representation or popularity of various academic disciplines within the group under observation.
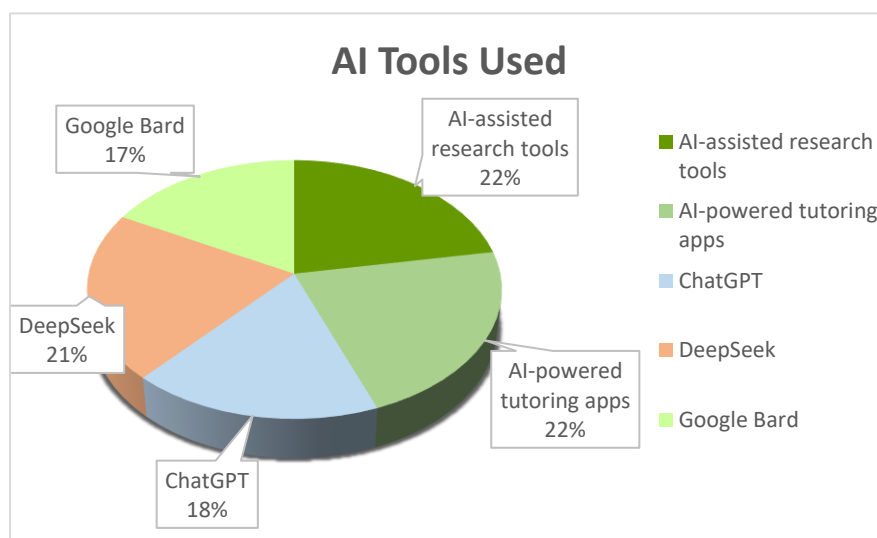
Figure 3: Graphical representation of the respondents by AI Tools.

The "AI Tools Used" pie chart shows how various AI tools are used. With 22% of all usage, the largest segments show that "AI-powered tutoring apps" and "AI-assisted research tools" are the most popular. "DeepSeek" comes in second at 21%, followed by "ChatGPT" at 18% and "Google Bard" at 17%, which is the smallest percentage of AI tools utilized in this context. The relative popularity of these five AI tools is clearly compared in the chart.
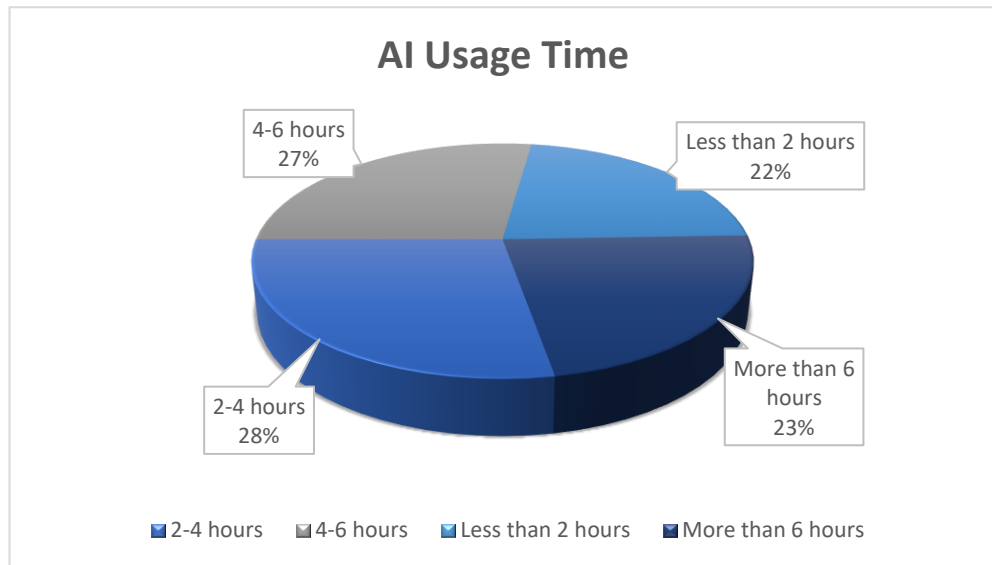
Figure 4: Graphical representation of the respondents by AI usage Time.

The proportion of time spent utilizing AI tools is shown in this pie chart, "AI Usage Time." According to the largest segment, "2-4 hours," which makes up 28% of the total, is the most frequently used usage duration. "4-6 hours" comes in second at 27%. The smallest segment reveals that 22% of users spend "Less than 2 hours" using AI tools, while 23% of users spend "More than 6 hours." Overall, the graph shows that a sizable percentage of users spend between two and six hours using AI tools.

3.2 Bi-variate Analysis

3.2.1 Introduction

In this chapter, we represent the measure of association and find whether it is significant or not. For this, we can develop a "Bivariate Analysis". In the bivariate analysis, we represent tabular presentation. We attempted to see some of the bivariate relationships between them. The aim of the chapter is to indicate an analysis of the effect of several variables and their statistical significance. This chapter also leads to making to contingency analysis of the selected variables. The contingency analysis investigates the degree of association together with the dependency criterion between the selected variables. Examination of the association was performed by means of the contingency table.

3.2.2 Cross-tabulation

Cross-tabulation is used to examine the relationship between two variables. It shows the intersection between two variables and reveals how the two interact with each other. In other words, while a frequency distribution describes one variable at a time, a cross-tabulation describes two or more variables simultaneously.

3.2.3 Chi-square test

The chi-square test is a non-parametric test to explore the relationship between two categorical variables. Each of these variables can have two or more categories. Also known as the chi-square test of contingency. We will use independence to evaluate group differences when the test variable is categorical, nominal, dichotomous, ordinal, or grouped variables with two or more categories.

Chi-square test statistics

Chi-square statistics is a non-parametric statistics technique used to determine if a distribution of observed frequencies differs from the theoretically expected frequencies.

3.2.4 Contingency Analysis

We represent contingency analysis, which is used to test the relationship between several phenomena. In contingency studies, if 'O' means observed frequency and 'E' denotes expected frequency of a contingency table, then the expected frequency of any hypothesis is Null and alternative hypothesis :

H_0 : There is no association between two classified variables.

H_1 : There is a significant association between two classified variables.

$$E_{ij} = \frac{(R_i)(C_j)}{N}$$

where,

E_{ij} = Expected frequency of the ith row and j^{th} column.

R_i = No. of total observation of the ith row the respective contingency table.

C_j = No. of total observation of the jth column the respective contingency table.

N = Total number of observations.

From each contingency table examine the association between variables/individuals and the different segment of the individual are made by computing Chi-square and using the test statistics is,

$$\chi^2 = \sum_{i=1}^{c} \sum_{j=1}^{c} \left(\frac{(O_{ij} - E_{ij})^2}{E_{ij}} \right)$$

Where, χ^2 follows (r-1) (c-1) degrees of freedom.

and O_{ij} = the observed number of observations in (i^{th}, j^{th}) cell.

Decision rule

The decision rule is if χ^2cal > χ^2tab reject the null hypothesis, where χ^2_{cal} obtained from the chi squared distribution with (r - 1) (c - 1) degree of freedom.

Cross-tabulation and contingency analysis of different variables used in this study are given below with a related comparison table and interpretation.

3.2.5 Test of Associations

i. Cross tabulation between AI revolution & AI Usage Fields.

H0 : There is no significant association between AI revolution & AI Usage Fields.

H1 : There is significant association between AI revolution & AI Usage Fields.

Table 2: Association between AI revolution and AI Usage Fields.

Is AI revolutionary ?		AI Usage Fields					
		Academic Education	Program-ming	Skill Develop-ment	Research	Problem Solving	Total
	Yes	58	42	56	53	53	262
	No	14	18	33	29	26	98
	Total	72	60	78	71	79	360
Pearson Chi-Square (χ^2)				Asymptotic Significance (2-sided) p-value			
4.304[a] (df 4)				0.043			

From the table 2, we see that the Pearson Chi-Square Statistic with 4 degrees of freedom is observed to be 4.304[a] of which asymptotically significance level is 0.043 is less than P-value 0.05 but some cell frequency is less than 5. So, we reject the null hypothesis. There is significant association between revolutions of AI & AI Usage Fields. That means students are using AI in many ways to enhance their education quality; thus, AI is revolutionary in academic fields.

ii. Cross tabulation between AI revolution & its purpose to use.

H0 : There is no significant association between AI revolution & it's purpose to use.

H1 : There is significant association between AI revolution & it's purpose to use.

Table 3: Association between AI revolution and it's purpose to use.

		AI Purpose				
		Find quick answer	Understanding complex topics	Help in Assignment or Projects	Assist with translation	Total
Is AI revolutionary	Yes	57	75	69	61	262
	No	28	20	14	36	98
	Total	85	95	83	97	360
Pearson Chi-Square (χ^2)				Asymptotic Significance (2-sided) p-value		
12.511[a] (df 3)				0.006		

From the table 3, we see that the Pearson Chi-Square Statistic with 3 degrees of freedom is observed to be 12.511[a] of which asymptotically significance level is 0.006 is lower than P-value 0.05 but some cell frequency is less than 5. So, we reject the null hypothesis i.e, there is significant association between AI revolution & its purpose to use. Now we can say that, not only education but also students are using AI for different purposes, which indicates the revolution of AI.

iii. Cross tabulation between revolutions of AI & AI Learning Impact.

H0 : There is no significant association between revolution of AI & AI Learning Impact.

H1 : There is significant association between revolution of AI & AI Learning Impact.

Table 4: Association between AI revolution and Impact of AI Learning.

		AI Learning Impact					
		Greatly improved	Somewhat improved	No Impact	Somewhat worsened	Greatly worsened	Total
Is AI revolutionary	Yes	65	49	51	48	49	262
	No	22	14	21	23	18	98
	Total	87	63	72	71	67	360
Pearson Chi-Square (χ^2)					Asymptotic Significance (2-sided) p-value		
2.06[a] (df 4)					0.725		

From the table 4, we see that the Pearson Chi-Square Statistic with 4 degrees of freedom is observed to be 2.06[a] of which asymptotically significance level is 0.725 is greater than P-value 0.05 but some cell frequency is less than 5. So, we do not reject the null hypothesis. There is no significant association between revolutions of AI & AI Learning Impact. Therefore, the AI revolution has nothing to do with the influence of AI learning on the students.

iv. Cross tabulation between AI revolution & Benefits of AI.

H0 : There is no significant association between AI revolution & Benefits of AI.

H1 : There is significant association between AI revolution & Benefits of AI.

Table 5: Association between AI revolution and Benefits of AI.

		Benefits of AI				
		Time saving	Improve grades	Better knowledge of topics	Enhanced creativity	Total
Is AI revolutionary	Yes	52	84	58	68	262
	No	27	24	31	16	98
	Total	79	108	89	84	360
Pearson Chi-Square (χ^2)				Asymptotic Significance (2-sided) p-value		
8.726[a] (df 3)				0.033		

From the table 5, we see that the Pearson Chi-Square Statistic with 3 degrees of freedom is observed to be 8.726[a] of which asymptotically significance level is 0.033 is lower than P-value 0.05 but some cell frequency is less than 5. So, we reject the null hypothesis i.e, there is significant association between AI revolution & Benefits of AI. It says that, students are using AI as a beneficial tool to education, and it is responsible for the revolution of it.

v. Cross tabulation between AI revolution & AI Learning Improvement.

H0 : There is no significant association between AI revolution & AI Learning Improvement.

H1 : There is significant association between AI revolution & AI Learning Improvement.

Table 6: Association between AI revolution and AI Learning Improvement

Is AI revolutionary		AI Learning Improvement				
		Personalized learning recommendations	Faster Access to Information	Improved to understand complex topics	Increased motivation and engagement	Total
	Yes	65	74	60	63	262
	No	23	32	22	21	98
	Total	88	106	82	84	360
Pearson Chi-Square (χ^2)				Asymptotic Significance (2-sided) p-value		
0.739ᵃ (df 3)				0.864		

From the table 6, we see that the Pearson Chi-Square Statistic with 3 degrees of freedom is observed to be 0.739ᵃ of which asymptotically significance level is 0.864 is greater than P-value 0.05 but some cell frequency is less than 5. So, we do not reject the null hypothesis. There is no significant association between revolutions of AI & AI Learning Improvement. Which defines, AI is helping students to get a better understanding of their lessons, which doesn't have anything to do with the revolution of AI.

vi. Cross tabulation between AI revolution & Dependency on AI.

H0 : There is no significant association between AI revolution & Dependency on AI.

H1 : There is significant association between AI revolution & Dependency on AI.

Table 7: Association between AI revolution and Dependency on AI.

		AI Dependency			
		Yes, Significantly	Somewhat	No, I still rely on traditional methods	Total
Is AI revolutionary	Yes	88	73	101	262
	No	33	39	26	98
	Total	121	112	127	360
Pearson Chi-Square (χ^2)				Asymptotic Significance (2-sided) p-value	
6.185[a] (df 2)				0.045	

From the table 7, we see that the Pearson Chi-Square Statistic with 2 degrees of freedom is observed to be 6.185[a] of which asymptotically significance level is 0.045 is lower than P-value 0.05 but some cell frequency is less than 5. So, we reject the null hypothesis i.e, there is significant association between AI revolution & Dependency on AI. We can state that, dependency on AI is an effective factor on AI revolution and it will become severe over the time.

vii. Cross tabulation between AI revolution & Teacher's opinion on it.

H0 : There is no significant association between AI revolution & Teacher's opinion using AI.

H1 : There is significant association between AI revolution & Teacher's opinion using AI.

Table 8: Association between AI revolution and Teacher's opinion on AI.

Is AI revolutionary		Teacher's opinion using AI			
		Encourage it	Discourage it	Neutral	Total
	Yes	80	94	88	262
	No	44	24	30	98
	Total	124	118	118	360
Pearson Chi-Square (χ^2)			Asymptotic Significance (2-sided) p-value		
7.287ᵃ (df 2)			0.026		

From the table 8, we see that the Pearson Chi-Square Statistic with 2 degrees of freedom is observed to be 7.28ᵃ of which asymptotically significance level is 0.026 is lower than P-value 0.05 but some cell frequency is less than 5. So, we reject the null hypothesis i.e, there is significant association between AI revolution & teacher's opinion on using AI. So, a teacher's opinion on using AI has a great impact on students' learning as well as the revolution of AI.

viii. Cross tabulation between AI revolution & Decrease Human Interaction because of it.

H0 : There is no significant association between AI revolution & Decrease Human Interaction because of it.

H1 : There is significant association between AI revolution & Decrease Human Interaction because of it.

Table 9: Association between AI revolution and Human Interaction.

		AI Decreases Human Interaction		
		Yes	No	Total
Is AI Revolutionary?	Yes	115	147	262
	No	57	41	98
	Total	172	188	360
Pearson Chi-Square (χ^2)		Asymptotic Significance (2-sided) p-value		
5.821[a] (df 1)		0.016		

From the table 8, we see that the Pearson Chi-Square Statistic with 1 degrees of freedom is observed to be 5.821[a] of which asymptotically significance level is 0.016 is lower than P-value 0.05 but some cell frequency is less than 5. So, we reject the null hypothesis i.e, there is significant association between AI revolution & decrease human interaction. That cause students are losing interaction among themselves and using AI instead of group study.

ix. Cross tabulation between AI revolution & AI Recommendation.

H0 : There is no significant association between AI revolution & AI Recommendation.

H1 : There is significant association between AI revolution & AI Recommendation.

Table 10: Association between AI revolution and AI Recommendation to others.

		AI Recommendation				
		Always	Often	Rare	Never	Total
Is AI revolutionary	Yes	68	60	65	69	262
	No	26	25	18	29	98
	Total	94	85	83	98	360
Pearson Chi-Square (χ^2)			Asymptotic Significance (2-sided) p-value			
1.776^a (df 3)			0.620			

From the table 10, we see that the Pearson Chi-Square Statistic with 3 degrees of freedom is observed to be 1.776^a of which asymptotically significance level is 0.620 is greater than P-value 0.05 but some cell frequency is less than 5. So, we do not reject the null hypothesis i.e, there is no significant association between AI revolution & AI Recommendation. Now we can say that, students are using AI and also referring to others, but this has nothing to do with the AI revolution.

x. Cross tabulation between AI revolution & AI Learning Experience.

H0 : There is no significant association between AI revolution & AI Learning Experience.

H1 : There is significant association between AI revolution & AI AI Learning Experience.

Table 11: Association between AI revolution and AI Learning Experience

		AI Learning Experience				
		Encourage it	Discourage it	Neutral	Negative	Total
Is AI revolutionary	Yes	57	64	79	62	262
	No	23	26	24	25	98
	Total	80	90	103	87	360
Pearson Chi-Square (χ^2)				Asymptotic Significance (2-sided) p-value		
1.120 (df 3)				0.772		

From the table 11, we see that the Pearson Chi-Square Statistic with 3 degrees of freedom is observed to be 1.120[a] of which asymptotically significance level is 0.772 is greater than P-value 0.05 but some cell frequency is less than 5. So, we do not reject the null hypothesis i.e, there is no significant association between AI revolution & AI learning experience. As, the experience of students learning about AI is not significant with the AI revolution.

3.3 Logistic Regression

Logistic Regression Analysis is one of the most important multivariate analyses in which the outcome variable is binary or dichotomous (cox, 1790). In this analysis, we have discussed only those variables, which are statistically significant at the bivariate analysis level. The relative importance of some multivariate techniques. The study used logistic distribution. In logistic regression, there is a (binary or dichotomous) response. In a regression problem, we often observe that one or more explanatory variables could be qualitative or indicator variables. These types of problems are generally handled by dummy variable regression. Sometimes, even the explained variable could be an indicator variable. Let us express the dependent variable as Y and the independent variable as X which is represented by the following logistic function.

$$Y_j = \frac{exp\left(\beta_0 + \sum_{i=1}^{n} \beta_i X_{ij}\right)}{1 + exp\left(\beta_0 + \sum_{i=1}^{n} \beta_i X_{ij}\right)}$$

Logistic regression on AI Revolution.

Let,

Y_j = Revolution of AI

X_{1i} = AI Usage Field

X_{2i} = AI Purpose

X_{3i} = AI Benefits

X_{4i} = AI Dependency

X_{5i} = Teacher's Opinion on using AI

X_{6i} = AI Decrease Human Interaction

Now we like to test the following hypothesis

H0 : Covariates do not have a significant effect on revolution of AI.

H1 : Covariates have a significant effect on revolution of AI.

Dependent Variable Encoding:

Variable	Original Value	Internal Value
Is AI Revolutionary or not?	Yes	1
	No	2

Independent Variable Encoding:

Variable	Original Variable	Internal Value
AI Usage Fields	Academic education	1
	Programming	2
	Skill development	3
	Research	4
	Problem Solving	5
Purpose of using AI	Find Quick Answer	1
	Improve understanding Complex Topics	2
	Ideas for Assignment	3
	Translation or writing Improvement	4
AI Benefits	Time saving	1
	Improve grades	2
	Better understanding of topics	3
	Enhanced creativity	4
AI Dependency	Yes, Significantly	1
	Somewhat	2
	No, Still rely on traditional methods	3
Teacher's Opinion	They Encourage it	1
	They Discourage it	2
	They are neutral	3
AI decreases Human interactions	Yes	1
	No	2

Table 12: Effects of selected co-variates on the revolution of AI among students.

Factors	Sub Category	B	S.E.	Wald	Sig.	Exp. (B)	95% C.I. for EXP(B) Lower	95% C.I. for EXP(B) Upper
AI Usage Field	Problem Solving (ref)							
	Academic education	-.576	.438	1.730	.188	.562	.238	1.326
	Programming	.063	.411	.023	.879	1.065	.476	2.384
	Skill development	.242	.367	.436	.509	1.274	.620	2.617
	Research	-1.102	.444	6.158	.013	.332	.139	.793
AI Purpose	language translation (ref)							
	Find Quick Answer	-.217	.344	.399	.528	.805	.410	1.580
	Improve understanding Complex Topics	-.819	.349	5.508	.019	.441	.222	.874
	Ideas for Assignment	-1.273	.388	10.734	.001	.280	.131	.600
AI Benefits	Enhanced creativity (ref)							
	Time saving	.906	.394	5.287	.021	2.475	1.143	5.358
	Improve grades	.162	.388	.174	.677	1.175	.550	2.512
	Better understanding of topics	.891	.387	5.308	.021	2.439	1.142	5.206
AI Dependency	No (ref)							
	Yes, Significantly	.476	.326	2.122	.145	1.609	.849	3.051
	Somewhat	.767	.328	5.479	.019	2.153	1.133	4.091
Teacher Opinion	Remain Neutral (ref)							
	They Encourage it	.409	.307	1.774	.183	1.505	.825	2.746
	They Discourage it	-.453	.341	1.761	.185	.636	.326	1.241
AI Decreases Human Interaction		.527	.261	4.082	.043	1.694	1.016	2.825
Constant		-1.474	.532	7.684	.006	.229		

AI Usage Field: Overall significance: $\chi^2 = 12.216$, df = 4, p = 0.016

- **Research**

    - B = -1.102**,** Exp.(B) = 0.332**,** p = 0.013
    - Students who use AI for research purposes are significantly less likely to consider AI revolutionary than problem solving. Their odds decrease by about 67%. This might be because they feel AI is still limited in deeper academic or analytical tasks or problems solving.

- **Academic Education**

    - B = -0.576**,** Exp.(B) = 0.562**,** p = 0.188
    - Not statistically significant, though shows a slight negative trend.

- **Programming**, **Skill Development**
    - Both are not significant (p = 0.879 and p = 0.509), meaning using AI in these ways doesn't greatly shape revolutionary perceptions.

AI Purpose: Overall significance: $\chi^2 = 13.549$, df = 3, p = 0.004

- **Ideas for Assignment**

    - B = -1.273**,** Exp.(B) = 0.280**,** p = 0.001
    - Strong negative effect. Students using AI mainly to get assignment ideas are about 72% less likely to view AI as revolutionary. This suggests they may see AI more as a shortcut than a transformative tool.

- **Improve Understanding of Complex Topics**

    - B = -0.819**,** Exp.(B) = 0.441**,** p = 0.019
    - Also a significant negative predictor. These students are 56% less likely to consider AI revolutionary—possibly because they expect deeper comprehension that AI can't always provide.

- **Find Quick Answers**

  - B = -0.217, Exp.(B) = 0.805, p = 0.528
  - Not significant. Using AI for quick answers doesn't affect revolutionary perceptions strongly in either direction.

AI Benefits: Overall significance: $\chi^2 = 9.634$, df = 3, p = 0.022

- **Time Saving**

  - B = 0.906, Exp.(B) = 2.475, p = 0.021
  - Highly influential. Students who say AI helps them save time are 2.5 times more likely to think AI is revolutionizing education.

- **Better Understanding of Topics**

  - B = 0.891, Exp.(B) = 2.439, p = 0.021
  - Another strong positive factor. These students are also 2.4 times more likely to see AI as revolutionary.

- **Improve Grades**

  - B = 0.162, Exp.(B) = 1.175, p = 0.677
  - Not significant. Improved grades alone don't seem to convince students that AI is transformational.

AI Dependency: Overall significance: $\chi^2 = 5.519$, df = 2, p = 0.063

- **Somewhat Dependent**

  - B = 0.767, Exp.(B) = 2.153, p = 0.019
  - Students who describe themselves as "somewhat dependent" on AI are more than twice as likely to believe AI is revolutionary. This suggests moderate, balanced use fosters appreciation.

- **Significantly Dependent**
    - B = 0.476**,** Exp.(B) = 1.609**,** p = 0.145
    - Not significant. Interestingly, heavy AI users may not feel the same way perhaps due to overuse fatigue or reduced novelty.

Teacher Opinion: Overall significance: χ^2 = 7.174, df = 2, p = 0.028

- **Encouraged by Teachers**
    - B = 0.409**,** Exp.(B) = 1.505**,** p = 0.183
- **Discouraged by Teachers**
    - B = -0.453**,** Exp.(B) = 0.636**,** p = 0.185
    - Neither category was significant individually, but overall, students' perceptions are influenced by their teachers' general stance on AI.

AI Decreases Human Interaction

- B = 0.527**,** Exp.(B) = 1.694**,** p = 0.043
- Students who feel AI reduces face-to-face or human interaction are 1.7 times more likely to see it as revolutionary. This could reflect both excitement and caution acknowledging AI's power to change how we learn and communicate.

Constant

- B = -1.474**,** Exp.(B) = 0.229**,** p = 0.006
- On its own, the base chance of considering AI revolutionary is quite low suggesting that meaningful use, benefits, or purpose is needed to shift student perception.

The results suggest that people are more likely to see AI as revolutionary when they clearly understand its purpose and believe it brings real benefits. Those who feel more dependent on AI in their daily lives also tend to view it as transformative. Interestingly, even when people think AI reduces human interaction, they still see it as a sign of progress—possibly because it represents efficiency and innovation. On the other hand, teachers' opinions didn't show a strong influence, which might mean their views are more

mixed or cautious. Overall, how people experience and interpret AI plays a big role in whether they see it as something truly groundbreaking.

The findings paint a mixed picture. Many students value AI for the support and simplicity it offers, but they also worry about relying too much on it. Some fear it might affect creativity or reduce chances for real human interaction. Overall, the study shows that how students use AI and what they expect from it matters a lot in shaping their views. In a time when AI is becoming a major force in education, this research encourages us to think more carefully about how these tools are used. With the right balance, AI can do more than just make learning easier it can truly support smarter, deeper, and more meaningful education.

3.4 Discussion

This study examined how AI-powered tools affect student learning, focusing on how learners view AI's role in education and whether they see it as transformative. The results offer a detailed look at the connections between students' experiences with AI and their perceptions, backed by both chi-square tests and logistic regression. Descriptive statistics showed that students from all academic years and fields are using AI tools. While current CGPAs displayed slight improvement compared to past results, this may partly reflect the academic support provided by AI tools. Notably, AI-powered tutoring apps, research platforms, and ChatGPT were the most frequently used, with 2 to 6 hours per week being the average usage time.

Chi-square tests indicated significant associations between students' perception of AI as revolutionary and variables such as:

- AI Usage Fields (p= 0.043)
- Purpose of using AI (p = 0.006)
- Perceived benefits (p = 0.033)
- Dependency on AI (p = 0.045)
- Teachers' opinions (p = 0.026)
- Belief that AI reduces human interaction (p = 0.016)

These findings are in line with current literature that emphasizes how frequent and purposeful AI use enhances positive perceptions (Luckin et al., 2016; Holmes et al., 2022).

For example, students who use AI to improve understanding, generate project ideas, or save time are more likely to regard AI as transformative. However, the lack of significant association between AI use and actual learning improvement or recommendation to peers may reflect underlying concerns around overdependence and surface-level learning—echoing concerns raised by scholars such as Selwyn (2019) and Zawacki-Richter et al. (2019).

Logistic regression provided a deeper look into the data. It revealed that students who use AI to generate assignments or help with complex topics are statistically less likely to see AI as revolutionary, possibly because they get frustrated with accuracy or critical thinking issues (Exp(B) = 0.316, 0.434). On the other hand, students who gain time savings or better understanding were more than twice as likely to view AI as revolutionary (Exp(B) ≈ 2.1). This emphasizes that how useful students think AI is shapes their positive feelings about it (Davis, 1989).

Interestingly, students who feel that AI reduces human interaction were still more likely to describe it as revolutionary. This suggests that while AI might affect the social side of learning, its efficiency and independence are appreciated in today's academic culture. These results reflect the changing landscape of digital education, where collaborative learning is often replaced by personalized instruction using AI (Tang et al., 2021).

The influence of teachers, while statistically close, was not a strong predictor. This might indicate a gap between how teachers view AI and how students feel about it. It could also show a wider cultural difference in how AI is adopted across different educational levels (HolonIQ, 2023).

Chapter Four

Conclusion and Future Studies

4.1 Conclusion

The study shows that AI tools are affecting student learning, especially in how students view and use them. Although academic improvement was not strongly linked to AI usage, these tools were found to be valuable for improving efficiency, providing support, and making learning easier. These advantages help shape the view of AI as a transformative force in education.

- Students who use AI for practical purposes, like saving time or enhancing understanding, are much more likely to see it as revolutionary.
- Interestingly, beliefs about AI reducing human interaction are tied to a positive perspective on its role in education.
- Teachers' opinions are less influential, suggesting a potential disconnect between educators and students regarding technology use.

While AI is clearly becoming a central part of student learning, concerns about creativity, dependency, and social interaction need to be managed through responsible integration and education in digital literacy. This study aimed to see if AI tools in education are revolutionary for student learning by looking at student behavior, their perceptions, and the statistical links among different influential factors. The analysis used descriptive statistics, chi-square tests, and logistic regression modeling to understand how various experiences and attitudes toward AI influence its perceived impact. From the descriptive analysis, we saw modest academic improvement, with the mean CGPA rising from 2.38 to 2.49.

Students often used AI tools such as tutoring apps, research platforms, and generative tools like ChatGPT. Most respondents used these tools for two to six hours each week, mainly for quick answers, understanding complex topics, or brainstorming ideas for assignments. These findings match recent research suggesting that accessibility and ease of use are key factors driving AI adoption. Chi-square tests found that several factors were

significantly linked to whether students viewed AI as revolutionary. A strong relationship existed between the perception of AI's revolution and its purpose of use ($p = 0.006$), its benefits ($p = 0.033$), dependence on AI ($p = 0.045$), teacher opinions ($p = 0.026$), and the belief that AI reduces human interaction ($p = 0.016$). However, there were no significant links between revolutionary perception and factors like AI's impact on learning and overall improvement, indicating that perceived usefulness may play a larger role than actual results. The logistic regression model offered more insights. It showed that students using AI for understanding complex topics or for help with assignments were statistically less likely to see AI as revolutionary (Exp(B) = 0.434 and 0.316, respectively). In contrast, students who saved time with AI (Exp(B) = 2.152, $p = 0.044$) or improved their understanding (Exp(B) = 2.136, $p = 0.042$) were significantly more likely to regard AI as transformative. This supports Davis's (1989) Technology Acceptance Model, which says that perceived usefulness is a crucial factor in how users accept technology. The overall model was statistically significant, with an R^2 (Nagelkerke) estimated between 0.22 and 0.26, showing that the chosen predictors explained a moderate amount of variation in students' perception of AI as revolutionary.

These results align with modern research highlighting AI's transformative role when viewed as beneficial and efficient (Holmes et al., 2022; Tang et al., 2021). In conclusion, while AI may not always improve academic performance or receive universal endorsement from educators, it is largely seen as a revolutionary learning aid by those who use it with clear objectives and perceive tangible benefits. Future uses of AI in education should focus on increasing its usefulness, reducing overdependence, and including ethical AI training in the curriculum. There is also a critical need to narrow the perception gap between educators and students, ensuring that AI tools support rather than replace human-centered education.

4.2 Limitations and Scopes

This research centres on university students currently using AI-powered tools for academic purposes. The sample is drawn randomly, targeting individuals with direct experience using AI in their studies. The study does not include primary or middle school students, nor does it examine teachers' use of AI. Additionally, while it explores perceptions and self-reported academic impacts, it does not measure long-term academic outcomes or causality.

While this study aimed to provide a clear understanding of how AI-powered tools are influencing student learning, it is important to recognize its limitations. First, the research was conducted only at Gopalganj Science and Technology University, which may limit how well the findings apply to students in other universities or regions. Different institutions may have varying access to AI tools and different attitudes toward their use.

Second, although simple random sampling was applied to reduce bias, the study depended on voluntary participation. It is possible that students who already had a strong interest in AI were more inclined to take part, which may have influenced the results.

Third, the data collected was self-reported. This means we relied on students to honestly describe their behaviours and opinions, which can sometimes lead to exaggerations or understatements. This kind of response bias is common in survey-based research.

Fourth, because the study was cross-sectional—meaning it collected data at just one point in time—it doesn't show how student perceptions might change in the future as AI tools continue to evolve.

Lastly, while we examined connections between variables using statistical tools like chi-square and logistic regression, the study does not establish cause-and-effect relationships. For example, we can say there is a relationship between AI use and positive perceptions, but we cannot say that one directly causes the other. Recognizing these limitations helps put the findings in context and highlights the need for further research on a broader scale.

4.3 Future Studies

As this study focused on how students use and perceive AI tools within a university, it opens the door to various opportunities for broader exploration. The findings provide valuable insights into the potential of AI in student learning. However, the fast pace of technology and the variety of academic environments indicate that further research is both necessary and promising. The following directions could help expand on this work and contribute to a better understanding of AI's role in education:

• **Long-term tracking of AI use:**

Future studies could follow students over time to see how ongoing AI use shapes their learning habits, performance, and attitudes. This would give a deeper view than a one-time survey.

• **Explore differences across academic disciplines:**

AI might be used differently in engineering, arts, business, or medical studies. Future research can investigate how students from various fields interact with AI tools and how these tools impact subject-specific learning.

• **Broaden the geographical scope:**

Since this study took place in one Bangladeshi university, future work should include students from other institutions or countries. This can help examine how culture, infrastructure, and access influence AI use and perceptions.

• **Investigate ethical and policy-related concerns:**

As AI becomes more integrated into education, there's a growing need to address issues such as academic honesty, student data privacy, and fairness in AI-generated content. These are essential for responsible use.

• **Include other stakeholder perspectives:**

Research that includes teachers, educational administrators, and even parents could give a fuller picture of how AI is shaping education and what support systems are needed for effective use.

• Examine institutional readiness:

Understanding how prepared universities are regarding teacher training, digital infrastructure, and AI-related guidelines would help determine whether AI can be used meaningfully and safely in the classroom.

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Questionnaire

Hello,

We are the students from Statistics department of 2019-20 session of Gopalganj Science and Technology University, Gopalganj. We are conducting a thesis report on "**Analyzing the Factors that Make AI a Revolutionary Tool in Student Learning**" and we welcome you to fill the questionnaire to assist us. This will take 4-5 minutes.

This questionnaire doesn't contain any of your personal details and we'll use this data only on this specific purposes. This questionnaire does not follow any illegal or abusive things. We respect your time.

Thank You.

Section 1: Demographic Information

1. What is your gender?

☐ Male   ☐ Female

2. What is your age?

☐ Under 18   ☐ 18-21   ☐ 21-24   ☐ 24-2   ☐ 27+

3. Academic Year

☐ 1st Year   ☐ 2nd Year   ☐ 3rd Year   ☐ 4th Year   ☐ Masters

4. What is your field of study?

☐ Engineering   ☐ Social Science

☐ Science   ☐ Business Studies

☐ Life Science   ☐ Law

☐ Humanities   ☐ Agriculture

5. Previous CGPA-

☐ Below 2.5

☐ 2.5 – 3.0

☐ 3.0 – 3.5

☐ 3.5 – 4.0

6. What is your current CGPA?

☐ Below 2.5

☐ 2.5 – 3.0

☐ 3.0 – 3.5

☐ 3.5 – 4.0

7. How much time do you often spend AI in a week?

☐ Less than 2 hours

☐ 2 – 4 hours

☐ 4 – 6 Hours

☐ More than 6 Hours

Section 2: AI Usage in Learning

8. Which field you need to use AI most?

☐ Academic education

☐ Programming

☐ Skill development

☐ Research

☐ Problem Solving

9. Which AI-powered tools do you use the most?

☐ ChatGPT
☐ Google Bard
☐ AI-powered tutoring apps (e.g., Khan Academy, Duolingo)
☐ AI-assisted research tools (e.g., Elicit, Scite)
☐ DeepSeek

10. How frequently do you use AI-powered tools for learning?

- [ ] Daily
- [ ] Weekly
- [ ] Occasionally
- [ ] Rarely

11. What is your primary purpose for using AI in education?

- [ ] To find quick answers to questions
- [ ] To improve understanding of complex topics
- [ ] To generate ideas for assignments or projects
- [ ] To assist with language translation or writing improvement

Section 3: Impact of AI on Learning

12. How do you think AI tools have affected your learning experience?

- [ ] Greatly improved
- [ ] Somewhat improved
- [ ] No impact
- [ ] Somewhat worsened
- [ ] Greatly worsened

13. How AI benefits your daily work?

- [ ] Time saving
- [ ] Improve grades
- [ ] Better understanding of topics
- [ ] Enhanced creativity

14. In what ways has AI improved your learning?

- [ ] Personalized learning recommendations
- [ ] Faster access to information
- [ ] Improved understanding of complex topics
- [ ] Increased motivation and engagement

15. Do you feel that AI tools have made you overly dependent on technology for studying?

- [ ] Yes, significantly
- [ ] Somewhat
- [ ] No, I still rely on traditional methods

16. Has AI reduced your creativity or critical thinking skills?

☐ Yes, I feel I rely too much on AI-generated answers
☐ No, AI helps me think in new ways
☐ Not sure

Section 4: AI's Effect on Mental Health and Well-being

17. Does using AI for studying make you feel more or less stressed?

☐ Less stressed, it makes learning easier
☐ More stressed, I worry about AI's influence
☐ No impact on my stress levels

18. Do you think AI tools make studying more enjoyable?

☐ Yes, I feel more engaged
☐ No, it makes studying feel impersonal
☐ No difference

19. Do you feel unconfident if you don't have access to use AI?

☐ Yes
☐ No
☐ Maybe

Section 5: AI vs. Traditional Learning

20. Do you prefer AI-powered tools over traditional learning methods (books, lectures, etc.)?

☐ Yes, AI is more effective
☐ No, traditional methods are better
☐ I prefer a combination of both

21. How do your teachers or professors feel about AI use in learning?

☐ They encourage it
☐ They discourage it
☐ They are neutral

22. What are the biggest challenges you face when using AI tools for studying?

☐ Inaccuracy of AI-generated information
☐ Over-reliance on AI instead of critical thinking
☐ Ethical concerns (e.g., plagiarism, fairness)
☐ Lack of personal interaction with teachers

23. Do you agree AI decreases Human interactions?

☐   Yes
☐   No

24. How likely are you to recommend the use of AI tools to others students?

☐   Always
☐   Often
☐   Rare
☐   Never

25. How has AI impacted your learning experience?

☐   Very Positive
☐   Somewhat positive
☐   Neutral
☐   Negative

26. Do you think the impact of AI is revolutionary or not?

☐   Yes   ☐   No