GENDER DIFFERENCES IN PERCEPTIONS AND USAGE OF CHATGPT

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Abstract:

This study investigates gender differences in the adoption and usage of ChatGPT among university students across various academic disciplines. Utilizing a combination of convenience, snowball, and purposive sampling methods, data were collected from 217 participants through digital platforms and analyzed using the Abbreviated Technology Anxiety Scale, an adapted Technological Acceptance Model, and a newly developed Perceived Risk scale. Results indicate no significant gender difference in ChatGPT acceptance but reveal variations in usage patterns and concerns related to technological over-reliance and privacy. Males reported longer usage times, while females showed higher usage frequency and greater apprehension about over-reliance on ChatGPT. Despite these differences, both genders found ChatGPT useful for educational purposes, suggesting its potential as an inclusive learning tool. The study's findings accentuate the importance of considering gender dynamics in educational technology deployment and call for further research into the socio-technical factors affecting ChatGPT usage.

Key Words: Chatgpt, Gender Differences, Technology Adoption, Educational Technology, University Students.

 Introduction:

An examination of gender disparities in the context of technological proficiency revealed a nuanced relationship between perceived and actual online skills. The findings suggested that although there are discernible differences in how men and women view their technological capabilities, these perceptions do not consistently correlate with tangible skill gaps in digital environments (Bain & Rice, 2006; Hargittai & Shafer, 2006). Specifically, the research highlighted that female participants tended to express higher levels of computer anxiety, lower confidence in their computer-related abilities (computer self-efficacy), and generally less positive and more stereotypical views about technology compared to their male counterparts (Cai et al., 2017; Jackson et al., 2001). Despite these differences in attitude, the direct impact on actual technological proficiency was less clear, indicating that while gender may influence how students feel about technology, it does not necessarily predict their ability to use it effectively.

The literature on gender disparities in technology engagement presents a complex picture, with findings indicating both differences and similarities in how men and women interact with digital tools. Gefen and Straub (1997) uncovered that although there are variances in men's and women's perceptions of email, these differences do not significantly influence their actual usage patterns. This observation is echoed by the study conducted by Goswami and Dutta (2016), which pointed out that gender may impact technology acceptance in certain instances, yet this influence is not universally applicable. Furthermore, it has been revealed that women tend to prioritize the use of technology for interpersonal communication and educational support, while men exhibit greater confidence in their computing abilities and a preference for using technology for entertainment purposes (Li & Kirkup, 2007; Weiser, 2000). Collectively, these studies highlight that gender-related differences in technology usage are present but manifest inconsistently across various digital platforms and applications, suggesting a multifaceted relationship between gender and technology engagement.

In recent studies, the acceptance and usage of ChatGPT among university students have been scrutinized with a focus on gender differences. Yilmaz et al. (2023) discovered that while male and female students shared similar overall attitudes towards ChatGPT, they diverged in their perceptions of its user-friendliness, suggesting nuanced gender-specific responses to technological ease of use. However, these perceptual differences did not translate into a gender gap in ChatGPT acceptance, as both groups exhibited comparable levels of positive attitudes and intentions to use the chatbot. This finding is corroborated by Romero-Rodríguez et al. (2023), who concluded that gender does not play a significant role in the acceptance of ChatGPT among university students, indicating a broad-based appeal of the technology across genders.

When examining ChatGPT usage patterns, research highlights a trend where female students engage with ChatGPT more frequently than their male counterparts. This tendency aligns with findings by Kimbrough et al. (2013), which suggest that females are more

inclined towards mediated communication forms, such as text messaging and social media, a behaviour that extends to their interactions with ChatGPT. This usage pattern is consistent with the broader observation noted by Weiser (2000) that women tend to utilize the Internet more for interpersonal communication purposes. Together, these studies shed light on the dynamics of ChatGPT's acceptance and use among university students, emphasizing the importance of considering gender as a variable in understanding the nuances of technology adoption and interaction.

Purpose of the Study

Through a gender lens, the research aims to delve into how male and female students' perceptions of ChatGPT—as reflected in its perceived ease of use and usefulness—and their concerns over risks such as plagiarism, privacy, and over-reliance, shape the frequency and manner of ChatGPT's usage. Central to this investigation are three pivotal research questions:

1. How do gender differences influence the extent of ChatGPT adoption and the frequency of its use among male and female users?
2. How do gender differences affect the perception of risks, such as plagiarism, privacy, information accuracy, over-reliance, and biases associated with using ChatGPT?
3. How do perceptions of ease of use and usefulness of ChatGPT differ between male and female users, and to what extent do these perceptions influence their intention to use ChatGPT in academic settings?

Methods

Research Design

This cross-sectional study investigates the influence of user perceptions and technological attitudes on ChatGPT usage in higher education. The research design integrates the Technological Acceptance Model (TAM) and additional constructs of perceived risk and technological anxiety to assess technological apprehension. independent samples t-test is mainly used to analyze the differences in mean scores between males and females. This methodology was chosen to enable a comprehensive exploration of the potential impacts and correlations between ChatGPT usage, technological acceptance and apprehension. Detailed descriptions of the participant recruitment, data collection procedures, and data analysis strategies will follow in the respective sub-sections.

Sample

Participants

217 Participants in this study were primarily drawn from various academic disciplines, with the majority (60.4%) belonging to English Studies. Other fields of study represented included Biology (9.7%), Arabic Studies (6.9%), Sociology (6.9%), French Studies (3.2%), Political Sciences (3.2%), Mechanical Engineering (3.2%), and Economy (3.2%). A slight majority of the participants were female (52.5%), compared to 47.5% male. Most participants were Bachelor's students (71.4%), followed by Doctoral students (21.7%), and a minority were Master's students (6.9%). In terms of ChatGPT usage, a substantial portion of the participants (66.4%) reported using the tool, while the remaining 33.6% did not.

Table 1. Demographic Data

Variables	Category	Frequency	Percent
Field of Study	English Studies	131	60.4
	French Studies	7	3.2
	Arabic Studies	15	6.9
	Biology	21	9.7
	sociology	15	6.9
	Political Sciences	7	3.2
	Mechanical engineering	7	3.2
	Economy	7	3.2
	École Normal Supérieure	7	3.2
Gender	Male	103	47.5
	Female	114	52.5
Academic Level	Bachelor	155	71.4
	Master's Student	15	6.9
	Doctoral Student	47	21.7
The use of ChatGPT	No	73	33.6
	Yes	144	66.4
	Total	217	100

Data Collection

In this study, we employed a multi-faceted approach to data collection, tailored to engage a diverse array of participants across various academic fields. Data collection was conducted using a combination of convenience sampling, snowball sampling, and purposive sampling methods. The primary method of distribution for our questionnaires was through digital platforms, specifically WhatsApp and Facebook. The WhatsApp groups consisted of English studies PhD students, a demographic readily accessible due to existing academic networks. Simultaneously, Facebook groups were utilized to reach a broader audience, encompassing various academic disciplines. This digital distribution was supplemented by a snowball sampling technique, wherein initial respondents were encouraged to share the questionnaire within their personal and academic circles, thus potentially amplifying the reach beyond the initial groups.

Furthermore, to ensure inclusivity and broaden participation from non-English speakers, purposive sampling was employed. Questionnaires were made available in multiple languages. Hard copies were distributed among students at the Faculty of Letters and Human Sciences in Fez City, with each English version featuring QR codes that directed respondents to French and Arabic online versions. This multilingual approach was instrumental in accommodating the linguistic diversity of our target population, thereby enriching the data with varied perspectives.

Data Analysis

Technological Apprehension:

• The study utilized the Abbreviated Technology Anxiety Scale (ATAS) developed by Wilson et al. (2022), comprising 11 items such as "I am not a technology person" and "I am reluctant to learn new features of technology." Responses were recorded on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree).

• A novel scale was developed to measure the perceived risk of using ChatGPT, featuring 6 items. Statements like "I'm concerned about plagiarism accusations from using ChatGPT" and "I fear over-reliance on ChatGPT could weaken my skills" were rated on a similar 5-point Likert scale.

Technological Acceptance:

• An adapted version of the Technological Acceptance Model (TAM) (Davis, 1989) was deployed to assess the perceived usefulness and ease of use of ChatGPT. It included two constructs—perceived usefulness and ease of use—with 6 items each, such as "Using ChatGPT would enable me to complete educational assignments more quickly" and "Learning to operate ChatGPT would be easy for me." Each item was rated on a 5-point Likert scale.

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ChatGPT Usage:

• Current Usage: Participants were initially filtered by a binary ('yes' or 'no') inquiry regarding their current use of ChatGPT. Subsequently, active users were asked to gauge the frequency of their ChatGPT usage on a 7-point Likert-type scale ranging from 'Rarely (Less Than Once A Month)' to 'Very Frequently (Daily)'.

Following data collection, a thorough statistical analysis was performed using SPSS software to address the research questions. The analytical procedures were as follows:

1. Composite Score Calculation: Initially, composite scores for technological acceptance—defined by the constructs of perceived ease of use and usefulness—were calculated by summing the scores of each respective item. Similarly, a composite score for technological apprehension was derived by combining the scores from the perceived risk of using ChatGPT and technology anxiety items.

2. Means comparison (RQ1, RQ2, and RQ3): The study employs an independent sample t-test within gender categories (male and female) to assess differences in mean scores. These tests will compare the use and frequency of use of ChatGPT, as well as the influence of technological acceptance and apprehension factors on this usage.

The scale

The consistency of the scales was evaluated, revealing high reliability, as evidenced by Cronbach's alpha coefficients of 0.826, 0.93, and 0.867, for the abbreviated technology anxiety scale (ATAS), Technological Acceptance Model (TAM), and Perceived Risk respectively.

Table 2. Reliability Statistics

	Cronbach's Alpha	N of Items
Technological Anxiety	0.826	11
TAM	0.93	12
Perceived Risk	0.867	6

Findings

Research question 1: How do gender differences influence the extent of ChatGPT adoption and the frequency of its use among male and female users?

Table 3: Usage Patterns and Frequency of ChatGPT by Gender

	Group	N	Mean	SD	SE	Coefficient of variation
Chatgpt_time	Male	58	4.655	1.722	0.226	0.370
	Female	86	2.547	1.719	0.185	0.675
Chatgpt_use	Male	103	0.563	0.498	0.049	0.885
	Female	114	0.754	0.432	0.040	0.573

Table 4: Independent Samples T-Test (ChatGPT usage and Frequency of use)

	t	df	p
Chatgpt_time	7.213	142	< .001 [a]
Chatgpt_use	-3.027	215	0.003 [a]

Note. Student's t-test.

[a] Brown-Forsythe test is significant (p < .05), suggesting a violation of the equal variance assumption

Males reported higher mean times using ChatGPT, while females had a higher mean frequency of use. The Independent Samples T-Test revealed statistically significant differences for both time spent and frequency of use between genders, with p-values well below the .05 significance level.

Research question 2: How do perceptions of the perceived risks, such as plagiarism, privacy, information accuracy, over-reliance, and biases associated with the use of ChatGPT?

Table 5: Concerns and Perceptions of ChatGPT by Gender

Group Descriptives

	Group	Mean
Chatgpt_Plagiarism	Male	3.398
	Female	3.518
Chatgpt_Privacy	Male	3.563
	Female	3.614
Chatgpt_accuracyDoubt	Male	3.262
	Female	3.491
Chatgpt_overReliance	Male	3.350
	Female	4.193

Group Descriptives

	Group	Mean
Chatgpt_Biases	Male	3.447
	Female	3.500
Chatgpt_Uneasy_LearningEffect	Male	3.262
	Female	3.474

Table 6: Independent Samples T-Test (ChatGPT usage and Frequency of use)

	t	df	p
Chatgpt_Plagiarism	-0.686	215	0.494
Chatgpt_Privacy	-0.340	215	0.734
Chatgpt_accuracyDoubt	-1.412	215	0.160
Chatgpt_overReliance	-6.145	215	< .001
Chatgpt_Biases	-0.439	215	0.661
Chatgpt_Uneasy_LearningEffect	-1.267	215	0.207 [a]

Note. Student's t-test.

[a] Brown-Forsythe test is significant (p < .05), suggesting a violation of the equal variance assumption

The provided data indicates that females generally report higher concerns than males, especially in over-reliance on technology (4.193 vs. 3.350). The differences in the other factors are not statistically significant.

Research question 3: How do perceptions of ease of use and usefulness of ChatGPT differ between male and female users, and to what extent do these perceptions influence their intention to use ChatGPT in academic settings?

Table 4: Educational Impact and Ease of Use of ChatGPT by Gender

	Mean Scores		
	Males	Females	p
Using chatgpt would enable me to complete educational assignments more quickly	3.505	3.456	0.750
Using chatgpt would improve my academic performance	2.99	2.658	0.051
using chatgpt would increase my productivity with schoolwork.	3.485	3.219	0.111
using chatgpt would enhance my effectiveness in studying.	3.272	2.64	< .001
using chatgpt would make it easier to learn and understand new concepts.	3.67	3.149	< .001
I would find chatgpt useful in my education.	3.65	2.904	< .001
learning to operate chatgpt would be easy for me.	4.019	3.64	0.014
I would find it easy to get chatgpt to do what I want it to do	3.709	3.482	0.128
my interaction with chatgpt would be clear and understandable	3.738	3.149	< .001
I would find chatgpt to be flexible to interact with	3.515	3.456	0.633
it would be easy for me to become skilful at using chatgpt	3.796	3.456	0.024
I would find chatgpt easy to use.	3.951	3.754	0.148

For the third research question, the results indicate that males find ChatGPT slightly more useful and easier to use in their education than females, with higher mean scores on statements related to learning new concepts, finding ChatGPT generally useful, the ease of using ChatGPT in terms of interaction and flexibility.

Discussion

The results of this study offer valuable insights into the gendered perceptions of ChatGPT's ease of use, usefulness, and associated risks in academic settings. The significant differences in usage patterns between male and female students, as revealed in the study, emphasise the nuanced ways in which gender impacts technological engagement. Specifically, males reported spending more time using ChatGPT, whereas females exhibited a higher frequency of usage. This divergence suggests that while males may engage with ChatGPT in more prolonged sessions, females tend to use it more regularly but for shorter durations. Such patterns could reflect underlying differences in the purposes for which each gender utilizes ChatGPT, potentially driven by distinct academic or personal interests.

Concerning perceptions of risks associated with ChatGPT, females demonstrated higher levels of concern, especially regarding over-reliance on the technology. This finding

aligns with broader literature suggesting that female users are often more cautious about the implications of technology use (Cai et al., 2017; Jackson et al., 2001). However, the lack of significant differences in concerns over plagiarism, privacy, and biases implies a general awareness and wariness amongst all users regarding these risks, regardless of gender. This shared concern is critical in the context of academic integrity and the ethical use of AI tools.

The perceptions of ChatGPT's ease of use and its usefulness in educational contexts revealed gender disparities, with males generally finding ChatGPT more beneficial and user-friendly. These perceptions significantly influence the intention to use ChatGPT in academic settings, highlighting the importance of addressing the unique needs and concerns of female students to foster a more inclusive and equitable technological engagement. Such findings point towards the necessity for educational institutions and AI developers to consider gendered experiences and perceptions in their deployment and development strategies.

Conclusion

This study contributes to the growing field of AI in education by shedding light on the gendered dynamics of ChatGPT usage among students. The findings reveal that male and female students differ not only in their usage patterns but also in their perceptions of risks and the technology's utility. While males tend to spend more time per session and perceive ChatGPT as more useful and easier to use, females use it more frequently but express greater concern over potential over-reliance. These insights emphasise the need for a gender-sensitive approach in the integration of AI tools like ChatGPT in educational settings, ensuring that both male and female students can harness the benefits of such technologies effectively and responsibly.

Further research should explore the underlying factors driving these gendered patterns and perceptions, including societal norms, educational backgrounds, and personal interests. Moreover, longitudinal studies could provide a deeper understanding of how these perceptions evolve as students become more accustomed to using AI tools in their academic journey. Ultimately, fostering an inclusive, equitable, and ethical environment for the use of AI in education requires a concerted effort among educators, policymakers, and technology developers to address and mitigate gender disparities.

Limitations

The study on gender differences in ChatGPT usage among university students encounters limitations due to its reliance on convenience, snowball, and purposive sampling methods through digital platforms, potentially introducing sampling bias and limiting generalizability. The use of self-reported data raises concerns about social desirability and recall bias, while the cross-sectional design restricts the ability to observe changes over time. The predominance of participants from English Studies and the study's binary approach to gender may not fully represent the diversity of academic disciplines and gender

identities. Additionally, variations in technological familiarity and access among students, not accounted for in the study, could significantly influence ChatGPT adoption and usage patterns. These limitations suggest a need for broader, more nuanced research methodologies to capture the complex dynamics of technology engagement across diverse student populations.

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