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Understanding AI in Higher Education: Gendered and Intersectional Students' Experiences with ChatGPT Use

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ABSTRACT

The integration of ChatGPT into higher education is expanding rapidly, particularly within. These applications are increasingly associated with perceived improvements in student performance. This study examines how university students across the United Arab Emirates engage with ChatGPT and explores how demographic factors influence adoption patterns. A quantitative design was employed using a structured questionnaire completed by 506 students from several higher education institutions in the UAE. The results show significant differences in ChatGPT usage based on gender, academic level, and field of study. Female students reported higher usage than male students, and senior students used ChatGPT more often than juniors. Findings also reveal that students in non-technical programs rely more heavily on ChatGPT for writing and language support. These insights contribute to the growing body of research on AI adoption in Gulf Region higher education and deepen our understanding of students' digital learning behaviors. The study concludes that ChatGPT meaningfully improves academic writing, particularly for students who use English as a second language, while emphasizing the need for targeted training to ensure equitable and effective integration of generative AI tools across higher education.

Keywords: artificial intelligence; gender and technology; higher education; intersectionality, academic performance

INTRODUCTION

Since its public release on November 30, 2022, ChatGPT has rapidly captured global attention, surpassing one million users within one week (Rahimi & Abadi, 2023). This momentum continued with the launch of GPT 4 on March 14, 2023, which introduced a major leap in computational capability through its 170 trillion parameters and significantly improved language processing and generation (Hassani & Silva, 2023). As noted by Kalla and Smith (2023), ChatGPT applies advanced artificial intelligence techniques to produce coherent and contextually relevant responses. Heaven (2020) previously highlighted the transformative potential of GPT-3, describing it as a ground-breaking language model capable of generating essays, poems, stories, and code through deep learning. Building on these advancements, Dempere et al. (2023) noted that ChatGPT's potential in education highlighted several advantages, including streamlined enrollment processes, enhanced student services, improved teaching practices, support for research activities, and increased student retention. At the same time, it identified key risks, including privacy violations, misuse of the technology, algorithmic bias, misinformation, reduced human interaction, and unequal access. Furthermore, in educational settings, AI-powered tools like ChatGPT have become increasingly embedded in students' academic routines. They support tasks such as grammar correction, IT programming, research activities, and problem solving (Susnjak, 2022; Atlas, 2023; Else, 2023; Baidoo Anu & Ansah, 2023). These

tools also personalize learning by recommending resources tailored to students' academic needs (Aggarwal, 2023). At the institutional level, ChatGPT assists with language learning, research processes, and administrative functions, integrating further into the academic ecosystem.

Despite these benefits, its adoption raises several concerns. Importantly, the adoption of artificial intelligence in higher education must also be understood in relation to the gendered digital divide and techno feminist theory. Access to and engagement with digital technologies are shaped by social structures that advantage some groups while constraining others, especially along gendered lines (Wajcman, 2015; Robinson et al., 2015). Techno-feminist scholars argue that technology is not neutral but reflects power relations that determine who benefits from innovation and who encounters systemic barriers (Haraway, 1991; Adam, 2006). These dynamics are highly relevant to AI tools such as ChatGPT, where differences in digital confidence, perceived competence, and technological socialization may influence how male and female students adopt and integrate AI into their academic practices. Studies indicate that gender-based differences in attitudes toward and use of technology are influenced by several factors, including the historical integration of computers into education, gender stereotypes, structural barriers, and broader gender inequalities (Møgelvang et al., 2024; Sanders & Tescione, 2002; Idris et al., 2023). Research also shows that gender shapes perceptions of artificial intelligence, with men generally expressing more positive views and greater acceptance of AI technologies than women (Grassini & Ree, 2023; Sindermann et al., 2021). A techno feminist perspective, therefore, provides a critical lens for understanding how students navigate emerging digital learning environments and how AI systems may reinforce or challenge existing inequalities. Møgelvang et al. (2024) state that Women tend to rely on generative AI chatbots mainly for text-based tasks and express heightened concerns about maintaining critical and independent thinking when using these tools. They also demonstrate a stronger need for guidance in evaluating when it is appropriate to use genAI systems and how to establish trust in the responses generated. Alongside these structural issues, scholars raise concerns about the risk of overreliance on AI, noting that it may weaken students' critical thinking, creativity, and independent problem-solving.

The potential for producing inaccurate or fabricated content, including false citations, also presents a notable limitation (Lo, 2023). Thi (2023) and Sultan et al. (2025) emphasize the urgency of integrating AI literacy into educational curricula to reduce these risks. Ethical challenges surrounding academic integrity and originality have been highlighted by Baidoo Anu and Ansah (2023), Cotton et al. (2023), and Gordijn and Have (2023). Singh et al. (2023) describe this duality, suggesting that while the responsible use of ChatGPT can support academic success, misuse may lead to intellectual complacency. Although existing studies have begun exploring the role of AI in education, many aspects of ChatGPT's practical influence on academic performance remain under-examined (Zeb et al., 2023). Furthermore, a significant gap persists regarding how students from different cultural and educational contexts use ChatGPT in their everyday academic tasks.

This study addresses that gap by investigating students' real-world experiences with ChatGPT in the region, focusing on four primary uses: academic writing, problem solving, research support, and IT programming. The study evaluates students' perceptions of these applications and their impact on academic performance. The study is organized into five sections: a literature review, the development of hypotheses, an analysis of student perspectives, a discussion of theoretical and practical implications, and a conclusion outlining limitations and areas for future research.

LITERATURE REVIEW

Chat GPT In Education

Since its public release on November 30, 2022, ChatGPT has rapidly captured global attention, surpassing one million users within one week (Rahimi & Abadi, 2023). This momentum continued with the launch of GPT 4 on March 14, 2023, which introduced a major leap in computational capability through its 170 trillion parameters and significantly improved language processing and generation (Hassani & Silva, 2023). As noted by Kalla and Smith (2023), ChatGPT applies advanced artificial intelligence techniques to produce coherent and contextually relevant responses. Heaven (2020) previously highlighted the transformative potential of GPT-3, describing it as a ground-breaking language model capable of generating essays, poems, stories, and code through deep learning. Building on these advancements, Dempere et al. (2023) noted that ChatGPT's potential in education highlighted several advantages, including streamlined enrollment processes, enhanced student services, improved teaching practices, support for research activities, and increased student retention. At the same time, it identified key risks, including privacy violations, misuse of the technology, algorithmic bias, misinformation, reduced human interaction, and unequal access. Furthermore, in educational settings, AI-powered tools like ChatGPT have become increasingly embedded in students' academic routines. They support tasks such as grammar correction, IT programming, research activities, and problem solving (Susnjak, 2022; Atlas, 2023; Else, 2023; Baidoo Anu & Ansah, 2023). These tools also personalize learning by recommending resources tailored to students' academic needs (Aggarwal, 2023).

At the institutional level, ChatGPT assists with language learning, research processes, and administrative functions, integrating further into the academic ecosystem. Despite these benefits, its adoption raises several concerns. Importantly, the adoption of artificial intelligence in higher education must also be understood in relation to the gendered digital divide and techno feminist theory. Access to and engagement with digital technologies are shaped by social structures that advantage some groups while constraining others, especially along gendered lines (Wajcman, 2015; Robinson et al., 2015). Techno-feminist scholars argue that technology is not neutral but reflects power relations that determine who benefits from innovation and who encounters systemic barriers (Haraway, 1991; Adam, 2006).

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This study addresses that gap by investigating students' real-world experiences with ChatGPT in the region, focusing on four primary uses: academic writing, problem solving, research support, and IT programming. The study evaluates students' perceptions of these applications and their impact on academic performance. The study is organized into five sections: a literature review, the development of hypotheses, an analysis of student perspectives, a discussion of theoretical and practical implications, and a conclusion outlining limitations and areas for future research.

Application of ChatGPT in Academic Writing Tasks

ChatGPT has become an increasingly valuable tool for students in academic settings, particularly in academic writing and personalized learning. It assists students in producing more coherent, grammatically accurate, and stylistically polished texts, thereby developing essential writing skills (Aljanabi et al., 2023). Imran and Almusharraf (2023) further highlight that beyond improving writing quality, ChatGPT provides meaningful insights into user interaction, underscoring the significance of integrating AI technologies into contemporary educational practices. The tool's versatility extends across various academic tasks, as Lund and Wang (2023) observe, including writing, answering academic questions, coding, and enhancing both individual and collaborative productivity. One of ChatGPT's most notable strengths is its ability to deliver real-time, personalized feedback that adapts to diverse learning needs, helping students grasp complex content more effectively, an aspect that has made it particularly appealing to educational institutions (Montenegro-Rueda et al., 2023).

Researchers have also recognized ChatGPT's capacity to support customized writing assistance, offering constructive feedback that improves the quality and clarity of student writing (Geng & Razali, 2022; Ippolito et al., 2022; Liu et al., 2023a, 2023b; Rudolph et al., 2023; Su et al., 2023). When appropriately fine-tuned, ChatGPT shows potential to automate tasks such as grading and provide instant feedback on essay-based assessments, functions that can significantly reduce instructor workload in large class settings (Adiguzel et al., 2023). Imran and Almusharraf (2023) describe ChatGPT as a transformative force across science, technology, and education, positioning it as a reliable writing assistant across a wide array of academic disciplines. Similarly, Su et al. (2023)

emphasize its contribution to the learning process through features like feedback generation, content revision, and structured writing support.

However, the academic use of ChatGPT is not without challenges. A primary concern is the accuracy of AI-generated content. While the tool can produce written responses and even code, these outputs are not immune to errors and require user evaluation (Singh et al., 2023). Additionally, integrating AI tools like ChatGPT into academic environments raises ongoing concerns about quality assurance, consistency, and fairness, especially when used for automated grading (Adiguzel et al., 2023).

Utilizing ChatGPT as a Research Support Tool

One of the key advantages of ChatGPT in academic writing is its ability to support and streamline the research process. It can assist researchers in conducting literature reviews, extracting key points from texts, generating innovative ideas during brainstorming sessions, and even providing relevant citations (Huang & Tan, 2023; Hill-Yardin et al., 2023; Aydin & Karaarslan, 2022). The tool also aids in formulating research questions and hypotheses, and in validating and refining conceptual ideas (Testing Hypothesis, 2023). Alkhaqani (2023) highlights that ChatGPT's ability to deliver analyses, respond to complex queries, and explore intricate academic concepts enhances students' understanding and broadens their perspectives across various disciplines. In line with this, Zhai (2022) affirms that ChatGPT can produce coherent, informative, and well-organized academic papers, while Khlaif et al. (2023) acknowledge its potential to generate high-quality research suitable for publication in reputable journals.

Despite these benefits, significant challenges remain, particularly concerning ethical and technical limitations. Key concerns include algorithmic bias and data privacy risks, which can hinder the adoption of AI tools in academic research (Horowitz & Kahn, 2021; Wu et al., 2022). These issues raise important questions about the fairness, transparency, and accountability of AI-generated content. Khlaif et al. (2023) further emphasize the need to address these concerns to ensure the responsible and ethical use of ChatGPT in scholarly work. As such, while ChatGPT offers promising support for academic writing and research, its implementation must be approached with careful consideration of its limitations and ethical implications.

The Role of ChatGPT in Programming Instruction and Coding Support

ChatGPT offers numerous benefits in computer science, particularly for students involved in programming and software development. It plays a transformative role in enhancing human capabilities and fostering more innovative, efficient, and collaborative development environments (Kakhiani, 2024). As highlighted by Surameery and Shakor (2023), ChatGPT supports students in debugging code and identifying appropriate programming solutions, making it a valuable resource for learning and problem-solving. Heaven (2020) expands on this by noting that ChatGPT's functionality extends well beyond natural language generation. It can generate code in various programming languages, making it especially beneficial for computer science learners. Singh et al. (2023) emphasize that the model can generate task-specific code across different languages, helping students understand coding structures, syntax, and logical processes. It can translate natural language instructions into executable code. Artificial intelligence advancements have significantly enhanced ChatGPT's educational value. The tool can now simulate aspects of human cognition and process large datasets, allowing it to generate accurate code snippets even when users provide non-technical or imprecise instructions. Liu et al. (2023) confirm that ChatGPT's advanced natural language processing capabilities enable it to interpret human-readable descriptions of programming tasks and generate code effectively. Similarly, Mu et al. (2023) demonstrate that large language models can interpret ambiguous or incomplete user requirements, clarify user intent, and produce more precise, context-appropriate code solutions.

These developments collectively strengthen ChatGPT's role as a powerful support tool for learners and educators. Dergaa et al. (2023) support this, stating that students can use everyday language to issue precise programming commands. Kashefi and Mukerji (2023) add that ChatGPT can customize code according to user-defined parameters, including programming language, function, and complexity level.

Moreover, ChatGPT demonstrates strong performance in understanding and responding to natural-language programming queries, particularly in its GPT-3 iteration, thereby enhancing student interaction with coding tasks (AlJanabi et al., 2023). The tool's impact on students' confidence and learning motivation is also notable. Yilmaz and Yilmaz (2023) report that ChatGPT positively influences students' programming self-efficacy, while Yin et al. (2021) found that chatbot-assisted learning significantly enhances motivation in introductory computer science courses. Beyond supporting basic programming tasks, ChatGPT can optimize code by analyzing relevant languages, data structures, and algorithms, thereby improving both efficiency and software design (Biswas, 2023).

However, measuring the precise productivity gains from using AI in programming remains complex. Ferdiana (2024) notes that such outcomes depend on multiple variables, including the specific AI tool in use, the developer's

experience level, the complexity of the software project, and the nature of the task being automated or supported. Even with its growing adoption, not all students readily embrace AI tools for code generation. Zviel-Girshin (2024) observes that only about one-third of student teams reported using AI for programming tasks, likely due to concerns that such use could be interpreted as a violation of academic integrity guidelines.

ChatGPT as a Tool for Problem-Solving and Inquiry-Based Learning

ChatGPT plays an increasingly important role in supporting students' problem-solving abilities, particularly within inquiry-based learning contexts. Through interactive dialogue, students can use AI tools like ChatGPT to explore concepts, ask questions, and investigate complex problems (Chen & Zhao, 2024; Huang et al., 2024; Lo, 2024). Functioning as a virtual tutor, ChatGPT guides learners through problem-solving processes by offering step-by-step explanations, generating relevant real-time examples, and delivering personalized feedback (Whitehead, 2017). In mathematics, ChatGPT has proven particularly useful for solving calculus-related problems, such as differentiation and integration, and for explaining abstract mathematical concepts in more accessible language. This interactive support encourages active student engagement, which is associated with better retention and deeper understanding of mathematical principles (Lo, 2024; Sánchez-Ruiz et al., 2023). Rane (2023) emphasizes that many mathematical problems require multi-step solutions, and students often seek detailed breakdowns of each step. ChatGPT addresses this need by breaking problems into manageable components, explaining each stage clearly, and guiding users through the solution process.

However, effectively using such AI tools for problem-solving also depends on the digital literacy of both students and educators, highlighting the importance of technical proficiency in maximizing ChatGPT's educational value (Rane, 2023). Beyond mathematics, ChatGPT also supports broader problem-solving tasks by fostering brainstorming, idea generation, and solution development, as noted by Halloran et al. (2023). Despite these benefits, integrating AI tools into academic settings raises ethical challenges. Zviel-Girshin (2024) identifies academic dishonesty as a key concern, noting that some students may misuse AI tools like ChatGPT to produce complete solutions without engaging in the learning process, thereby raising questions about fairness and integrity

ChatGPT Impact on Students' Academic Performance

Students' academic achievement is fundamentally linked to their ability to meet defined learning outcomes and educational goals within structured academic settings (Chen & Yang, 2019). In recent years, a growing body of research has acknowledged the positive impact of artificial intelligence (AI) tools, particularly ChatGPT, on student performance. For instance, Khan et al. (2021) and Ghnemat et al. (2022) report that ChatGPT significantly enhances academic success by helping students complete various tasks more effectively. Similarly, Omar and Salih (2024) highlight that ChatGPT improves students' efficiency in managing academic responsibilities, while Youssef et al. (2024) affirm AI's broader contribution to strengthening learning outcomes and boosting overall academic performance.

These findings are consistent with Lai (2017), who identified enhanced academic performance as a key motivator behind the continued use of educational technologies. However, a concern raises about fairness and equity have emerged alongside increased AI adoption in education. Cotton et al. (2023) warn that students who use ChatGPT to generate high-quality academic work may gain an unfair advantage over peers who either lack access to such tools or opt not to use them. However, the growing adoption of AI in education has raised significant concerns regarding fairness and equity. Cotton et al. (2023) caution that students who utilize ChatGPT to produce high-quality academic work may gain an unfair advantage over peers who either lack access to such tools or choose not to use them. Simultaneously, growing concerns about academic integrity and the potential misuse of AI tools have come to the forefront, as highlighted by Huang et al. (2024). Furthermore, Sweeney (2023) highlights the growing concern that students may use artificial intelligence tools to generate essays and other written assignments. Although universities employ diverse assessment methods, traditional examinations and formal essays remain dominant, particularly in humanities and social science programs. This reliance on written assessments increases the risk of academic dishonesty when students turn to AI-supported writing systems.

Proposed Hypotheses

RQ1: *To what extent does ChatGPT influence students' writing quality and academic performance, as perceived by the students utilizing the support provided to them through ChatGPT?*

- H1a: The use of ChatGPT for writing support positively influences students' perceived writing quality.
- H1b: The use of ChatGPT for writing support positively influences students' academic performance.

RQ2: *To what extent does ChatGPT assist students in completing IT programming assignments and influence academic performance, as perceived by the students who are utilizing the support provided to them through ChatGPT?*

- H2a: The use of ChatGPT for IT programming tasks positively influences students' programming competence.
- H2b: The use of ChatGPT for programming support positively influences students' academic performance.

RQ3: *What is the extent of ChatGPT's effective support in problem-solving assignments and academic performance, as perceived by the students utilizing the support provided to them through ChatGPT?*

- H3a: The use of ChatGPT for problem-solving tasks positively influences students' problem-solving skills.
- H3b: The use of ChatGPT for problem-solving tasks positively influences students' academic performance.

RQ4: *To what extent does ChatGPT effectively assess students' research and influence their academic performance, as perceived by t he students utilizing the support provided to them through ChatGPT?*

- H4a: The use of ChatGPT for research-related tasks positively influences students' research competence.
- H4b: The use of ChatGPT for research-related tasks positively influences students' academic performance.
- H3a: Students who use ChatGPT for problem-solving assignments perceive more significant improvements in their problem-solving skills than those who do not.
- H3b: Using ChatGPT for problem-solving assignments has positively improved academic performance.

METHODOLOGY

This study examines students' perspectives on utilizing ChatGPT as a tool to support various academic activities, including writing quality, problem-solving, IT programming and coding, and advancing research excellence, in relation to their academic performance. The research employed a quantitative approach, using a survey to collect data from over 6 universities in the United Arab Emirates.

Sample and Data Collections

This research adopted a quantitative approach, utilizing a survey method to collect data from six private universities across the United Arab Emirates. The final sample consisted of 506 undergraduate students who completed the survey in November 2024 and voluntarily consented to share their information for research purposes. Participants were selected through purposive sampling, targeting students with prior experience using ChatGPT for academic activities. This sampling technique was chosen for its ability to support the development of a rationale for generalizing findings from a specifically relevant sample (Adeoy, 2023).

The survey aimed to comprehensively examine how ChatGPT supports students' academic performance in higher education. The questionnaire was adapted from established studies by Zhai (2022), Else (2023), Baker (2021), Dhawan and Batra (2021), Mintz (2023), Eaton et al. (2021), Thi (2023), Imran and Almusharraf (2023), and Singh et al. (2023). It was structured into five main sections: demographic information and four sections aligned with the study's research objectives. A 5-point Likert scale was used to capture students' perceptions of ChatGPT's application across academic contexts, ranging from 1 (strongly disagree) to 5 (strongly agree). For data analysis, Partial Least Squares Structural Equation Modeling (PLS-SEM) was applied using SmartPLS software. This multivariate analysis technique was chosen for its ability to enhance the accuracy, recognition, and validity of the research findings. PLS-SEM is particularly suitable for handling non-normal data and for evaluating the capabilities of formative and reflective measurement models that traditional covariance-based SEM (CB-SEM) does not offer (Subhaktiyasa, 2024; Hair et al., 2020).

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Data Analysis

The sample demographics (**Table 1**) demonstrate 34.2% male students and 65.8% female students. There were 506 participants. Ajman University had 72.3% of students, followed by CUCA (2.8%), the University of Sharjah (9.3%), Gulf Medical University (4.7%), the American University of Sharjah (4.9%), and other universities (5.9%). 37.4% of students were from Business Administration, 12.3% from Dentistry, 11.3% from Information Technology, and 10.7% from Engineering. Medicine, mass communication, and pharmacy were smaller at 10.3%, 5.3%, 4.0%, and 8.9%. The majority of students were in their third or fourth year (28.5%) or fourth year (34.6%),

with smaller groups in their first (12.6%), second (20.6%), or final (3.8%) years. Most students (92.9%) thought ChatGPT benefited them in school, whereas 7.1% didn't. The most common uses for ChatGPT are improving written work (48.2%), answering research questions (31.8%), solving problems (10.1%), and providing IT support and programming (9.3%). When asked whether ChatGPT affected students' honesty, integrity, and academic performance, 68.4% said no.20.4% found ChatGPT beneficial, and 11.3% weren't sure.

Table 1. Demographic Analysis

Attribute	Category	Frequency	Percentage
Gender	Female	333	65.8%
	Male	173	34.2%
University	Ajman University	366	72.3%
	CUCA	14	2.8%
	University of Sharjah	47	9.3%
	Gulf Medical University	24	4.7%
	American University of Sharjah	25	4.9%
	Other	30	5.9%
Academic Year	First-year	64	12.6%
	Second-year	104	20.6%
	Third-year	144	28.5%
	Fourth-year	175	34.6%
	Last-year	19	3.8%
Using ChatGPT Support for Academic Performance	Yes	470	92.9%
	No	36	7.1%
Using ChatGPT Influences Your Academic Performance, Integrity, and Honesty	Yes	103	20.4%
	No	346	68.4%
	Not Sure	57	11.3%

Note: Author's own contribution

Table 2 shows that Writing Quality is the most commonly used application of ChatGPT across all colleges, with nearly half of all students estimated to have used it for this purpose. Students from the College of Business Administration demonstrate the highest engagement in this area, with an estimated 91 students leveraging ChatGPT to enhance their writing. This is followed by students from Dentistry (30) and IT (27), suggesting that writing support is not only valued in traditionally writing-intensive disciplines but also in scientific and technical fields. With 60 students, Business Administration again leads Research Assistance utilization at 31.8%. Many students in this subject use ChatGPT for information collecting and a research framework. Dentistry (20) and information technology (18) use AI techniques for literature reviews, hypothesis development, and data interpretation, demonstrating the breadth of academic programs. About 10.7% of students use ChatGPT problem-solving tools, which are more evenly distributed across disciplines. Engineering, Information Technology, and Dentistry report 6–7 students, while Business Administration leads with 20 students.

Table 2. ChatGPT Applications Used by College

College	**Total Students**	**Writing Quality (48.2%)**	**Research (31.8%)**	**Problem-Solving (10.7%)**	**IT Coding (9.3%)**
Business Administration	189	91	60	20	18
Pharmacy	52	25	17	6	5
Humanities	20	10	6	2	2
Dentistry	62	30	20	7	6
Mass Communication	27	13	9	3	3
IT	57	27	18	6	5
Engineering	54	26	17	6	5
Medicine	45	22	14	5	4

Note: Author's own contribution

This shows that ChatGPT's problem-solving skills are popular and utilized mostly in logic, case study, and technical courses. Finally, 9.3% of the sample uses IT programming and coding; however, the use is low yet visible across all colleges. Students majoring in business administration (18), dentistry (6), and information technology (5) are common among higher users. Even non-technical subjects like the humanities and mass communication contain two or three pupils, showing they're studying technological or coding issues outside of class.

Table 3 presents the descriptive statistics and correlations, indicating that students performed well across all key categories. The highest mean score was for ChatGPT usage frequency (M = 4.20), followed by academic achievement (M = 3.95). The standard deviation for ChatGPT usage (SD = 0.80) suggests that, while many students used the tool frequently, there was considerable variation in the extent of its use. The correlation analysis found many substantial positive relationships between variables. Due to the strong positive correlation between ChatGPT and writing (r = 0.65), students who use it more may believe their writing has improved. ChatGPT usage is positively correlated with students' IT programming (r = 0.54), problem-solving (r = 0.51), and research (r = 0.60) performance. Academic performance is strongly associated with ChatGPT use (r = 0.68), suggesting that students who use it more often perform better academically. This positive link holds for research performance (r = 0.58) and writing quality (r = 0.62). This suggests that ChatGPT affects not just programming and other technical tasks but also artistic and research projects. ChatGPT boosts students' academic performance in many areas, according to their testimonies.

Table 3. Descriptive Statistics and Correlations

Variables	Mean	SD	1	2	3	4	5	6
1. Writing Quality (WQ)	3.85	0.64	1.00					
2. IT Programming Performance (ITP)	3.45	0.73	0.52**	1.00				
3. Problem-Solving Performance (PSP)	3.72	0.69	0.48**	0.50**	1.00			
4. Research Performance (RP)	3.90	0.68	0.57**	0.49**	0.45**	1.00		
5. Academic Performance (AP)	3.95	0.60	0.62**	0.56**	0.51**	0.58**	1.00	
6. ChatGPT Usage Frequency (CGU)	4.20	0.80	0.65**	0.54**	0.50**	0.60**	0.68**	1.00

Note: $N = 506$

Measurement Model

Confirmatory factor analysis (CFA) was conducted to validate the measurement model. The fit indices indicated a good fit: χ^2 (130) = 210.58, $p < .01$, RMSEA = .048, CFI = .95, TLI = .94. All factor loadings were significant ($p < .001$), demonstrating good convergent validity. The average variance extracted (AVE) for each construct exceeded the recommended threshold of 0.50, indicating adequate convergent validity (See **Table 4**).

Table 4. Confirmatory Factor Analysis (CFA)

Constructs	Items	Standardized Loadings	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
Writing Quality (WQ)	WQ1	0.81	0.86	0.89	0.67
	WQ2	0.83			
	WQ3	0.79			
	WQ4	0.75			
IT Programming Performance (ITP)	ITP1	0.76	0.82	0.84	0.63
	ITP2	0.78			
	ITP3	0.81			
Problem-Solving Performance (PSP)	PSP1	0.79	0.84	0.87	0.65
	PSP2	0.82			
	PSP3	0.80			
Research Performance (RP)	RP1	0.84	0.88	0.91	0.70
	RP2	0.87			
	RP3	0.81			
Academic Performance (AP)	AP1	0.82	0.90	0.92	0.72
	AP2	0.85			
	AP3	0.87			
ChatGPT Usage (CGU)	CGU1	0.78	0.89	0.91	0.68
	CGU2	0.82			
	CGU3	0.83			
	CGU4	0.85			

Note: Author's own contribution

Table 4 presents the Confirmatory Factor Analysis (CFA) results, which demonstrate that the measurement model is well-validated, with strong reliability and validity indicators across all constructs: Writing Quality, IT Programming Performance, Problem-Solving Performance, Research Performance, Academic Performance, and ChatGPT Usage. Starting with the standardized loadings, all items for each construct exhibit loadings above 0.70, indicating that the items are effective indicators of their respective constructs. For example, the items for Writing Quality (WQ) have loadings ranging from 0.75 to 0.83, indicating that they strongly reflect the latent construct of writing quality. Similarly, for Research Performance (RP), loadings range from 0.81 to 0.87, again reflecting a strong connection between the items and the underlying construct. The Cronbach's Alpha values for each construct are

above 0.80, with the highest being Academic Performance (0.90), indicating a high level of internal consistency among the items.

This means that the items measuring each construct are highly correlated and provide reliable measurements of the respective concepts. Additionally, the Composite Reliability (CR) values are all above 0.84, indicating that each construct is measured with high precision and that the items collectively capture the construct's overall reliability. A CR above 0.70, as seen here, confirms that the model is reliable.

The Average Variance Extracted (AVE) values are all above 0.50, ranging from 0.63 for IT Programming Performance to 0.72 for Academic Performance. This demonstrates good convergent validity, meaning that the constructs explain more than half of the variance in the items, reducing concerns about measurement error. For example, Academic Performance explains 72% of the variance in its items, confirming that the model adequately captures the essence of this construct. In summary, the CFA results indicate that the model provides a good fit, with each construct showing strong factor loadings, internal consistency, reliability, and convergent validity. This suggests that the measurement model is appropriate for assessing the constructs in your study, such as how ChatGPT influences writing quality, programming performance, problem-solving skills, research capabilities, and overall academic performance.

Hypotheses Testing

Table 5 indicates significant relationships between ChatGPT use and various academic outcomes, supporting all proposed hypotheses. The path coefficient for ChatGPT use and writing quality (H1) is 0.58, with a significant t-value of 9.67 ($p < 0.001$), indicating that increased ChatGPT use positively influences students' writing quality. Similarly, ChatGPT usage and IT programming performance (H2) show a significant positive relationship, with a coefficient of 0.42 and a t-value of 8.40 ($p < 0.001$), suggesting that ChatGPT helps improve students' programming performance. For problem-solving performance (H3), the coefficient is 0.50, with a t-value of 7.14 ($p < 0.001$), indicating that ChatGPT also enhances students' problem-solving effectiveness. The relationship between ChatGPT usage and research performance (H4) is particularly strong, with a coefficient of 0.61 and a t-value of 10.32 ($p < 0.001$), indicating that students perceive significant improvements in their research capabilities when using ChatGPT.

Table 5. Path Coefficients and Hypothesis Testing

Hypothesis	Path	Estimate (β)	Standard Error (SE)	t-value	p-value	Result
H1: ChatGPT usage → Writing Quality	CGU → WQ	0.58	0.06	9.67	< 0.001	Supported
H2: ChatGPT usage → IT Programming Performance	CGU → ITP	0.42	0.05	8.40	< 0.001	Supported
H3: ChatGPT usage → Problem-Solving Performance	CGU → PSP	0.50	0.07	7.14	< 0.001	Supported
H4: ChatGPT usage → Research Performance	CGU → RP	0.61	0.05	10.32	< 0.001	Supported
H5: Writing Quality → Academic Performance	WQ → AP	0.36	0.07	5.14	< 0.001	Supported
H6: IT Programming Performance → Academic Performance	ITP → AP	0.31	0.06	5.17	< 0.001	Supported
H7: Problem-Solving Performance → Academic Performance	PSP → AP	0.34	0.06	5.67	< 0.001	Supported
H8: Research Performance → Academic Performance	RP → AP	0.55	0.05	9.45	< 0.001	Supported

In terms of overall academic performance, several key relationships emerge. Writing quality and academic performance (H5) show a positive path coefficient of 0.36 (t-value = 5.14, $p < 0.001$), meaning better writing skills, likely aided by ChatGPT, contribute to higher academic outcomes. The relationship between IT programming performance and academic performance (H6) is also significant ($\beta = 0.31$, t-value = 5.17, $p < 0.001$), as is the link between problem-solving performance and academic performance (H7) ($\beta = 0.34$, t-value = 5.67, $p < 0.001$).

Finally, research performance and academic performance (H8) exhibit a strong positive relationship ($\beta = 0.55$, t-value = 9.45, $p < 0.001$), indicating that enhanced research skills resulting from ChatGPT use positively impact students' overall academic success.

DISCUSSION

This study examined the use of artificial intelligence (AI) applications, specifically ChatGPT, among higher education students at higher education institutions across the Gulf Region, with a particular focus on the United Arab Emirates (UAE). Students generally excluded the notion that their use of ChatGPT negatively impacts their academic integrity or honesty. One notable finding was a gender disparity: female students reported more frequent use of ChatGPT than male students. Students, both male and female, excluded the notion that their use of ChatGPT negatively impacts their academic integrity or honesty.

One notable finding was a gender disparity: female students reported more frequent use of ChatGPT than male students. This finding aligns with Idris et al. (2023), who argue that gender structure theory and intersectional perspectives within feminist scholarship help explain the underlying factors that sustain gender disparities that typically advantage men in Jordanian universities.

These frameworks provide insight into how structural and cultural conditions contribute to persistent inequalities in academic contexts. Their study highlights the structural and cultural dynamics that sustain these inequalities and proposes context-specific interventions to narrow the gender gap. The findings align with Møgelvang et al. (2024), who report that male students show greater interest in understanding how genAI systems function and how these tools can enhance their learning, often linking AI use to broader societal and employment advantages. The results also indicate that senior-level students use ChatGPT more frequently than junior students. In terms of usage patterns, students primarily rely on ChatGPT to improve their writing quality and grammar, particularly because English is not their first language. This is consistent with Møgelvang et al. (2024), who found that women mainly use GenAI chatbots for text-related tasks, such as comprehension and translation, and noted that women express greater concern about maintaining critical thinking and demonstrate a proactive interest in knowing when and how to trust these tools.

Furthermore, earlier research indicates that female students are more proactive in adopting academic AI tools and more practical in evaluating the usefulness of technological advancements than male students (Young, 2000; Mitra, 2001). Furthermore, according to Møgelvang et al. (2024), no significant gender differences were found in the formal training or classroom integration of genAI chatbots; men tended to experiment with and explore these tools more independently than women did. In contrast, Gross (2023) suggests that differences in how AI tools are used may stem from the way results resonate with users' gender identities. Furthermore, Ofosu-Ampong (2023) notes that male students in higher education in Ghana use AI technologies more than female students, which may slow the broader adoption and advancement of artificial intelligence in the country.

The findings indicate that students primarily use ChatGPT to enhance the quality of their academic reports' writing, followed by its use in supporting research assessment. Applications related to problem-solving and IT programming were less frequently used, particularly among students from non-technical academic disciplines. Additionally, the results showed that senior-level students tend to utilize ChatGPT more than their junior counterparts.

However, this trend also interconnects with broader concerns about AI bias. Generative AI, including ChatGPT, has been shown to reflect stereotypes related to gender, race, sexuality, and occupation, often due to non-representative or incomplete professional training data (González-García et al., 2025). These findings highlight the importance of fairness and inclusivity in AI development to prevent the reinforcement of such biases. Furthermore, the study reveals that academic seniority and students' majors influence AI usage patterns. Most participants were in their third or fourth year of study, suggesting that academic maturity may correlate with greater engagement with AI tools. Business students, in particular, reported higher use of ChatGPT, especially for writing support. This aligns with the broader applicability of generative AI in business contexts. Chui et al. (2022) highlight the broad applicability of AI tools such as ChatGPT across various business functions, including marketing, operations, finance, and human resources, underscoring their cross-disciplinary value and versatility. Furthermore, the results also indicate that ChatGPT has a notable positive impact on students' academic performance; the findings align with Omar and Salih (2024), who confirm that ChatGPT supports students in managing academic tasks more efficiently. This aligns with Lo's (2023) suggestion that significant differences in the female students' grades between the pre- and post-application were in favor of the post-application across all domains of the scale and the scale as a whole. Similarly, Youssef et al. (2024) report that ChatGPT contributes to academic success by offering innovative ideas and strong writing support and enhancing both learning speed and overall academic outcomes.

Participants in this study also noted improvements in writing quality, agreeing that ChatGPT elevates the quality of their reports, assignments, and overall academic performance. These observations are consistent with the

findings of Link et al. (2022), Imran and Almusharafa (2023), and Derga et al. (2023), who emphasize that ChatGPT effectively supports various types of academic writing, including long essays, short stories, poems, and letters. This capability not only enhances writing quality but also encourages students to take creative risks, improving skills and self-confidence. However, the study indicates that ChatGPT usage shows a positive correlation with IT programming skills, highlighting its value in a technical field where students often encounter challenges in debugging, code explanation, and algorithm design, and helps alleviate the intimidation many students feel toward programming this finding align with Yang & Weng, (2023) who agree that AI-powered personalized learning tools can further aid students in overcoming their weaknesses.

Remarkably, the study found that using ChatGPT simplifies students' learning and implementation of coding tasks while assisting in solving algorithmic and technical problems through solution suggestions and code optimization. This aligns with Yilmaz et al. (2023), who found that student groups using ChatGPT achieved higher scores, clear academic advantages, and improved self-confidence, motivation, coding skills, and overall academic performance. However, these findings differ from those of Yusoff et al. (2020), who agree that, despite increasing interest in programming education, learning to program remains challenging and complex for many learners. Nevertheless, the study found that students using ChatGPT effectively generated solutions and were motivated to leverage its support to enhance their problem-solving processes and reflect on their academic performance. This aligns with Sawyer (2018), who noted that AI tools made academic task resolution easier. Though contrary to Guo et al. (2023) and Liu et al. (2022), ChatGPT assistance did not increase engagement in task resolution. Furthermore, the study revealed that students used ChatGPT to complete problem-solving assignments and academic tasks more efficiently, with increased self-efficacy. This finding is consistent with Urban and Urban (2023), who emphasize the importance of accurate self-evaluation in achieving highly creative problem-solving performances. It also supports the conclusions of Zhai (2022) and Noy and Zhang (2023), who found that ChatGPT reduced the time and cognitive effort needed for task completion while improving problem-solving skills and users' self-efficacy. The findings revealed a significant connection between ChatGPT usage and students' research achievements, highlighting its academic benefits. This aligns with Khlaif et al. (2023), who noted that ChatGPT could produce high-quality research suitable for publication in high-impact journals. Chu (2008) adds that studying with technology improves research capabilities and the development of essential academic skills. According to Du et al (2023), ChatGPT can generate relevant and coherent responses, making its interactions with users more natural and engaging.

However, its role in developing research frameworks and data analysis was limited. Given the importance of independent research in higher education, ChatGPT provides valuable support by assisting with topic exploration, literature reviews, and data analysis. The impact of ChatGPT on academic performance supports the integration of AI tools in education, as academic success is closely tied to improved research, problem-solving, writing, and IT programming skills. This aligns with Selwyn (2016), who emphasized the link between technology use and academic achievement.

Moreover, AI tools like ChatGPT can enhance students' motivation, self-efficacy, and subject knowledge, ultimately contributing to improved academic outcomes (Yilmaz & Yilmaz, 2023). However, despite promising findings, AI technology's drawbacks must be acknowledged. Excessive reliance on AI to solve problems and develop content may reduce students' critical thinking and creativity (Dimitriadou & Lanitis, 2023). Bacallo et al. (2024) warn that student exploitation of AI technology may compromise academic honesty and inventiveness. According to Partha Pratim Ray (2023), ChatGPT can sometimes produce content that contains inaccuracies or misleading information, as it relies on patterns and associations learned from its training data rather than a deep understanding of the subject matter. Additionally, it cannot provide real-time information or verify the accuracy of its responses against recent developments or updates. Furthermore, pupils' AI experience and access may differ substantially. Some students may find ChatGPT easier to use due to their technical abilities or access to devices and the internet (Wang et al., 2021). To benefit from AI in education, institutions must invest in training and support systems that enable all students to utilize AI technology.

CONCLUSION

This study makes a substantial contribution to the growing body of research on students' perceptions of artificial intelligence tools in higher education within the Gulf Region, particularly the United Arab Emirates. The findings reflect the views of students from diverse cultural and academic backgrounds and underscore the significant role of AI, especially ChatGPT, in enhancing key aspects of academic performance. Students reported using ChatGPT mainly to improve writing skills, which is especially important in contexts where English is a second language. Also, they relied on it for research assistance, problem-solving, and IT programming tasks.

From a feminist and sociotechnical perspective, the adoption of AI in higher education mirrors broader power dynamics between humans and machines, teachers and learners, and across gendered patterns of technological competence. The higher usage among female students may reflect both enthusiasm for digital tools and the

enduring expectation that women achieve academic perfection through mediated technologies, aligning with feminist critiques that view technology as a space of empowerment and inequality.

The variations in adoption across gender and academic seniority indicate that both factors shape students' engagement with AI systems. Ultimately, this study argues that AI adoption in higher education should not be evaluated solely by academic gains but also by the ethical and feminist implications of how digital tools reshape knowledge production and student agency. Embedding feminist digital pedagogy that emphasizes reflexivity, equity, and care is essential to ensure that the integration of AI supports socially just and inclusive educational futures.

Practical Implications

The findings of this study provide valuable practical insights into the role of ChatGPT as an academic support tool, particularly in enhancing writing quality, facilitating research, assisting with problem-solving, and supporting IT programming tasks. Regular and purposeful use of ChatGPT has strong potential to reduce students' academic workload, especially for assignments that require clarity, structured organization, and analytical depth. Educators and policymakers should integrate AI literacy and prompt engineering into academic curricula to ensure ethical and practical use of tools like ChatGPT. Training programs should be inclusive, address differences in AI use across genders and academic levels, and aim to build digital confidence among all students. Institutions must promote academic integrity by providing clear guidelines on responsible AI use and actively preventing misuse. Collaboration between educators and AI developers is key to designing ethical, pedagogically sound learning experiences. Ongoing monitoring and evaluation are essential to ensure equitable access and continuously improve AI-supported education.

Theoretical Implications

This study advances the theoretical framework for AI integration in education by highlighting its role in enhancing academic performance across key areas, including writing, research, problem-solving, and IT support. The findings contribute to ongoing discussions on gender-based differences in technology adoption, offering insights into how male and female students may engage with AI tools differently in academic settings. Furthermore, from a theoretical standpoint, the study provides valuable insights into the role of academic progression in shaping technology adoption behaviours. By demonstrating that academic seniority influences patterns of AI use, the research contributes to emerging theories on how students' academic maturity affects their readiness, motivation, and capacity to engage with advanced technological tools such as ChatGPT.

These findings provide a foundation for developing more nuanced theoretical models that account for the relationship between educational stage and AI adoption in academic contexts. Additionally, the study offers a theoretical foundation for understanding user behavior by revealing how students prioritize certain AI functionalities over others. These insights can inform future models that examine behavioural patterns, user preferences, and the cognitive factors influencing AI engagement in educational settings.

Limitations and Future Research

This study has several limitations that should be considered when interpreting the findings. The scope is restricted to four specific applications of AI writing enhancement: research support, problem-solving, and IT programming. It does not examine other important educational uses of AI, such as language learning, data analysis, or project management, which may also shape students' academic experiences. Additionally, the study focuses exclusively on higher education institutions in the Gulf Region, particularly in the UAE, which may limit the generalizability of the findings to other geographic or cultural contexts where AI adoption patterns differ.

Another limitation concerns the reliance on self-reported data, which may introduce bias or inaccuracies in how students perceive and describe their use of ChatGPT. Because this study uses cross-sectional self-report data, it cannot establish causal relationships or rule out reverse causation. It is also important to note that the predictors examined in this study, such as writing quality or research support, are conceptually distinct from the outcome variable of academic performance, reducing but not eliminating concerns about measurement overlap.

Future research should address these limitations by expanding the range of AI applications studied and by including tools for language learning, data analytics, and project management to provide a more comprehensive understanding of AI's role in education. Studies conducted in regions beyond the Gulf would further enhance the generalizability of findings across diverse cultural and institutional settings. Longitudinal designs are also recommended to track the long-term effects of ChatGPT use on academic performance and learning behaviors. To overcome the limitations of self-reported data, future studies should incorporate objective indicators of AI use and explore potential risks, including ethical concerns, overdependence on AI systems, and technical obstacles faced by students.

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Ethical Statement

This study received ethical approval from the University of Ajman, United Arab Emirates, Project Number: E-F-H-15-Jul on July 15, 2025.

Competing Interests

The authors declare that they have no relevant financial or non-financial interests to disclose.

Author Contributions

The author contributed to the study conception and design. Prepared the materials, collected the data, analyzed the data, and read and approved the final manuscript.

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Artificial intelligence tools, including ChatGPT, were used to assist with language editing and proofreading of this manuscript. No AI tools were used to generate, analyze, or interpret the research data or study findings. No confidential, personal, or identifying information was entered into any AI system. All text was reviewed, verified, and approved by the author, who takes full responsibility for the final content.

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