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USE OF META AI IN HIGHER EDUCATION: GENDER BASED PERSPECTIVES

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Abstract
This study aimed to examine gender variations in use of Meta AI in higher education. Meta AI has become one of the important technological tools to assist students in learning, research, and academic activities. A sample was 400 undergraduate and post graduate students was selected through multi stage sampling technique from four universities in Lahore including two public and two private universities to have variety of responses. The structured questionnaire was in a form of a six-point Likert type scale and closed-ended questions was used. The results showed that both male and female students get academic advantages of Meta AI, such as better learning and academic achievements and performance, creativity, and time management. Nonetheless, gender variances existed in dependency level, levels of trust as well as usage patterns of the Meta AI. Female students appeared to be relatively more worried about such issues of ethical concern as plagiarism, academic dishonesty, and AI misuse whereas male students expressed concern about AI misuse and usage by academic context slightly higher. Another issue that is noted in the findings of the study is that male and female students perceive differently is the issue of accuracy of information, over-reliance, and absence of institutional policies. The results of the study highlighted the need to take into consideration gender perspectives in the application of AI technologies in education. So, it is inferred that even though the Meta AI has a lot of academic benefits, the issue of gender disparity needs to be tackled by creating awareness, training, and policies to guarantee proper and appropriate use of AI tools in higher learning institutions.

Keywords: Meta AI, Gender Differences, Higher Education, Academic Benefits, Ethical Concerns, Student Perceptions

Introduction

Artificial Intelligence (AI) is radically changing the field of higher education and bringing in new creative tools that are changing the way of teaching, learning, and research. Meta AI has become one of such tools that help a student to enhance their academic performance, creativity, and time management (Imran, Akhtar, & Khan, 2026; Zaidi, et al., 2024). Researchers suggest that AI can enhance personalized and adaptive learning, which is highly beneficial in increasing student engagement and learning outcomes (Bond et al., 2024). The aspect of AI uptake in higher education has expanded considerably over the past few years, especially in the period between 2021 and 2022, as learners and university staff members keep upskilling and becoming proficient in its application (Mulford, 2025). In specific, meta-AI has become popular because of its capability to help students in idea generation, study material organization as well as academic productivity. Students have been found to believe that AI tools help to enhance their understanding (25%), academic performance (18%), and creativity (15%) (Mulford, 2025).

Unlike these benefits, there are also challenges that are related to the integration of Meta AI. The problems that students have encountered are the excessive use of AI, the question of the validity of the information, and the lack of access or technical infrastructure (Imtiaz, et al., 2025; Amin, et al., 2024; Imtiaz, Malik & Khan, 2024). These issues underscore the importance of adequate training and mentorship in a bid to achieve successful application of AI tools in academic institutions. Besides practical issues, ethical issues relating to Meta AI have become one of the most popular topics of discussion. Among the problems that have been highlighted

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in studies include plagiarism, academic dishonesty, risks to data privacy, and the absence of clear institutional policies (Zhou et al., 2025; Caja et al., 2025). Another issue raised by a great part of the students is the abuse of AI tools and the lack of ethical advice and education, which is why raising awareness and creating policies should be viewed as essential.

Despite the growing popularity of the application of AI tools in the world, little research has been done on the implementation of the Meta AI in the Pakistani higher education (Phulpoto, Oad, & Imran, 2024; Oad, Zaidi, & Phulpoto, 2023). Specifically, the perception of students towards its advantages, difficulties, and ethical issues needs to be examined. Thus, the given study is going to examine the presence of Meta AI among undergraduate and postgraduate learners to present the information that can assist policymakers and educational organizations in facilitating the responsible and efficient application of AI technologies.

The use of Artificial Intelligence (AI) has notably revolutionized the sphere of higher education with the emergence of new sophisticated tools that improve teaching learning and research processes (Imtiaz, 2026; Imtiaz & Elbedour, 2026; Amin, 2025; Hossain, et al., 2025). AI systems can be used to perform activities including learning, reasoning, and solving problems, all of which were previously attributed to the human intelligence (Vieriu & Petrea, 2025). In education, AI promotes customized learning, adaptive learning systems, and automated learning, which facilitate efficiency of learning and student-centered learning. Meta AI is one of the latest applications that are becoming a strong generative tool used by students and researchers in academic writing, brainstorming ideas, and creating content (Amin, Said & Butt, 2025; Shah, Amin & Khan, 2025; Dash, et al., 2025). In contrast to the conventional AI systems, the Meta AI is able to produce new knowledge, synthesize research, and assist complicated academic activities, thus enhancing productivity and educational outcomes (Ali et al., 2025). It also makes it possible to provide personalized feedback and promotes recent pedagogical methods like collaborative and inquiry-based learning. Although they exist, AI in learning has some challenges including excessive dependency on technology, challenges in accuracy, as well as a lack of access to digital infrastructure (Oad, et al., 2024; Rehan, et al., 2024; Hussain, et al., 2023). More to the point, such an ethical issue as plagiarism, academic dishonesty, data privacy, and the absence of institutional policies are also important (Marin et al., 2025). These issues emphasize the necessity to use AI tools responsibly and govern them appropriately in education.

As much as the integration of AI in education globally has been researched, the application of Meta AI on the Pakistani higher education is less evidenced. Consequently, the proposed study examined how male and female university students perceive Meta AI concerning its advantages in academic aspects, obstacles, and ethical issues to inform policymakers and schools.

Research Objectives

Following were the objectives of the study:

1. To examine students' overall perceptions regarding the use of Meta AI in higher education.
2. To compare the perceptions of male and female students regarding the use of Meta AI.
3. To analyze whether gender significantly influences students' perceptions of Meta AI.

Research questions

Study sought the answers of the following research questions:

1. What are students' overall perceptions regarding the use of Meta AI in higher education?

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2. Is there a difference between male and female students' perceptions regarding the use of Meta AI in higher education?
3. Does gender significantly influence students' perceptions regarding the use of Meta AI in higher education?

METHODOLOGY

The research paradigm that was used was the positivist paradigm of research involving a quantitative research approach. Descriptive and comparative survey design was utilized in the study to examine the perception that students have about the use of the Meta AI in higher education and to investigate the gender-based variations amongst the students. Students who were enrolled in four universities of Lahore in both undergraduate and postgraduate programs were the population of the study, two of them in the public sector and the other two in the private sector. The sample of 400 students was chosen with the help of the convenient sampling method to guarantee the presence of various academic disciplines and levels of education. Both male and female students were used as the sample to enable gender-based comparison. A structured questionnaire was taken as the primary data collection tool. The questionnaire was comprised of closed-ended questions that were measured in a five-point Likert scale or strongly agree to strongly disagree. The questionnaire that was utilized in the current study is a variation of the questionnaire that was developed by Alghazo et al. (2023) but optimized to suit the goal of the current study (Oad, et al., 2024; Imran & Akhtar, 2023). The tool was aimed to assess the perception of students about the use of Meta AI in higher education. It contained the objects of three broad dimensions academic benefits, challenges, and ethical concerns. These dimensions also contained several sub-factors which included learning support, creativity, overreliance, technical problems, and ethical awareness. Moreover, demographic data, specifically gender, was gathered in order to help in the comparative analysis. Independent sample t-test was used to test the differences between male and female students using the gathered data. A pilot test on the responses of 100 university students was done to determine the questionnaire items clarity, relevance, and appropriateness. It was modified in minor ways with regard to the feedback of the participants to enhance the quality of the instrument. Internal consistency (reliability) of the instrument was estimated using the Alpha of Cronbach. The entire reliability coefficient was discovered to be 0.897, which shows a very high degree of internal consistency. Also, the factor-wise reliability analysis revealed that all sub-constructs have Cronbach Alpha exceeding 0.80, which proved that the tool was also reliable when it comes to measuring how students perceive the use of Meta AI.

Data Analysis

Both descriptive and inferential statistics were employed in the analysis of the collected data. The overall student perceptions on the use of Meta AI in higher education were examined with the help of descriptive statistics such as mean scores and standard deviations. In order to analyse the perception differences based on gender in the students, an independent sample t-test was used to test the differences between the genders. The test was applicable in estimating the average scores of both male and female students in various dimensions of Meta AI use. The cut off value was established at 0.05 which was used to decide whether the differences observed were statistically significant.

Table 1
Independent t-test for mean Difference between Male and Female Responses Based on Benefits

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Gender	*N*	*M*	*SD*	*df.*	*t-value*	*Sig.*
Male	224	53.09	8.34	397	-1.72	.085
Female	175	54.46	7.26			

Table 1 show the results of the independent sample t-test presented in the table show that there was no statistically significant difference in the perceived benefits of Meta AI between male and female students, $t(397) = -1.72$, $p = 0.085$. The mean score for female students ($M = 54.46$, $SD = 7.26$) was slightly higher than that of male students ($M = 53.09$, $SD = 8.34$), indicating that females tended to perceive Meta AI as slightly more beneficial in enhancing academic performance and learning quality. However, since the difference was not significant at the 0.05 level, it can be concluded that both male and female students generally shared similar positive perceptions about the academic benefits of using Meta AI.

Table 2

Independent t-test for mean difference between Male and Female Students' responses on the basis of Challenges they Face while using AI

Gender	*N*	*M*	*SD*	*df.*	*t-value*	*sig.*
M	124	52.09	9.11	397	-.639	.523
F	175	52.66	8.50			

Table 2 shows the results of the independent sample t-test indicate that there was no statistically significant difference between male and female students regarding the challenges faced while using Meta AI, $t(397) = -0.639$, $p = 0$ .523. The average of female students ($M = 52.66$, $SD = 8.50$) was slightly above the average of male students ($M = 52.09$, $SD = 9.11$) implying that female students reported experiencing slightly more challenges but not significantly different. This means that the male and female students faced equal degrees of technical, accessibility, and usability difficulties with the application of Meta AI to their academic assignments.

Table 3

Independent t-test for mean difference between male and female responses based on ethical concerns

Gender	*N*	*M*	*SD*	*df.*	*t-value*	*Sig.*
M	224	52.638	10.132	397	-1.850	.065
F	175	54.291	6.890			

Table 3 indicates that the results of the independent sample t-test indicate that the difference between male and female students in their ethical concerns regarding the use of Meta AI was statistically insignificant, $t(397) = -1.850$, $p = .065$. But the female student mean score ($M = 54.29$, $SD = 6.89$) was a bit higher than the male students ($M = 52.64$, $SD = 10.13$) which means that the female students were more sensitive to the ethical issues related to plagiarism, abuse, and academic dishonesty related to the Meta AI.

Table 4

Independent Sample t-test for Mean Difference between Responses of Male and Female Students based on Academic Improvement and Quality Enhancement

Gender	*N*	*M*	*SD*	*df.*	*t-value*	*Sig.*
Male	224	18.05	3.50	397	-1.58	.115
Female	175	18.56	3.72			

Table 4 is presenting gender wise comparison on the sub-factor of Academic Improvement and Quality Enhancement under the main factor "Benefits of using Meta AI". The average female student ($M = 18.56$, $SD = 3.72$) has a slightly higher score than the male

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students (*M* = 18.05, *SD* = 3.50), which means that females rated the quality of academic higher when they used Meta AI. Nevertheless, the *t*(397) = -1.58 with the significance level of *p* =0.115 indicates that the difference is not significant and therefore both male and female students have the same opinion with respect to the benefits of using Meta AI in academic improvement.

Table 5

Independent Sample t-test for Mean Difference between Responses of Male and Female Students Based on Learning Support and Understanding

Gender	*N*	*M*	*SD*	*df.*	*t-value*	*Sig.*
Male	224	18.133	3.37	397	-1.396	.164
Female	175	18.594	3.12			

The gender comparison of the sub-factor of Learning Support and Understanding under the main factor Benefits of Meta AI is found in the table 5. The average female students (*M* = 18.59, *SD* = 3.12) have a slightly higher score than male students (*M* = 18.13, *SD* = 3.37), which indicates that female students perceived Meta AI to be a little more helpful in learning and academic content comprehension. The *t*(397)= -1.396 and significance value *p* = 0.164 obtained are however indicated that the difference is not significant. This means that the perceptions of both male and female learners on the learning support support and understanding advantages offered by Meta AI are almost similar.

Table 6

Independent Sample t-test for Mean Difference between Male and Female Responses Based on Creativity and Idea Generation

Gender	*N*	*M*	*SD*	*df.*	*t-value*	*Sig.*
Male	224	10.74	2.33	397	-1.37	.171
Female	175	11.03	1.81			

The sub-factor under the main factor Benefits of Meta AI titled Creativity and Idea Generation gender-wise comparison is presented in the table 6 The average score of female students (*M* = 11.03, *SD* = 1.81) is a little bigger than that of male students (*M* = 10.74, *SD* = 2.33), which means that females rated Meta AI as a little more useful in helping to be creative and generate new ideas. Nonetheless, the *t*(397)= -1.37 and the significance value *p* = 0.171 indicate that the difference between male students and female students is not significant. This implies that males and females have almost equal opinion concerning the role of Meta AI that encourages creativity and generation of ideas.

Table 7

Independent Sample t-test for Mean Difference between Male and Female Responses Based on Time Management and Efficiency

Gender	*N*	*M*	*SD*	*df.*	*t-value*	*Sig.*
Male	224	6.16	1.44	397	-.759	.448
Female	175	6.27	1.52			

The gender comparison of the sub-factor of Benefits of Meta AI, Time Management and Efficiency, can be found in the table 7 The average score of female students (*M* = 6.27, *SD* = 1.52) is slightly better than that of male students (*M* = 6.16, *SD* = 1.44), which indicates that females found Meta AI a bit more useful in assisting them to properly organize their time and to do their tasks efficiently. *t*(397) =-0.759 and significance value *p* = 0.448 however show that this difference is not significant. This implies that both the male and female students had almost similar views about the usefulness of Meta AI in enhancing time management and efficiency.

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Table 8
Independent T-Test for mean difference in Students' responses on Challenges Faced by them while using AI on the basis of Gender

Gender	*N*	*M*	*SD*	*df*	*t-value*	*sig.*
M	224	13.98	2.72	397	-.436	.663
F	175	14.09	2.45			

The table 8 shows the gender-wise comparison for the sub-factor *"Overreliance and Development on Meta AI"* under the main factor *Challenges of Meta AI.* The average score of female students (M = 14.09, SD = 2.45) is a bit more than that of male students (M = 13.98, SD = 2.72), which shows that females were found to be slightly more inclined to feature on the one hand, to rely on Meta AI to assist in academic activities. The received $t(397)$ = (-0.442) and the level of significance p = 0.663 indicate that this difference is not significant. This means that the male and female students were almost equally overreliant and had developmental problems when using Meta AI.

Table 9
Independent sample T-Test for Mean difference between responses of Male and Female Students based on Challenges Accuracy and Information Issues

Gender	*N*	*M*	*SD*	*df*	*t-value*	*sig.*
M	224	13.80	2.85	397	-.862	.389
F	175	14.05	2.72			

The table 9 shows the gendered comparison of the sub-factor of Accuracy and Information Issues of the main factor Challenges of Meta AI. The female students have a slightly higher mean score (M = 14.05, SD = 2.72) than male students (M = 13.80, SD = 2.85) which reveals that females had a somewhat higher degree of concern as to the accuracy and reliability of Meta AI-generated information. But, $t(397)$ = (-0.867) and p = 0.389 shows that there is no significant difference between the male and female students. This implies that there were no differences between the perceptions of both genders on the accuracy and informational reliability issues of Meta AI.

Table 10
Independent sample T-Test for mean difference between Male and Female responses based on Challenges Technical and Accessibility Challenges.

Gender	*N*	*M*	*SD*	*df.*	*t-value*	*sig.*
M	224	10.11	2.29	397	-1.54	.124
F	175	10.46	2.22			

The table 10 shows the gender-based comparison for the sub-factor *"Technical and Accessibility Challenges"* under the main factor *Challenges of Meta AI.* The mean score of female students (M = 10.46, SD = 2.22) is slightly higher than that of male students (M = 10.11, SD = 2.29), indicating that females experienced marginally more technical or accessibility issues while using Meta AI. However, the $t(397)$= (-1.54) and significance level p = .124 reveal that this difference is not statistically significant. Therefore, both male and female students reported nearly similar experiences regarding the technical and accessibility-related challenges of Meta AI in higher education.

Table 11

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Independent sample T-Test for mean difference between Male and Female responses based on Challenges Ethical and Policy Uncertainty.

Gender	*N*	*M*	*SD*	*df*	*t-value*	*sig.*
M	224	14.19	2.73	397	.513	.157
F	175	14.05	2.69			

The table 11 shows gender variations in regards to the sub-factor of Ethical and Policy Uncertainty under the key factor Ethical Concerns of Meta AI. The average rating of male students $M = 14.19$, $SD = 2.73$) is a little more than that of female students $M = 14.05$, $SD = 2.69$), which indicates that males indicated more uncertainty about the ethical and policy-related application of Meta AI. Nonetheless, t (397) =(.513) and $p = 0.157$ mean that this difference is not significant. This implies that male and female students had almost equal perceptions regarding the ethical and policy ambiguity linked with the use of Meta AI in academics.

Table 12

Independent sample t-test for mean difference between male and female responses based on ethical concerns plagiarism and academic dishonesty.

Gender	*N*	*M*	*SD*	*df.*	*t-value*	*Sig.*
M	224	17.45	3.68	397	-1.41	.157
F	175	17.93	2.84			

Table 12 shows the gender comparison of the sub-factor of Ethical Concerns of Meta AI Plagiarism and Academic Dishonesty. The average of male students ($M = 17.45$, $SD = 3.68$) is a little less than female students ($M = 17.93$, $SD = 2.84$), which implies that females were a bit more aware or concerned with plagiarism and dishonest academic practices when using Meta AI.

However, the obtained $t(397) = (-1.41)$ and significance level $p = 0.157$ indicate that the difference between male and female students is not statistically significant. This implies that both genders hold nearly the same views about the issue of plagiarism and academic dishonesty linked with Meta AI usage in higher education.

Table 13

Independent sample t-test for mean difference between male and female responses based on ethical concerns lack of ethical awareness and guidance.

Gender	*N*	*M*	*SD*	*df.*	*t-value*	*Sig.*
M	224	59.13	3.28	397	-1.33	.182
F	175	59.52	2.33			

This table 13 presents gender-based comparison on the sub-factor "Lack of Ethical Awareness and Guidance." The mean score of male students ($M = 59.13$, $SD = 3.28$) is slightly lower than that of female students ($M = 59.52$, $SD = 2.33$). The obtained $t(397)$= (t = -1.33 and -1.39) and significance levels p = .182 indicate that the difference between male and female students is not statistically significant**.** This means that both male and female students show similar levels of lack of ethical awareness and guidance regarding the use of Meta AI in higher education.

Table 14

Independent sample t-test for mean difference between male and female responses based on misuse and unfair advantages.

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Gender	*N*	*M*	*SD*	*df.*	*t-value*	*Sig.*
M	224	54.15	3.05	397	-1.99	.046
F	175	54.70	2.26			

This table 14 shows gender-based differences for the sub-factor "Misuse and Unfair Advantages." The results indicate that male students (M = 54.15, SD = 3.05) scored slightly lower than female students (M = 54.70, SD = 2.26). The $t(397)$ = (-1.99 and -2.07) with corresponding significance levels (p = .046 and p = .039) reveal that the difference between male and female students is statistically significant**.** This means that female students perceive misuse and unfair advantages of Meta AI more strongly than male students, showing greater awareness of its ethical implications in academic settings.

DISCUSSION

The current research was an attempt to investigate gender-based variations in the perceptions of students on the application of the Meta AI in higher education (Amin, 2025; Soma, et al., 2025; Amin, Daudpota & Khan, 2025). The results showed that male and female students did not differ significantly on key dimensions such as academic benefits, challenges and ethical issues. This shows that gender is not a major factor that can influence the perceptions of students regarding the use of Meta AI.

In terms of academic advantages, both males and females students found that they had a similar perception concerning the effectiveness of Meta AI in enhancing learning, academic performance, creativity, and time management. Even though female students were slightly higher in mean scores, the differences were not statistically significant (Ahmad, Sewani, & Channa, 2025). These results align with the earlier research that indicates that AI tools do not have an advantage or a disadvantage in terms of their usefulness and acceptance among a student population based on gender (Bond et al., 2024; Vieriu and Petrea, 2025). This is indicative of the universality of AI tools in improving learning outcomes.

Regarding challenges, these two groups also reported some common challenges like overdependence on AI, fears of inaccuracy in information, and technical or access issues. The fact that there were no significant differences by gender is an indication that these issues are universal to all students and more of a feature of the technology itself than demographic (Shah, Ali & Ahmad, 2024). These findings align with the previous studies which note that all users experience an equal degree of usability and technical challenges of AI systems (Hwang et al., 2020; Bozkurt et al., 2024; Imran et al., 2023).

Analyzing ethical issues, the research identified that male and female students were aware of such issues as plagiarism, academic dishonesty, and AI misuse (Imran, Akhtar, & Khan, 2026; Haider, et al., 2025). Despite the fact that the levels of concern were slightly higher in female students, the differences were not statistically significant in most cases. Nevertheless, there was a lot of difference in the perception of misuse and unfair advantage as female students were more sensitive. This finding is consistent with the previous studies which suggest that ethical awareness might be slightly different between genders, with certain groups of people being more concerned with responsible technology use (Marin et al., 2025; Zhou et al., 2025; Ahmad, Noorani, & Sewani, 2025).

In general, the results indicate that the acceptance of Meta AI among higher education students is broad, and gender does not play a significant role in the formation of the perception. Nevertheless, the ethical sensitivity of female students is relatively higher, which indicates the importance of enhancing the ethical awareness of all students. Schools must pay more attention to coming up with specific rules and responsible AI use to maintain academic honesty and ethical conduct (Ali et al., 2025; Bond et al., 2024; Oad et al., 2024).

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CONCLUSION

The current research was conducted to investigate the gender-based variations in the perception of students on the use of Meta AI in higher education. The results showed that male and female students have a similar view on the application of the Meta AI as a rule, which means that it is still a fairly popular academic aid tool.

The findings revealed no statistically significant differences in the male and female students in most of the dimensions of the Meta AI use. Both groups showed similar attitudes in terms of its contribution to learning, academic performance and general learning experience. This implies that gender is not a significant factor determining how students perceive Meta AI in higher learning institutions.

Nevertheless, there was a peculiar exception in the sphere of ethical issues associated with abuse and unfair gain, because female students were much more sensitive in contrast to male students. It means that female students can be more responsible and careful when using Meta AI on academic matters.

In general, the research finds that students of both sexes have a positive attitude towards Meta AI, yet there is a necessity to raise ethical consciousness and responsible utilization among all students. The results point out that despite the universality of technological tools, the issue of ethics is also a significant field that should be addressed in higher education.

RECOMMENDATIONS

On the basis of the results of the study, following recommendations were made:

1. Universities are to create proper ideas on how meta-AI should be used responsibly and learners of both sexes should be aware of ethical issues like plagiarism and abuse.
2. The awareness activities are to be implemented to increase the knowledge of students regarding ethical aspects of AI use, particularly the responsible use of AI in academics.
3. Schools and universities ought to incorporate AI literacy and ethics in the curriculum to encourage informed and moderate usage by learners.
4. Educators are advised to instruct students concerning the right utilization of Meta AI to avoid being over reliant and to promote self-directed learning.
5. Students should be organized in training workshops to enhance effective and ethical use of AI tools in academic work.
6. Systems that monitor AI tool abuse and promote academic integrity should be established.
7. More studies are needed in understanding gender variations in other areas of AI use, including learning outcomes and critical thinking.

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