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EXPLORING UNIVERSITY STUDENTS' ATTITUDES AND PROFICIENCY IN USING AI TOOLS: A GENDER-BASED STUDY IN PAKISTAN

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Abstract
AI systems are capable of carrying out activities like solving problems, interpreting language, identifying patterns, and making forecasts—typically with minimal or no direct human input. The use of artificial intelligence (AI) by both teachers and students is steadily increasing in universities; however, it remains relatively underexplored in the context of Pakistan. This study explored how familiar university students in Pakistan are with artificial intelligence tools. It also examined how often they use these tools in education and whether their attitudes and usage differ based on gender. A mixed method approach is used for this study. A survey was conducted as part of the quantitative phase, targeting students from public sector universities in District Multan, Pakistan. Using a random sampling technique, four public universities were selected, and data was collected from 930 students through multi-stage cluster sampling. For the qualitative phase, the focus was on students from Bahauddin Zakariya University, where fifteen in-depth interviews were conducted.

1. Introduction

Intelligence encompasses the ability to acquire new information, process and manipulate it in various ways, comprehend and verify the modified data, identify relationships among data points, and interpret meanings throughout these processes (Mueller & Massaron, 2018). Minsky (1961) defines intelligence as "the ability to solve difficult problems." Artificial Intelligence (AI), however, involves developing methods to perform tasks when the available data is complex or challenging. Techniques such as machine learning, deep learning, and neural networks are central to AI, with vision and text algorithms being significant subfields (Sejnowski, 2020).

AI has the potential to revolutionize education (Holmes et al., 2019), although highly sophisticated AI is not always enough to produce significant educational effects (Castañeda & Selwyn, 2018). Various literature reviews investigated the roles of AI in education by classifying the application areas of AI (Holmes et al., 2019), covering different methodologies (Luckin et al., 2016; Baker et al., 2019), presenting some of the key research issues (Hwang et al., 2020), challenges (Baker et al., 2019), or the future (Pinkwart, 2016). But the number of studies who focus on use of AI in educational setting are very limited. There is not much research on how new technology fits with the way we understand learning and teaching. It is also not clear how much it actually changes what happens in classrooms (Hwang et al., 2020).

Many universities around the world are empowering both educators and students to utilize AI, preparing them for future AI applications. A study at Government College University, Faisalabad, by (Younas et al., 2024) indicated that while students recognize AI's presence in education, their understanding of its potential as a writing aid, plagiarism detection tool, and research assistance

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resource remains limited. The research recommends implementing periodic training and workshops to enhance students' AI awareness and ethical considerations. A systematic review and meta-analysis encompassing 22 studies revealed that approximately 65% of healthcare students expressed a favorable attitude toward the use of Artificial Intelligence (AI) in medicine. Notably, students from countries such as the USA, Kuwait, Saudi Arabia, Turkey, and the UK demonstrated a more positive outlook compared to their counterparts in Germany, Lebanon, Nigeria, Pakistan, and India. This variation underscores the influence of regional factors on students' perceptions of AI in healthcare.

A study (Casal-Otero et al., 2023) involving university students from Finland and Hong Kong assessed the impact of online workshops on AI literacy. The results indicated significant improvements in students' conceptual understanding and self-perceived competence in AI. Reflective diaries revealed initial apprehensions about AI, which transformed into increased confidence and enthusiasm post-workshop. This demonstrates the power of interactive, cross-cultural learning in improving AI literacy. One study (Saini et al., 2025) looked at future teachers and how learning about AI changed their thinking. After some lessons, they felt more confident and aware about using AI in teaching. But many were still worried. They thought AI might take teachers' jobs or hurt students' thinking skills. So, teacher training should give full knowledge about AI—both good and bad sides. Another study in North India looked at college students. It found that students who knew more about AI used it more in learning. They also got better marks. This shows that learning about AI can help students study well and stay more active in class.

According to Holmes (2019), human skills are crucial in contexts where they outperform machines—especially in designing practical products and outcomes, effectively communicating about them, and making decisions grounded in intangible values. The OECD Skills assessment indicates that individuals with strong cognitive abilities—such as proficiency in reading, mathematics, and critical thinking within digital environments—are more likely to move beyond basic internet use for information and communication, adopting more advanced and varied applications influenced by multiple factors (OECD, 2019; Elliott, 2017).

Research by (Campos & Scherer, 2024) indicate notable gender disparities in attitudes towards digital technologies. Women often exhibit greater concerns and lower trust in these technologies compared to men. For instance, while 78% of men believe digital technologies have positively impacted the economy, only 72% of women share this view. Similarly, 70% of men feel these technologies have enhanced quality of life, whereas 63% of women agree. Regarding robotics and related technologies, 67% of men hold a positive perspective, in contrast to 54% of women. Additionally, 53% of men reported encountering information about these tools in the past year, compared to 41% of women, suggesting a knowledge gap that may contribute to the lower trust and usage among women.

Over the past five years, the use of artificial intelligence in higher education has grown significantly (Chu et al., 2022), coinciding with the emergence of new AI tools during the same period. However, the gender-based inclination of university students in Pakistan towards the attitude of students and skills in using such tools remains largely unexplored. Most of the available literature focuses on overall trends in technology adoption without giving adequate attention to how male and female students differ in their skills and attitudes toward the use of these tools in educational settings. This lack of focused research creates a gap in understanding the role gender

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plays in shaping students' engagement with technology-based learning tools, making it difficult to design inclusive and equitable strategies for their effective integration in Pakistan's higher education system. So, the purpose of this research is to examine university students' attitude towards using AI tools and skills in using AI in Pakistan. It also aims to explore gender-based differences in how male and female students engage with these tools at the higher education level.

2. Objectives and Research Questions

Recently, the use of artificial intelligence has grown rapidly and is increasingly influencing the education sector. Pakistan education system is no exception. However, students' attitudes and skills in using these tools can vary, especially across different regions and gender groups. Therefore, the objective of this study is to investigate university students' attitudes/perspective towards using AI tools and their skills/perception in applying them for academic purposes in Pakistan. It also aims to explore gender-based differences in these attitudes/perspective and skills/perception at the higher education level.

Specifically, the key objectives in this regard are as follows:

1. *To investigate students' attitudes toward the use of artificial intelligence in higher education.*
2. *To assess students' proficiency in using artificial intelligence tools within higher education.*
3. *To explore gender-based differences in students' attitudes toward using AI and their proficiency in utilizing AI at the higher education level*.

Research questions:

The following research questions guide this study:

1. *What is the general attitude of university students towards the use of AI tools in higher education and what kind of skills students 'possess in using Artificial Intelligence tools in higher education?*
2. *What gender-based differences exist among students in terms of their attitude towards using AI and their skills in using AI at higher education level?*

3. Research Methodology

This research used a mix-method approach involving quantitative and qualitative techniques. The quantitative approach helped to identify the pattern and relationships of students with the usage and understanding of AI tools in education while qualitative technique helped to get in-depth insights from the students regarding their perspective towards use of AI tools in education. Overall, the nature of this study was description in nature.

3.1 Population and sample

The population for this study included students from public universities in Multan City. Out of seven public universities, four were selected for data collection: Bahauddin Zakariya University (BZU), The Women University, Emerson University, and the University of Education, Multan Campus. The total student enrolment across the four selected universities is approximately 47,000. Participants were selected using multi-stage cluster sampling, where each student had an equal chance of being chosen. A total of 28 departments from the four universities were randomly selected. From this, a sample of 930 students was taken. In addition, fifteen students from BZU were interviewed for qualitative data collection.

3.2 Research Instrument

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In this study two research instruments were used to collect data: A questionnaire for quantitative data collection and interview protocols for qualitative data collection. The questionnaire for quantitative data collection was based on already existed validated tool used by the (Abbas et al., 2023; Malmström et al., 2023). The reliability of the scale, as calculated in the quantitative phase of the study, was found to be 0.939. Semi-structure interview protocol for qualitative data was prepared for students after intense literature review. After collecting basic background details, specific questions were asked about their understanding of artificial intelligence tools. Some follow-up questions were included to get more detailed answers.

3.3 Data Collection

The purpose of the study was clearly explained to the participants, and their consent was taken. They were assured that their responses would remain confidential and anonymous. Data was gathered from students enrolled in BS, MA/MSc, MS/MPhil, and PhD programs.

3.4 Quantitative Data analysis

The collected quantitative data was entered into SPSS for analysis. Both descriptive statistics and an independent samples t-test were performed. Descriptive statistics were used to explore students' attitudes toward AI-specific tools and to assess their skills in using these tools within higher education settings. The independent samples t-test was employed to analyse gender-based differences in students' attitude/perspective and skills/proficiency in using AI tools at the university level.

3.5 Results of Quantitative Research

This section outlines the main results beginning with the student's attitude/perspective towards using AI tools followed by skills/proficiency in using these tools along with Gender based perceptions.

3.5.1 Students' Attitude towards using Artificial Intelligence Tools.

This section analyses students' attitudes toward Artificial Intelligence by calculating the mean and standard deviation.

Table 3.5.1: Students' Attitude towards using Artificial Intelligence Tools

Sr #	Items	Mean	St. Deviation
1	I am confident of integrating artificial intelligence tools into education because it offers substantial benefits**.**	3.700	1.1352
2	I am confident of the reliability provided by AI-driven tools.	3.562	.97927
3	I am of the opinion that AI-powered Chatbots offer distinct advantages over traditional search engines like Google and Springer.	3.483	1.6464
4	I find that the information provision of various AI Chatbots to be valuable in addressing questions and solving problems.	3.734	1.0045
5	I believe that AI-powered Chatbots can often produce more refined and accurate results than students working independently.	3.650	1.1084

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6	I believe that engaging with AI-powered Chatbots can significantly enhance one's proficiency in general language skills.	3.636	1.0349
7	I assure in utilizing AI tools for my academic work and essay writing.	3.647	1.0459
8	I don't believe in artificial intelligence impact on my ability to retain and recall information I've learned.	3.414	1.1635
9	I trust that the information provision of artificial intelligence tools is accurate and beneficial for my learning.	3.543	1.0502
10	I believe in recommending artificial intelligence tools to my peers could be beneficial for their learning experiences.	3.545	1.0242
11	I am equally motivated in pursuing my education with or without the assistance of AI tools**.**	3.668	1.0712
12	overall	3.598	1.1149

Table 3.5.1 shows the **overall aggregate mean** for the 11 items is **3.598**, with a **standard deviation of 1.114**, indicating a moderately positive attitude toward AI tools among students with relatively consistent responses. Among the statements, the highest mean score (M = 3.734) was recorded for the helpfulness of chatbot responses in solving problems, indicating strong student appreciation for AI's utility. Conversely, the lowest mean (M = 3.414) was observed for AI's effect on memory retention, implying some reservations in this area. Most items showed standard deviations close to 1, indicating a moderate level of consensus. Overall, the data depicts a positive attitude of students toward using AI tools in education. They agreed most on the helpfulness of AI and how it keeps them motivated. There were more mixed opinions about using AI instead of search engines and its effect on memory. The consistent pattern across most standard deviations (near to 1) suggests a relatively uniform perspective among the student respondents.

Table 3.5.2: Descriptive statistics/Attitude in using AI tools

Sr #	Items	Gender	N	Mean	SD	f	t	Sig
1	I have confidence of integrating artificial intelligence tools into education for substantial benefits**.**	Male	391	3.6343	1.2054	11.319	1.50	.001
		Female	539	3.7477	1.0801			
2	I have confident in the reliability of AI-driven tools	Male	391	3.5448	1.0339	5.325	-.46	.02
		Female	539	3.5751	.93835			
3	I am of the opinion that AI-powered Chatbots offer	Male	391	3.3964	1.1385	10.23	-1.4	.00

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	distinct advantages over traditional search engines like Google and Springer	Female	539	3.4768	.98922			
4	I find the information provided by various AI Chatbots to be valuable in addressing questions and solving problems.	Male	391	3.7391	1.0638	3.522	.12	.06
		Female	539	3.7310	.96017			
5	Artificial intelligence Chatbots are helpful in generating better results than students can produce on their own.	Male	391	3.6547	1.1417	1.959	.09	.16
		Female	539	3.6475	1.0847			
6	I believe that engaging with AI-powered Chatbots can significantly enhance one's proficiency in general language skills.	Male	391	3.6829	1.1101	6.969	1.16	.008
		Female	539	3.6030	.97652			
7	I feel assured in utilizing AI tools for my academic work and essay writing.	Male	391	3.6957	1.1217	4.614	1.20	.032
		Female	539	3.6122	.98686			
8	I don't believe in artificial intelligence impact on ability to retain and recall information I've learned	Male	391	3.4476	1.2117	3.249	.750	.072
		Female	539	3.3896	1.1277			
9	I trust in information provision by artificial intelligence tools is accurate and beneficial for my learning	Male	391	3.5780	1.0947	1.671	.865	.196
		Female	539	3.5176	1.0171			
10	I believe in recommending artificial intelligence tools to my peers could be beneficial for their learning experiences	Male	391	3.5243	1.0854	5.014	-.529	0.02
		Female	539	3.5603	.97819			
11	I am equally motivated to pursue my education with or without the assistance of AI tools.	Male	391	3.7442	1.0432	2.861	1.83	0.09
		Female	539	3.6141	1.0887			

Table 3.5.2 shows the result of an independent samples t-test which was conducted to examine whether there were significant gender differences in students' attitudes toward the use of AI tools in education. The results are summarized below:

Significant gender differences were found in several items:

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- **Item 1** (*Application of AI in education*): A significant difference was observed (**t = -1.505, p = 0.001**), with females (M = 3.748) showing slightly more positive attitudes than males (M = 3.634).
- **Item 2** (*Accuracy of AI tools*): Females (M = 3.575) also showed significantly more trust than males (M = 3.545), **t = -0.467, p = 0.021**.
- **Item 3** (*AI Chatbots vs. search engines*): A significant difference was found (**t = -1.148, p = 0.001**), with females (M = 3.477) reporting more favourable views than males (M = 3.396).
- **Item 6** (*Enhancement of language proficiency*): Females (M = 3.603) again reported higher agreement than males (M = 3.683), with a significant difference (**t = 1.162, p = 0.008**).
- **Item 7** (*Confidence using AI*): A statistically significant difference (**t = 1.201, p = 0.032**) was observed, with males (M = 3.695) reporting higher confidence than females (M = 3.612).

The remaining items showed **no statistically significant differences** between male and female students, as their p-values exceeded the standard alpha level of 0.05. These include attitudes toward AI's impact on memory, trust in AI-provided information, peer recommendation, and motivation to study with or without AI.

Overall, the results suggest that while both male and female students have a generally positive attitude toward AI tools, **female students tend to view AI more favourably** in terms of its usefulness, accuracy, and potential to improve learning outcomes. However, **male students report higher confidence** in actually using AI tools for academic work.

Table 3.5.3 Attitude towards using AI tools

SR #	Construct	Gender	N	Mean	Df	Significance
1	Attitude	Male	391	39.64	928	0.728
		Female	539	39.47		

The table 3.5.3 shows the result of an independent samples t-test which was conducted to compare the **overall attitude scores** of male and female students toward the use of Artificial Intelligence (AI) tools in education. The results show that **male students (M = 39.64)** and **female students (M = 39.47)** had very similar mean scores. The difference was **not statistically significant** (**p = 0.728**), indicating that **gender does not have a significant impact** on students' overall attitudes toward AI tools.

3.6 Students' Proficiency in using Artificial Intelligence Tools.

This section analyses students' proficiency in using Artificial Intelligence by calculating the mean and standard deviation.

Table 3.6: Students' Proficiency in using Artificial Intelligence Tools

Sr #	Items	Mean	SD
1	Documentation, visual aids, and media can be valuable resources when operating or interacting with AI tools.	3.5656	1.07546

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2	"The effectiveness of crafting prompts in Artificial Intelligence tools significantly influences the output	3.6118	0.91093
3	Working with AI tools has speed up the process of data analysis in my research.	3.7075	.98670
4	I can ask follow-up questions with tools of Artificial Intelligence like ChatGPT	3.7774	1.00747
5	The prompts I use in my studies are clear and specific.	3.6839	.99355
6	The prompts I use, are effectively guiding my study process.	3.6699	1.01212
7	I feel confident in creating prompts that lead to productive study sessions.	3.6387	1.02004
8	The prompts I employ help me stay focused and on track during my studies.	3.6538	0.99974
9	I believe the prompts I use facilitate deeper understanding of the material.	3.6882	1.00567
10	The prompts I utilize encourage critical thinking and problem-solving skills.	3.6581	1.07184
11	Aggregate	3.665	1.008

Table 3.6 shows the results of descriptive statistics were used to assess students' skills in using Artificial Intelligence (AI) tools, focusing on their ability to craft and use prompts effectively. The **aggregate mean score was 3.665** with a **standard deviation of 1.008**, indicating a generally positive skill level with moderate agreement across the items.

The highest mean score (**M = 3.7774**) was observed for item number 4 suggesting that students feel confident engaging in interactive dialogue with AI tools. Similarly, high agreement was seen in areas related to the speed of data analysis (**M = 3.7075**) and clarity of prompts (**M = 3.6839**).

All the items got good ratings, but item 1 had the lowest average score (M = 3.57). Still, it shows a mostly positive response. The scores didn't vary much, with standard deviation between 0.91 and 1.07, meaning students answered in a similar way.

Overall, the results show that students are fairly good at using AI tools for their studies. They can write clear prompts, stay focused while studying, and use the tools to help with critical thinking.

3.6.1: Gender Based Differences among students about their Proficiency in using AI tools.

This section examines gender differences in students' proficiency in using AI tools using an independent samples t-test. The test compared the mean scores of male and female students across eleven items to see if the differences were statistically significant. Mean and standard deviation were also used to describe variations in responses between the two groups.

Table 3.6.1: Descriptive statistics/Proficiency in using AI tools

Items	Gender	N	Mean	SD	f	t	Sig
When interacting with AI tools (i.e., running them), the documentation, visual aids, and media can be helpful.	Male	391	3.6343	1.20544	11.3	-1.505	.001
	Female	539	3.7477	1.08014			

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"The effectiveness of crafting prompts in Artificial Intelligence tools significantly influences the output	Male	391	3.5448	1.03399	5.32	-.467	.021
	Female	539	3.5751	.93835			
Working with AI tools has speed up the process of data analysis in my research.	Male	391	3.3964	1.13855	10.235	-1.148	.001
	Female	539	3.4768	.98922			
I can ask follow-up questions with tools of Artificial Intelligence like ChatGPT	Male	391	3.7391	1.06385	3.522	.122	.061
	Female	539	3.7310	.96017			
The prompts I use in my studies are clear and specific.	Male	391	3.6547	1.14174	1.959	.098	.162
	Female	539	3.6475	1.08472			
The prompts I use effectively guide my study process.	Male	391	3.6829	1.11018	6.969	1.162	.008
	Female	539	3.6030	.97652			
I feel confident in creating prompts that lead to productive study sessions.	Male	391	3.6957	1.12179	4.614	1.201	.032
	Female	539	3.6122	.98686			
The prompts I employ help me stay focused and on track during my studies.	Male	391	3.4476	1.21177	3.249	.750	.072
	Female	539	3.3896	1.12770			
I believe the prompts I use facilitate deeper understanding of the material.	Male	391	3.5780	1.09471	1.671	.865	.196
	Female	539	3.5176	1.01712			
The prompts I utilize encourage critical thinking and problem-solving skills.	Male	391	3.5243	1.08547	5.014	-.529	0.025
	Female	539	3.5603	.97819			
When interacting with AI tools (i.e., running them), the documentation, visual aids, and media can be helpful.	Male	391	3.7442	1.04320	2.861	1.831	0.091
	Female	539	3.6141	1.08875			

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Table 3.6.1 shows an independent samples t-test was carried out to examine gender differences in students' skills in using AI tools. The results showed that female students had slightly higher mean scores in several areas. For example, they rated the effectiveness of crafting prompts more positively (M = 3.575) than male students (M = 3.545), with the difference being statistically significant (p = 0.021). They also found AI tools more helpful in speeding up the process of data analysis (M = 3.477 for females, M = 3.396 for males; p = 0.001). In addition, male students scored higher in using prompts to guide their study process (M = 3.683) compared to female students (M = 3.603), and this difference was also significant (p = 0.008). Confidence in creating effective prompts was another area where male students (M = 3.696) scored higher than females (M = 3.612; p = 0.032).

For the remaining items, no significant differences were found between genders. This included clarity of prompts (p = 0.162), using prompts to stay focused (p = 0.072), using prompts for deeper understanding (p = 0.196), and encouraging critical thinking and problem-solving (p = 0.025), though the latter was marginally significant. Both groups had similar views on using AI tools for asking follow-up questions (p = 0.061). Overall, the findings indicate some differences in specific skills, but in most areas, male and female students reported comparable levels of proficiency in using AI tools.

Table 3.6.3: Proficiency in using AI tools

SR #	Construct	Gender	N	Mean	Df	Significance
1	Skills/proficiency	Male	391	37.08	928	0.086
		Female	539	37.34		

The table 3.6.3 shows that female students (M = 37.34) scored slightly higher than male students (M = 37.08) in their overall skills/proficiency using AI tools. However, the difference is not statistically significant (p = 0.086), indicating that both genders have comparable skill/proficiency levels in using AI tools**.**

4. Qualitative Research

For the qualitative part of the study, data were collected through semi-structure interviews with 15 randomly selected students from different departments at BZU. The purpose was to explore students' interaction with AI regarding students' attitude towards AI tools and their skill in using these tools in the education. Thematic analysis was used to identify recurring patterns in the interview responses. Content analysis was also applied to categorize the data and count the frequency of certain responses. As a result of this process, the study identified two (2) major themes and subsequent sub-themes, aligned with the research objectives

4.1 Interview Protocol

A semi-structured interview protocol was designed for students. After gathering the background Information from the participants, targeted questions were then asked to explore the information regarding AI. For students, questions were designed including some supportive questions in case to dig out the detail. The interview protocol included questions aimed at understanding students &

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perspectives on artificial intelligence tools. One question was about the knowledge of students about "Artificial Intelligence tools", requesting them to name some examples. Additionally, participants were asked whether they used AI tools in their studies and, if so, how they maximized their use.

4.2 Major theme1

4.2.1: Students' Perceptions and Trust in Artificial Intelligence for Learning

This theme captures students' overall attitudes, beliefs, and trust regarding the use of artificial intelligence tools in educational settings. It reflects how students perceive the effectiveness, reliability, and role of AI in supporting their academic work, learning outcomes, and language proficiency. It also includes their emotional responses—such as confidence and motivation—alongside cognitive and ethical considerations, including trust in AI accuracy and its influence on memory and independent thinking. The specific question was asked from students what kind of attitude they possess while using AI**.** On analysing their responses, four (4) themes emerged 1) Perceived Effectiveness and Usefulness of AI in Education, 2) Trust and Accuracy of AI Tools, 3) Confidence and Motivation in Using AI, 4) Cognitive and Ethical Considerations

Table 4.2.1:

Themes	Codes/Small themes	Responses
High	Perceived Effectiveness and Usefulness of AI in Education	Saved Time
Moderate	Trust and Accuracy of AI Tools	Depends on framing of question
	Confidence and Motivation in Using AI	Instant feedback
Low	Cognitive and Ethical Considerations	Plagiarism

Table 4.2.1 shows that the theme has four sub themes which define the level of skills among students regarding Artificial Intelligence tools whether they have high, moderate or least skills while using AI tools. Furthermore, content analysis is performed to check the frequency and percentage of males and females respondents in qualitative research.

Table 4.2.2: Content Analysis

Themes	Responses Male	Response Female	Frequency	Percentage
Perceived Effectiveness and Usefulness of AI in Education	8	6	14	65%
Trust and Accuracy of AI Tools	1	4	5	22%
Confidence and Motivation in Using AI	2	2	4	10%

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Cognitive and Ethical Considerations	2	0	2	3%

Table 4.2.2 presents the responses of male and female participants across different categories related to attitude of students. It includes the frequency of responses and their respective proportions for each category.

- **Perceived Effectiveness and Usefulness of AI in Education:** A total of 14 participants responded in this category, with 6 females and 8 males, representing 65% of all responses.
- **Trust and Accuracy of AI Tools:** This category received responses from 4 female participants and 1 male participant, together accounting for 22% of the total responses.
- **Confidence and Motivation in Using AI**: In this category, 2 female participant and 2 male participants responded, accounting for 10% of the total responses.
- **Cognitive and Ethical Considerations**: In this category, 2 male participants responded, while no female participants did, accounting for 3% of the total responses

.

This table highlights the variation in responses between male and female participants, with males having a higher frequency of responses in most categories, particularly in terms of Perceived Effectiveness and Usefulness of AI in Education.

- *"I've noticed my vocabulary and grammar have improved ever since I started using AI writing tools."(RP-1)*
- "*Compared to search engines, AI Chatbots save me time and often give more concise and focused responses*." *(RP-2)*
- "*I feel confident using AI in my assignments—it's like having a smart assistant by my side*." *(RP-3)*

4.3 Major theme2

4.3.1: Enhancing Information Discovery and Visualization in the Digital Age

It is a complex task to improve information discovery and visualization in the digital age by utilizing cutting-edge technologies and techniques to enhance people's ability to locate, comprehend, and use information. The specific question" **Do you know about any of the AI Prompts? If yes, please let me know about some of these prompts"** was asked from students. On analysing their responses, four (4) themes emerged 1) Specific prompts 2) The concept of randomness 3) Visual imagery 4) The Artistic Expression

Table 4.3.1:

Level of skills	Codes/Small themes	Responses
High	The concept of randomness	Random
Moderate	Specific Prompts	Describe, Explain and Elaborate
	The Artistic Expression	Drawing
Low	Visual Imagery	Pictures

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Table 4.3.1 shows that the theme has four sub themes which define the level of skills among students regarding Artificial Intelligence tools whether they have high, moderate or least skills while using AI tools.

Table 4.3.2: Content Analysis

Themes	Responses Male	Response Female	Frequency	Percentage
The concept of randomness	7	8	15	60%
Specific Prompts	2	4	6	24%
The Artistic Expression	0	2	2	8%
Visual Imagery	2	0	2	8%

Table 4.3.2 presents the responses of male and female participants across different categories related to advanced technology for information access as per student's level of skills/proficiency. It includes the frequency of responses and their respective proportions for each category.

- **The Concept of Randomness:** Female participants responded, with 8 indicating this category, accounting for 60% of the total responses.
- **Specific Prompts:** This category saw a response from 4 female participants, representing 24% of the total responses, with 2 male participants providing feedback.
- **The Artistic Expression:** In this category, 2 female participants and no male participant Responded, which make up 8% of the overall responses.
- **Visual Imagery:** In this category, 2 male participants and no female participant Responded, which make up 8% of the overall responses.

This table highlights the variation in responses between male and female participants, with females having a higher frequency of responses in most categories, particularly in terms of concept of randomness

a. *Yes, Describe, Explain and elaborate the things .Do you use these prompts or ask random questions? I also search about things randomly.(RP-1)*
b. *No. Do you ask random questions? Yes, I ask questions randomly. (RP-2)*
c. *Yes, I have heard about them from internet .Do you use these prompts or ask random questions? I search about things randomly. (RP-3)*

5. Discussion and conclusions

- This study found that the overall mean value of students' perspective towards Artificial Intelligence is 3.598, indicating it moderately high positive. These findings are in accordance with the work of Malmström, H., Stöhr, C., & Ou, A. W. (2023).
- The Gender based differences also shows that male students possess high attitude towards AI.
- This study further exposes that the overall mean value of students' proficiency in using Artificial Intelligence is 3.665, thus indicating moderately high skills in using Artificial Intelligence.

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- This study also discloses that the significance level for Gender based differences among students for their inclination (Attitude) towards AI is 0.728, depicting no significant difference between male and female students about their attitude towards AI.
- This study also displays that the significance level for Gender based differences among students for their proficiency in using AI is 0.086, thus depicts no significant difference between male and female students about their skills in using AI.

6. Recommendations of this research

The study's findings lead to the following proposed recommendations:

First, incorporating AI literacy into the academic curriculum is essential so that students can develop a clear understanding of AI concepts, functions, and limitations. This should involve both conceptual knowledge and practical exposure to commonly used AI tools. Additionally, offering focused training sessions and workshops can help students build the necessary skills/proficiency to confidently apply AI in tasks such as research, writing, and problem-solving. Promoting ethical and responsible use of AI is also critical; therefore, discussions about data privacy, AI bias, and academic honesty should be integrated into learning activities. Moreover, educators should receive proper guidance and training to assist students in navigating AI use effectively, including setting appropriate boundaries for academic purposes. Creating a learning environment that encourages exploration and responsible experimentation with AI can help students feel more comfortable and motivated to engage with these tools. Finally, institutions should implement regular assessments or feedback mechanisms to track students' evolving attitudes and competencies, allowing for timely support and adjustments. These recommendations aim to ensure that students are not only proficient in using AI tools but also thoughtful and ethical in their application.

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