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Student Satisfaction with ChatGPT as a Writing Tool in Moroccan Higher Education: A Mixed Methods Study

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Abstract
With reference to the 2023 CCI Global Consumer Sentiment Survey by the Boston Consulting Group (BCG), Morocco ranks among the top users of ChatGPT globally. 38% of Moroccan students reported actively using ChatGPT. In line, this research has been carried to come to terms with this high adoption rate among university students. This mixed-methods study (N=101 survey; email interviews) investigated ChatGPT usage, satisfaction levels, perceived benefits, and influencing factors among Moroccan university students. Key results revealed that ChatGPT is the dominant tool (75.25% primary choice), widely used for writing (64.36%), particularly creative (30.69%) and academic tasks (25.74%). Students appreciated its efficiency (73.2% time-saving) and idea generation capabilities (68.3% frequent benefit). Satisfaction was strongly correlated with engagement ($r=0.776$, $p<0.01$). Major concerns included accuracy (59.4% unsure/concerned) and plagiarism risks. Interviews confirmed incongruence and exposed fears of nurturing laziness ("makes us become lazy") and hindering skill development ("I won't improve..."). Opinions were split on whether it actually improved writing skills (47.5% positive / 52.5% negative). This scholarly work calls for informed initiatives to promote AI literacy and ethics with a view to guiding responsible use. The study concludes by advocating for the responsible use of AI in education without undermining core human competencies and skills.

Keywords: AI in education, AI writing tools, ChatGPT, education technology, higher education, Moroccan students, student satisfaction, university students

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Introduction

Artificial intelligence(AI) is being rapidly (unofficially) incorporated into higher education institutions. Undeniably, AI writing tools like ChatGPT are gaining more prominence around the globe (Pavlenko & Syzenko, 2024). No wonder these tools propose potential benefits; however, numerous ethical and pedagogical implications revolving around heavy use and irresponsible misuse remain subject to debate (Abbas, 2023; Akgun & Greenhow, 2022; Han et al., 2023). To this end, this research attempts to shed light on the emerging role of AI writing tools in higher education in general, and in a developing country like Morocco in more particular, where access to technology and digital literacy vary substantially (Bokhari & Awuni, 2024; El Ghazali & Benbrahim, 2024). Hence, it is of utmost importance to know how students feel about using AI tools in higher education. This knowledge helps stakeholders decide if using these Avant-guard tools is right and how they should be used. Succinctly, the objectives of the current research are fourfold: (1) to explore student satisfaction with ChatGPT, (2) to identify factors influencing their satisfaction, (3) analyse usage patterns, and (4) scrutinise influence on writing and learning across gender. In line, the research questions which guide this study are outlined as follows:

Research Questions

RQ1: What are the levels of student satisfaction with ChatGPT as a writing tool among Moroccan undergraduate university students?
RQ2: What factors influence student satisfaction with ChatGPT among this population?
RQ3: How frequently do Moroccan undergraduate university students use ChatGPT for writing, and what types of writing tasks are they primarily using it for?
RQ4: To what extent do Moroccan undergraduate university students perceive ChatGPT as a beneficial tool for improving their writing skills and academic performance?
RQ5: Is there a statistically significant correlation between Moroccan undergraduate university students' satisfaction with ChatGPT and their self-reported engagement with the tool (frequency of use)?
RQ6: Are there gender-based differences in the types of writing tasks for which Moroccan undergraduate university students use ChatGPT?

To effectively answer these research questions and gain profound insight into the context of the study, it is essential to survey existing research studies about the use of AI writing tools in higher education.

Literature Review

AI writing Tools in Higher Education

Unquestionably, AI writing tools are getting increasingly prevalent in higher education. Tools such as ChatGPT are acclaimed to have the potential to create original and coherent content which eludes current plagiarism detection methods (Gültekin Talayhan et al., 2023). The status-quo poses challenges for academic teaching staff respecting whether certain content is human, or AI generated (Baron, 2023). On the previous lines of reasoning, real concerns are raised about academic integrity (Perkins & Roe, 2023). The integration of AI tools in higher education has been accelerated by the shift to online learning during the COVID-19 pandemic (Bhullar et al., 2024). AI has been utilized for automated essay scoring and item generation. Various studies attempted to measure the reliability of tools like ChatGPT against human performance (Khademi, 2023; Wang et al., 2024). In tertiary education, the impact of large language models and associated

applications necessitates rethinking and research to address key areas affected by generative AI (Lodge et al., 2023). In their edge-cutting article, "AI-writing tools in education: If you can't beat them, join them," Tseng and Warschauer (2023) proposed a pedagogical framework which stresses understanding, access, prompting, corroborating, and incorporating these tools into the learning process. Despite the fact that AI-powered chatbots present advantages in higher education, it is primordial for students to view these tools as assistive rather than addictively relying on them entirely (Zhou & Zhang, 2024). The integration of AI into higher education has been shown to improve writing skills, assist students with disabilities, advance critical thinking, and tackle challenges related to biases and misinformation (Ciampa et al., 2023). Studies comparing human-written essays to ChatGPT-generated essays have delineated differences in linguistic characteristics, and accentuate the need for critical evaluation of AI-generated content (Herbold et al., 2023). In language learning, the efficacy of AI-assisted language learning tools like ChatGPT in improving academic writing skills and motivation has been confirmed (Song & Song, 2023). In brief, it is of paramount importance to understand how these tools work and determine the extent to which students are satisfied.

Student Satisfaction with AI Writing Tools

The use of AI writing tools in higher education has been a topic of interest in recent years. In a previous study, Hartshorne and Ajjan (2009) formerly found that though students recognize the potential benefits of Web 2.0 technologies in improving their writing ability and increasing satisfaction with a course, only few actually choose to adopt these tools to their needs and wants in educational contexts. This reluctance to adopt new technologies may be due to a lack of awareness or understanding of how these tools upgrade the learning experience. In a study by Sajjad (2024), a novel framework called Artificial Intelligence-Enabled Intelligent Assistant (AIIA) was proposed for personalized and adaptive learning in higher education. It has been found that AI-enabled Virtual Teaching Assistants (VTAs) could improve student engagement, satisfaction, and learning outcomes. Distinctly, the impact of AI on academic writing has been a subject of a heated debate in the existing literature. In relation to this, Chemaya and Martin (2024) traced the emergence of Large Language Models (LLMs) in tools like ChatGPT and raises questions marks about how AI could affect academic writing. Concisely, the literature suggests a growing interest in AI technology to improve student satisfaction with writing tools in higher education.

ChatGPT in Different Domains

ChatGPT, a large language model developed by OpenAI, has been the subject of various studies exploring its capabilities in different domains. Kim and Lee (2023) investigated how ChatGPT addresses transport problems and solutions in North America. Kashefi and Mukerji (2023) examined the potential of ChatGPT for programming numerical algorithms, while Yuan et al. (2024) proposed ChatTESTER for unit tests generated by ChatGPT. Chanthran et al. (2023) assessed ChatGPT performance in extracting entities and relations from Malaysian English text. Christy et al. (2024) examined ChatGPT ability to provide appropriate and reliable responses to questions about distal radius fractures, highlighting the model's inconsistency in delivering accurate responses consistently. Roy et al. (2024) assessed ChatGPT efficacy in solving attitude, ethics, and communication case scenarios for competency-based medical education in India. (Zong et al., 2024) evaluated ChatGPT performance on Chinese national medical licensing examinations, noting differences in question types but not in units. Carlà et al. (2024) compared ChatGPT-3.5,

ChatGPT-4, and Google Gemini in suggesting surgical planning for retinal detachment cases, finding agreement with vitreoretinal surgeons in a significant percentage of cases. Yu et al. (2024) discussed improving ChatGPT self-verification capability and the accuracy of explanations for incorrectly generated code and failed repairs in test reports. These studies collectively demonstrate the diverse applications of ChatGPT across various fields, showcasing both its potential and limitations in different tasks and scenarios.

ChatGPT Potential in Higher Education (Liberal Arts)

ChatGPT capabilities, in academic settings, are being actively assessed by researchers worldwide. One empirical study by Chaudhry et al. (2023) ventured to compare ChatGPT solutions for undergraduate assignments to those of top students. The study in question found that the performance of the latter is quite promising. In harmony, Atlas (2023), Hasanein and Sobaih (2023), and Malik et al. (2024), all combined, pinpoint to the value of AI in so far as improving student writing and productivity in academic settings. It has been reported that students utilise ChatGPT to develop ideas, gather information, and polish their writing (Dempere et al., 2023), and receive feedback to build skills. Nonetheless, ethical concerns over academic integrity (Farrokhnia et al., 2024) and the risk of students becoming too dependent on such tools have been clearly expresses. Besides, the use of generative AI, including ChatGPT, in higher education has been recognized for its ability to respond to user prompts and enhance the learning experience (Chan & Hu, 2023). Research has explored the impact of ChatGPT on language learning and its potential to improve students' critical thinking and writing skills (Sandu et al., 2024). In a word, the literature confirms that ChatGPT is likely to positively impact writing skills in higher education through providing ample support with respect to idea development, information retrieval, and feedback on written work.

ChatGPT Deployment in the Study Context

Research on ChatGPT in education rapidly expands (Baidoo-Anu & Ansah, 2023; Kasneci et al., 2023; Mugableh, 2024); nevertheless, a critical look at the existing pool of knowledge exposes several gaps. Existing studies often ignore specific populations; research that investigates the experiences of students in the MENA region, particularly Morocco, is very scarce (Al-Zubaidi et al., 2024; El Ghazali & Benbrahim, 2024; LARGOU & Isam, 2023; Moussa & Belhiah, 2024; Ouahani & MAHRAJ, 2025). For reasons of unique cultural, educational, and linguistic factors, the generalisability of previous findings from predominantly Western contexts to the study context is problematic. Likewise, there is poor integration of student satisfaction and engagement data. Global and local research typically targets either satisfaction (Al-Zubaidi et al., 2024; Khan et al., 2024; LARGOU & Isam, 2023; Moussa & Belhiah, 2024; Safdar et al., 2024; Sajjad, 2024) or usage patterns (Rudolph et al., 2023a; Rudolph et al., 2023b) in isolation. Little scholarly work has been conducted to systematically probe into the relationship between these constructs. In addition, analysis of writing task engagement lacks granularity. Research often treats academic writing as a single activity (Anshori & Fauziah, 2024; Imran & Almusharraf, 2023), so the differential use and perception of ChatGPT across specific writing components requires more detailed examination. Methodologically, studies heavily rely on quantitative self-reported survey data (Farrokhnia et al., 2024; Khoudri et al., 2024; LARGOU & Isam, 2023; Lingard, 2023; Moussa & Belhiah, 2024; Noroozi et al., 2024); this method is necessary but susceptible to bias, and few studies employ more objective measures. Beyond doubt, the specific factors that influence student satisfaction

with ChatGPT for academic writing invoke a much deeper exploration which transcends general usability (Almulla, 2024; Xing & Jiang, 2024; Yu et al., 2024).

Such limitations showcase clear research gaps. To reiterate, little empirical investigation attempted to tackle the satisfaction levels and engagement patterns with ChatGPT among Moroccan undergraduate students. To the best of our knowledge, no existing study tried to provide context-specific data for this group, methodically links satisfaction and engagement, and analyzes tool use across distinct writing tasks. Ergo, the current study ventures to fill these gaps. It investigates student satisfaction (RQ1), influential factors (RQ2), task-specific engagement patterns (RQ3, RQ6), perceived benefits (RQ4), and the satisfaction-engagement correlation (RQ5) within the Moroccan higher education context.

Methods

This study employed a convergent mixed methods research design (Creswell & Plano Clark, 2023) within an overall descriptive framework (Dulock, 1993). The aim was to expansively probe into Moroccan undergraduate students' satisfaction with ChatGPT as a writing tool, their usage patterns for academic writing tasks, their perceptions of its benefits for writing skills and academic performance, and the factors which influence these perceptions and satisfaction levels.

Participants

The study participants comprised 101 undergraduate university students enrolled in the common core program (semester four) within the Department of English Studies and Culture, Faculty of Arts and Human Sciences, Meknès, Morocco. A convenience sampling approach (Sedgwick, 2013) was utilized to recruit participants. This method was selected for its practicality and efficiency in accessing a readily available group of students within the specific program and institutional context relevant to the research questions.

Demographic Data

Figure 1 shows that the majority of participants are female (63%). Male participants constitute 37%. There is a larger proportion of females compared to males in this group. With respect to age (Figure 2), the majority being over the age of 18-24, which makes up 77.23% of the total sample.

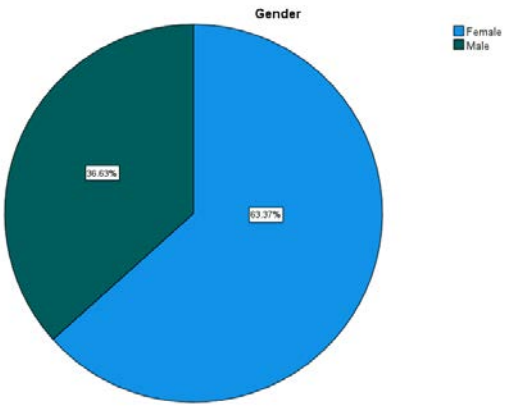


Figure 1. The Participants' Gender

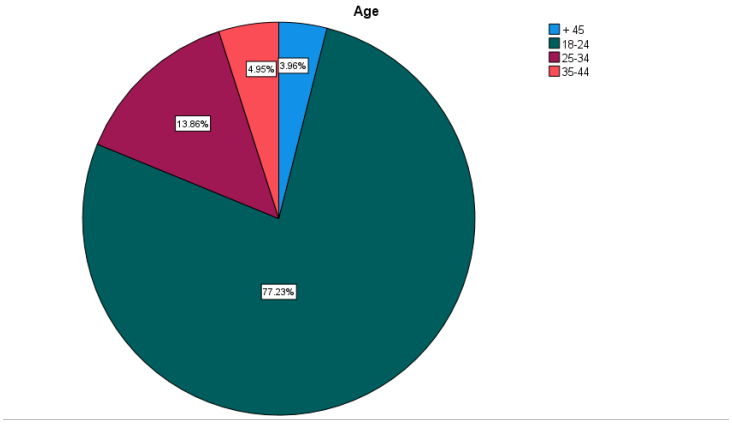


Figure 2. The Participants' Age

Figure 3 shows the distribution of participants across two academic levels: Year 2 (S4) and Year 3 (S6). In Year 2, there are notably more female participants (54) compared to male participants (12). In Year 3, gender representation is closer to parity (26 female and 30 male participants).

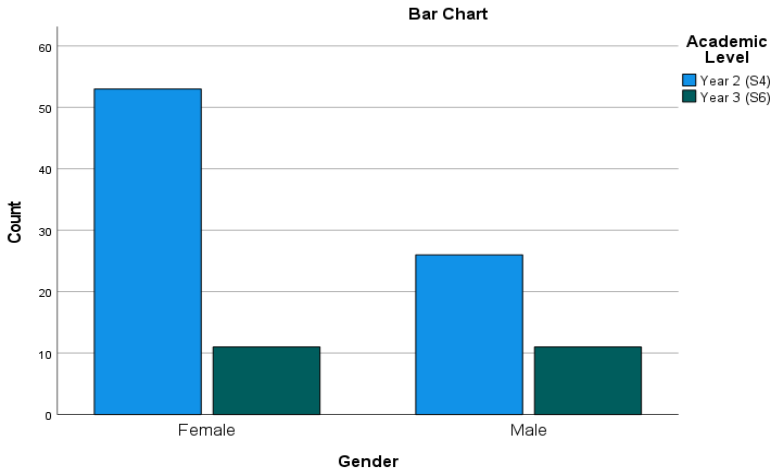


Figure 3. Gender and Academic Level

Research Instruments

Data were collected using a single online survey instrument, which was administered via Google Forms (link: https://forms.gle/jy15RpE35K2DtmGQ9). The instrument contained both quantitative closed-ended questions and qualitative open-ended questions. The former items were principally devised to quantify key variables that involve students' self-reported levels of satisfaction with ChatGPT (using Likert-type scales), frequency of use, and the types of writing tasks for which they deploy the tool. The latter items sought to gather rich qualitative data in order to grant students the floor to elaborate on their experiences. They were explicitly devised to inspect the factors, which influence their satisfaction or dissatisfaction with ChatGPT, their reasoning behind specific usage patterns, and their perceptions of the tool affordances in academic writing.

Research Procedures

The online survey link was distributed to the target student population in complete adherence with ethical considerations, namely anonymity and informed consent. Consistent with

a mixed methods convergent design (Creswell & Clark, 2007; Creswell & Plano Clark, 2023; Fetters et al., 2013), data collection occurred concurrently for both quantitative and qualitative strands. In relation, data analysis proceeded in two parallel streams. Data from the closed-ended questions were analysed using descriptive statistics (frequencies, percentages, means, standard deviations) to summarize satisfaction levels, describe usage patterns, and identify common writing tasks addressed with ChatGPT (Quantitative Analysis). In contrast, data from the open-ended questions underwent thematic analysis (Qualitative Analysis) which entailed steadily reading responses, identifying initial codes, developing categories, and refining themes with a view to elicit deeper insights into students' experiences, the underlying reasons for their satisfaction levels, and the multiple ways they perceive and utilize ChatGPT for academic writing. Eventually, the results from both the quantitative and qualitative analyses were integrated and compared during the interpretation phase to provide an all-inclusive understanding of Moroccan undergraduate students' experiences with ChatGPT as a writing tool.

Results

Quantitative Results

Figure 4 illustrates the popularity of various AI chatbots among users. The chart displays the percentage of users who favour each chatbot.

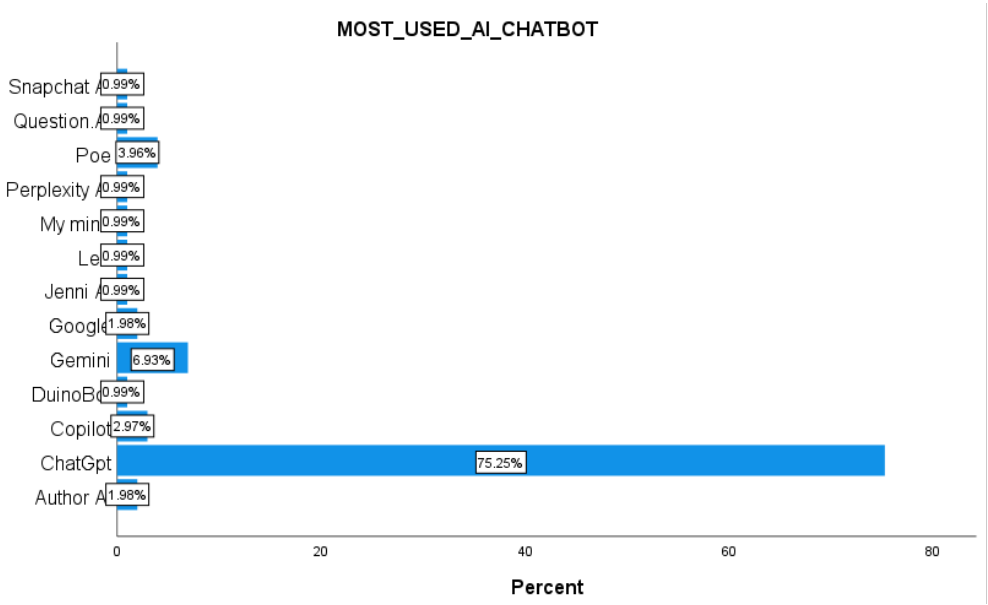


Figure 4. Most Used AI Chatbot

As shown, ChatGPT is the most widely used AI chatbot. It accounts for 75.25% of the total usage. The remaining chatbots have substantially lower market shares.

Technology Acceptance

Table one (See Appendix A) presents the responses of participants to a survey assessing their attitudes towards and acceptance of new technologies. The responses show a general openness towards trying out novel technologies. A majority (71.3%) tends to feel comfortable learning complex technologies. In this respect, 65.4% are found to excited about experimenting with new writing tools, which pinpoints a willingness to engage with novel innovation. That being said, several participants (64.4%) favour researching and scrutinising new technologies before

adoption (use) and 37.6% are reported to be hesitant to use them until proven effective. Remarkably, it has been found that social influence plays a role. 60.4% are reported to be more likely to try new technologies recommended by peers. 58.4% expressed that they do not feel pressured to adopt technology just because others do. As delineated, the participants exhibited a generally positive attitude towards new technologies. Still, a notable portion also expressed caution and a desire for more information before adopting new technologies.

AI Chatbots Use

Figure five illustrates the responses of participants to a survey regarding their use of AI chatbots. As shown, a significant portion of participants (43.56%) indicated that they are not sure whether they use AI chatbots (**Hesitancy and Uncertainty**). A smaller group (29.70%) expressed certainty about their use of AI chatbots.

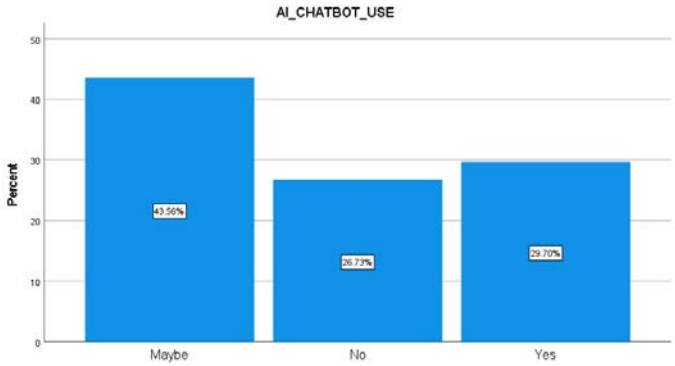


Figure 5. AI ChatBot Use

Only 26.73% of participants stated that they do not currently use or plan to use AI chatbots (Limited Use).

ChatGPT Perceived Ease of Use

Figure six depicts the percentage of students who have ever used ChatGPT for writing. It shows that a majority of students (64.36%) have used ChatGPT, whereas 35.64% have not.

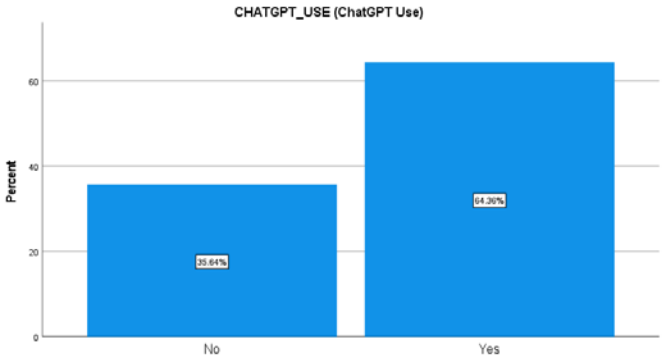


Figure 6. ChatGPT Use

Figure seven indicates that ChatGPT has gained substantial traction among Moroccan undergraduate university students. Over two-thirds of the students surveyed have utilized the tool for writing purposes.

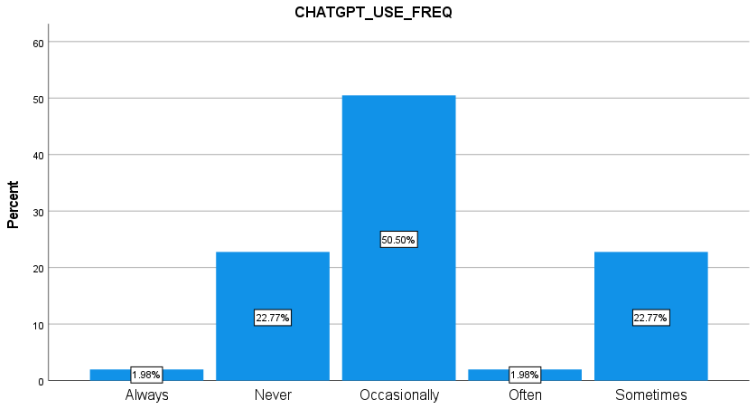


Figure 7. ChatGPT Frequency of Use

The types of writing tasks, assigned to students, and most frequently invokes ChatGPT, are illustrated in Figure 8. As shown, a small percentage (5.94%) of participants acknowledge that they used ChatGPT to write blog posts or articles. ChatGPT was rarely used to write social media posts (14.85%). Using ChatGPT to write up emails (personal or professional) ranked third at 22.77%., followed by academic writing such as essays, and research papers (25.74%). The highest percentage (30.69%) of participants reported using ChatGPT to creative writing purposes such as poems, stories, scripts.

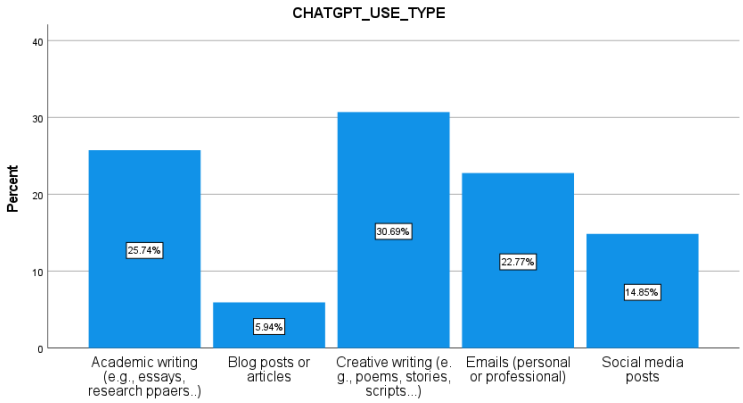


Figure 8. ChatGPT Type Use

Table 1 presents the responses of participants with regards to their experiences with ChatGPT as a writing tool. The responses indicate mixed experiences with using ChatGPT for writing tasks. A generally positive view of its usability was observed. A majority (52.5%) agree or strongly agree that learning the basics was straightforward, and 48.5% find locating features and functions easy. All the same, confidence in using ChatGPT for various writing assignments is lower; only 34.7% agree or strongly agree. 29.7% of participants remain neutral. Having said that, 48.5% declare that ChatGPT is a user-friendly tool.

Table 1. *Participants' Experiences with ChatGPT for Writing*

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1) Learning the basics of using ChatGPT for writing tasks was straightforward.	6.9%	9.9%	30.7%	37.6%	14.9%

2)	I feel confident using ChatGPT to handle various writing assignments.	12.9%	22.8%	29.7%	24.8%	9.9%
3)	Locating the features and functions I need within ChatGPT is a smooth and easy process.	9.9%	10.9%	30.7%	38.6%	9.9%
4)	Overall, I find ChatGPT to be an intuitive and user-friendly tool for writing	6.9%	16.8%	27.7%	36.6%	11.9%

ChatGPT Perceived Benefits

Table two (Appendix B) reveals varied usage patterns of ChatGPT for different writing tasks. Some aspects are being more frequently utilized than others. 27.7% use it occasionally, which indicates moderate reliance for brainstorming purposes. When it comes to grammar improvement, usage is less frequent; only 20.8% frequently use it. A notable 30.7% never use it, which indicates limited confidence in its grammar capabilities. For tasks like structuring writing and checking factual accuracy, around 27.7% and 23.7% respectively use it frequently, but considerable portions use it rarely or never (**Selective Utility**). Regardless, ChatGPT is more frequently used for vocabulary enhancement. 39.6% state that they frequently use it, which shows its perceived value in improving word choice.

Overall Levels of Student Satisfaction with ChatGPT as a Writing Tool Among Moroccan Undergraduate University Students

Figure nine displays the distribution of student satisfaction with ChatGPT. It shows that a majority of the students (42.57%) reported being neutral towards ChatGPT. This indicates that they neither liked nor disliked the tool. A significant proportion of participants (16.83%) were not satisfied at all. 17.82% were not satisfied. 16.83% were satisfied. Only a small percentage (5.94%) of participants were very satisfied.

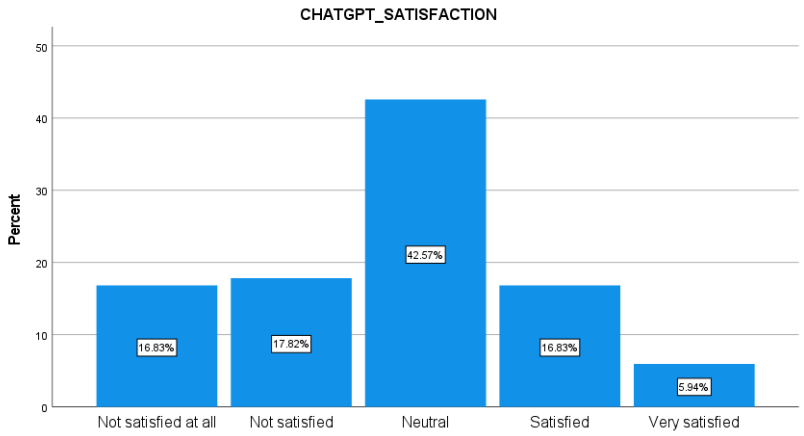


Figure 9. Users' Satisfaction

With regards to engagement, Figure ten shows that most participants (42.57%) deem the interaction with ChatGPT to be neutral (neither particularly disengaging nor engaging). 22.77% of the participants judge the interaction with ChatGPT as not engaging at all. Another 19.80% believe that the tool is not engaging. Last but not least, a smaller proportion (11.88%) described the interaction as engaging, and only 2.97% found it very engaging.

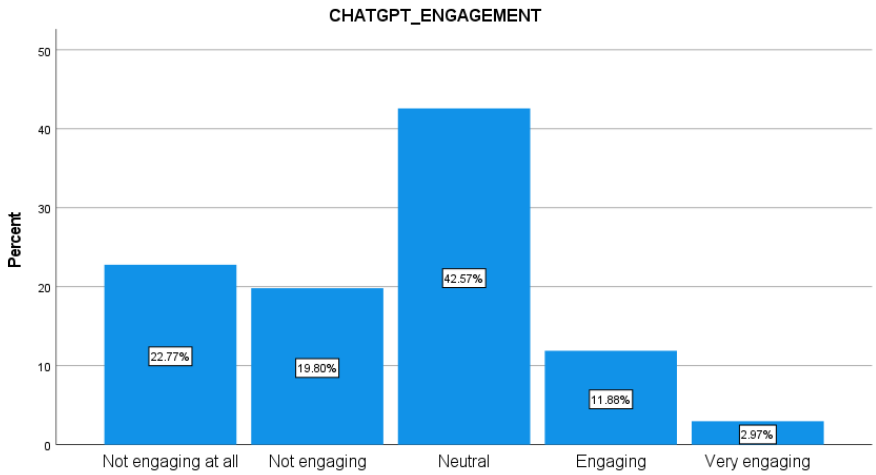


Figure 10. Engagement with ChatGPT

According to Figure ten, participant interaction with ChatGPT was generally perceived as moderately engaging, rather than strongly exciting or uninteresting. Table 3 provides correlational data linking user satisfaction and engagement. A strong, statistically significant positive correlation ($r = 0.776$, $p < 0.01$) was found between user satisfaction and engagement.

Table 3. *The Correlation Between ChatGPT User Satisfaction and User Engagement*

Correlations

		CHATGPT_SATISFACTION	CHATGPT_ENGAGEMENT
CHATGPT_SATISFACTION	Pearson Correlation	1	.776**
	Sig. (2-tailed)		<.001
	N	101	101
CHATGPT_ENGAGEMENT	Pearson Correlation	.776**	1
	Sig. (2-tailed)	<.001	
	N	101	101

**. Correlation is significant at the 0.01 level (2-tailed).

Based on Table three, it can be inferred that as user satisfaction with ChatGPT increases, user engagement tends to increase as well. This correlation works both ways. Higher engagement is linked to greater satisfaction, and greater satisfaction appears to be more connected to higher engagement.

Factors significantly influencing student satisfaction with ChatGPT

Table 4 provides a summary of the factors that affect student satisfaction with ChatGPT, and sheds light on both the perceived benefits and concerns associated with using the AI tool for writing.

Table 4. *Factors Influencing Student Satisfaction with ChatGPT*

Factor	Key Results / Details
1) Ease of Use	Students generally found the tool easy to use.
2) Efficiency	Perceived as efficient. 73.2% reported it saved them time on assignments.
3) Perceived Benefits	Most common benefits reported: – Getting ideas (68.3%)

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	– Improving grammar (51.5%) – Structuring writing (44.6%) – Overcoming writer's block (44.6%) – Paraphrasing text (42.6%)
4) Concerns (Accuracy)	Significant concern about the accuracy of information. 59.4% raised questions marks over the correctness and credibility of the information provided.

Perceived Impact of ChatGPT on students' Writing Skills and Academic Performance

Figure Eleven illustrates students' perceptions on whether ChatGPT has contributed to improving their writing skills. It shows that a slight majority of students (52.48%) believe ChatGPT has had a positive impact on their writing. In contrast, 47.52% believe it has not.

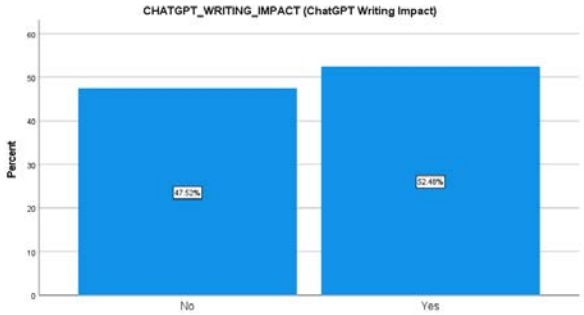


Figure 12. ChatGPT Impact on Writing

Figure twelve points to a slight positive perception of ChatGPT's impact on writing skills. Notwithstanding, there is no clear consensus among students. Similarly, Table 5 showcases ChatGPT has a mixed impact on student writing and academic performance.

Table 5. *Impact of ChatGPT on Student Writing and Academic Performance*

Category	Perceived Impact	Percentage
Impact on Writing Skills	Positive	47.5%
Impact on Writing Skills	Negative	52.5%
Perceived Improvements	Grammar and mechanics	49.5%
Perceived Improvements	Clarity and organization	42.6%
Perceived Improvements	Vocabulary and precision	44.6%
Impact on Academic Performance	Positive	52.5%
Impact on Academic Performance	Unsure	30.7%
Confidence in Writing	Somewhat confident	46.5%

Although some students see various benefits in terms of grammar, clarity, and organization, others believe it has a negative impact. A significant number of students are also unsure about the impact on their academic performance. Students' confidence in their writing abilities also remains moderate after using ChatGPT.

The Relationship Between Years of Formal English Study and Frequency of ChatGPT Use

As indicated in Table 6, a strong association was found between higher levels of formal English education and lower frequency of ChatGPT use. For this comparison, participants were categorized by their years of formal English study: +16 years, 11-15 years, and 5-10 years.

Table 6. *The Relationship Between Formal English Years and ChatGPT Use Frequency*

FORMAL_ENG_YRS * CHATGPT_USE_FREQ Crosstabulation

Count

		CHATGPT_USE_FREQ					
		Always	Never	Occasionally	Often	Sometimes	Total
FORMAL_ENG_YRS	+ 16	0	0	3	0	0	3
	11-15	0	2	7	0	4	13
	5-10	2	21	41	2	19	85
Total		2	23	51	2	23	101

Markedly, students with +16 years of formal English education are found more likely to use ChatGPT 'Never' or 'Occasionally'. Those with 5-10 years are observed to use it 'Occasionally' or 'Often'. Less reliance on ChatGPT for writing assistance is therefore indicated for students with more extensive formal English training.

Gender and ChatGPT Use Type

Table 7 sheds light on the relationship between gender and the types of writing tasks which involve ChatGPT use. Four types of writing (academic, creative, blog posts/articles, emails, and social media posts) are considered. The most common applications of ChatGPT reported by all genders were creative writing, followed by academic writing. Female users showed higher usage rates for both these main tasks and for communications like blogs, emails, and social media posts. The results indicate that female students utilize ChatGPT for a more diverse set of writing tasks than male ones.

Table 7. *The Relationship Between Gender and ChatGPT Use Type*

Gender * CHATGPT_USE_TYPE Crosstabulation

Count

		CHATGPT_USE_TYPE					
		Academic writing (e.g., essays, research ppaers..)	Blog posts or articles	Creative writing (e.g., poems, stories, scripts...)	Emails (personal or professional)	Social media posts	Total
Gender	Female	15	5	18	15	11	64
	Male	11	1	13	8	4	37
Total		26	6	31	23	15	101

It is important to note that these differences are relatively small. Thus, there is significant overlap in the types of writing tasks for which all genders use ChatGPT. Table 8 presents the frequency of ChatGPT usage across different writing tasks based on years of formal English education.

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Table 8. *The Frequency of ChatGPT Usage Across Different Writing Tasks Based on Years of Formal English Education*

Count

CHATGPT_USE_TYPE			CHATGPT_USE_FREQ Always	Never	Occasionally	Often	Sometimes	Total
Academic writing (e.g., essays, research papers..)	FORMAL_ENG_YRS	11-15	0	0	2	0	1	3
		5-10	2	1	10	1	9	23
	Total		2	1	12	1	10	26
Blog posts or articles	FORMAL_ENG_YRS	11-15		0	1			1
		5-10		2	3			5
	Total			2	4			6
Creative writing (e.g., poems, stories, scripts...)	FORMAL_ENG_YRS	+ 16		0	1		0	1
		11-15		0	3		2	5
		5-10		5	15		5	25
	Total			5	19		7	31
Emails (personal or professional)	FORMAL_ENG_YRS	+ 16		0	1	0	0	1
		11-15		2	1	0	1	4
		5-10		6	8	1	3	18
	Total			8	10	1	4	23
Social media posts	FORMAL_ENG_YRS	+ 16		0	1		0	1
		5-10		7	5		2	14
	Total			7	6		2	15
Total	FORMAL_ENG_YRS	+ 16	0	0	3	0	0	3
		11-15	0	2	7	0	4	13
		5-10	2	21	41	2	19	85
	Total		2	23	51	2	23	101

The largest group of users (5-10 years of English education) frequently uses ChatGPT, especially for academic and creative writing. Overall usage tends to be 'occasional' or 'sometimes', rarely 'always'. Notably, those with 16+ years of formal English training use ChatGPT the least. This pattern indicates that reliance on ChatGPT may decrease as formal English education increases. It can be inferred that ChatGPT is a more valued tool for those with fewer years of study.

Perceived Impact of ChatGPT on Students' Writing

Table 9 indicates how users perceive ChatGPT influence on their writing with respect to seven key areas (*clarity and organization, grammar, and mechanics, writing style, vocabulary, persuasion, tone, and originality*). Table 9 reveals a positive perception of ChatGPT impact on writing. A majority of respondents reported improvements in *clarity, organization, grammar, and vocabulary*. In addition to this, a significant portion felt that ChatGPT helped them develop *a more engaging and persuasive writing style*.

Table 9. *ChatGPT Impact on Writing*

Statement	Strongly Disagree	Disagree	Neutral	Strongly Agree	Agree
1) Improved clarity and organization	15.84%	20.79%	24.75%	6.93%	31.68%
2) Improved grammar and mechanics	15.84%	22.77%	26.73%	4.95%	29.70%
3) More engaging and impactful style	15.84%	21.78%	28.71%	7.92%	25.74%
4) Stronger vocabulary and precise language	13.88%	17.82%	24.75%	7.92%	35.64%
5) More persuasive and argumentative style	14.85%	22.77%	27.72%	6.93%	27.72%
6) More formal and professional tone	13.88%	19.80%	25.74%	9.90%	30.69%
7) More original and creative writing	19.80%	22.77%	24.75%	5.94%	26.73%

ChatGPT Impact on Writing Confidence across Gender

Figure 13 compares the self-reported writing confidence levels of female and male students after frequent use of ChatGPT. The majority of both female (29) and male (18) students expressed "somewhat confident" feelings, which indicates a generally positive perception of ChatGPT influence on their writing skills. Subtle gender differences were observed. Female students exhibited a more balanced distribution across confidence levels. A slightly higher proportion of female respondents reported feeling "not confident at all." Contrary to that, male students demonstrated a more concentrated trend towards "somewhat confident". Fewer reported extreme confidence or lack thereof.

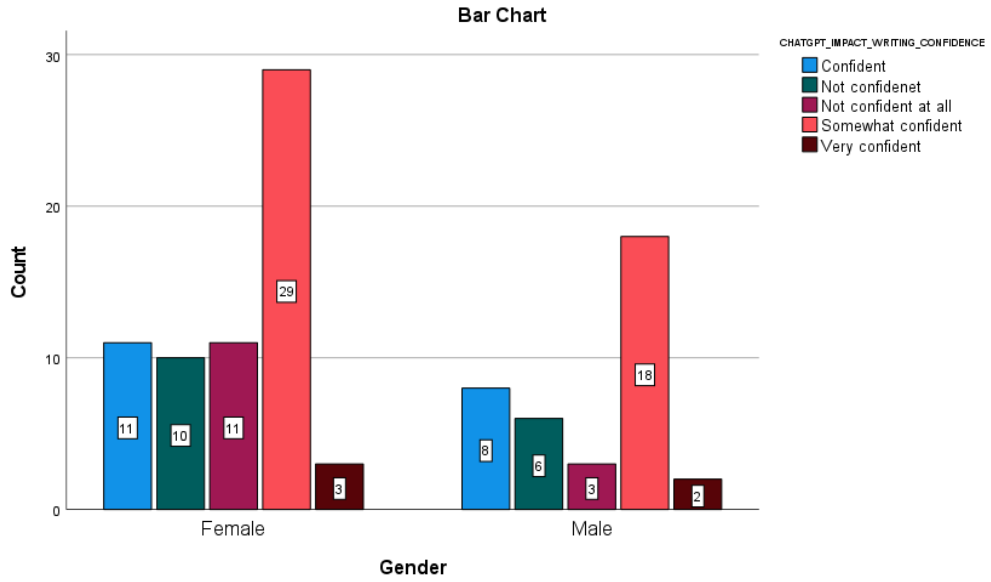


Figure 13. ChatGPT Impact on Writing Confidence across Gender

To determine if these observed differences were statistically significant, Pearson Chi-Square and Likelihood Ratio tests were conducted after checking normality and homogeneity assumptions. Both tests yielded high p-values (Table 10), which suggests that the observed gender disparities in writing confidence were likely due to chance and not a systematic impact of ChatGPT usage. This compels us to say that ChatGPT influence on writing confidence is relatively consistent across genders.

Table 10. *Pearson Chi-Square and Likelihood Ratio tests*

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.725[a]	4	.786
Likelihood Ratio	1.840	4	.765
N of Valid Cases	101		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.83.

Qualitative Results

Thematic analysis of the student responses reveals several key themes regarding the frequency of using ChatGPT for writing purposes (Figure 14).

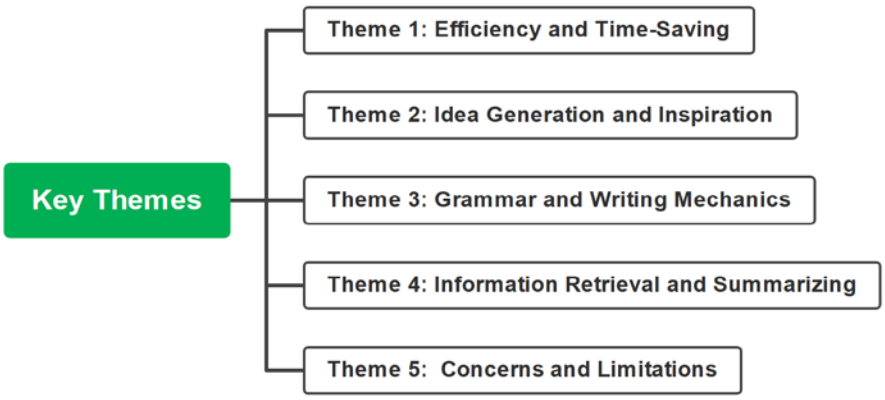


Figure 14. Key Themes

Theme 1: Efficiency and Time-Saving

A great portion of students consistently stressed the capability of ChatGPT to save time and improve efficiency in their writing process. They appreciate its speed in generating ideas, providing information and suggestions, and making writing tasks more manageable. In relation to the theme of time-saving, participant 15 shared the following insights: *"Speed for writing emails and efficiency... It's fast and can either ask it to make an answer long and detailed or short and simple*".

Theme 2: Idea Generation and Inspiration

Students shed light on ChatGPT role in overcoming writer's block and sparking new ideas, acting as a creative springboard for their writing. This poignant observation from participant 78 stresses the power of ChatGPT to kickstart the writing process: *"The thing I like about using ChatGPT is that it gives me a start to what I am about to write*." Participant 92's words provide a powerful glimpse into how ChatGPT helps overcome the writer's block: *"It gives you somehow exactly what you're asking for*". A particularly revealing statement from participant 45 is, *"I like when AI gives me new ideas about the subject*." This displays the degree to which ChatGPT sparks fresh creative thinking.

Theme 3: Grammar and Writing Mechanics

Students appreciated ChatGPT assistance with grammar and mechanics. They recognized its potential to improve the quality of their writing. From participant 87's point of view, *"It corrects my mistakes actually*." This indicates a direct appreciation for ChatGPT capability to identify and correct errors. Participant 15 proposes a personal reflection on ChatGPT value for improving grammar: *"It corrects my grammar and helps me find concise words.*" According to participant 29, *"It is simple and fast*". This shows the ease of use for addressing grammatical issues.

Theme 4: Information Retrieval and Summarizing

Several students noted that ChatGPT is a great helping in gathering information and summarizing complex topics, which makes research more efficient. In the words of participant 69,

"I*t gives me a general idea on how my writing should be*". This underlines how ChatGPT provides a clear structure for organizing their thoughts. A powerful expression of this theme comes from participant 27, who states: "*It helps summarizing complex and long ideas and explain them more*", which demonstrates the value of ChatGPT for simplifying and understanding complex information. Participant 05 articulates this point succinctly when they say, *"It provides me with a clear outline*." This points up to the capability of ChatGPT to help structure their writing assignments.

Theme 5: Concerns and Limitations

It is interesting to note that several students recognized the potential benefits of ChatGPT. Nevertheless, they also expressed concerns and perceived limitations. Participant 14 expressed this idea as follows: *"I don't use it because I believe that human intelligence is better than artificial intelligence*." As highlighted by participant 17, "*It makes us become lazy*." The latter underscores a real concern about potential dependence on AI. In the words of Participant 27, *"To be honest, I don't like ChatGPT*." This indicates a resistance to relying on AI for writing. Several participants shared similar experiences, such as participant 80 who said: "*For me, I don't like anything about using ChatGPT for writing*." This suggests a lack of appeal or trust in the tool for some students. To illustrate this point, consider the following quote from Participant 66: *"It make us become uncapable of writing without checking a device*." Participant 67's experience is emblematic of the broader issue of AI dependence: *"I don't use it because I believe that human intelligence is better than artificial intelligence.* " To understand the complexities of ChatGPT potential impact on writing skills, consider participant 56's perspective: *"I won't improve my writing skills if I keep using ChatGPT*. " This participant expresses concern about ChatGPT potentially impeding individual learning and development. These responses accentuate concerns about potential overuse, reliance on AI, and the potential for sacrificing originality and critical thinking skills. In brief, thematic analysis reveals that Moroccan undergraduate students perceive ChatGPT as a tool that provides time-saving features, idea generation, and grammatical assistance, but with reservations about its potential impact on their independent thinking and writing skills.

Mixing

Table 11 (Appendix C) provides a comprehensive overview of the combined QUAN-QUAL results on ChatGPT usage among Moroccan university students. In fact, ChatGPT is widely used by students. Over two-thirds utilize it for various writing tasks (**High Adoption).** Students have a complex relationship with ChatGPT. They highly value its benefits and still express concerns about over-reliance and potential negative impacts **(Mixed Satisfaction).** Several participants claim that ChatGPT helps them improve their writing skills in areas like grammar and organization. Conversely, some participants voiced certain concerns about its potential to hinder independent thinking and creativity **(Positive and Negative Impacts).** Although ChatGPT is used for grammar improvement, it is not the primary tool for this purpose. ChatGPT is particularly valuable for stimulating creativity and overcoming writing hurdles (Idea **Generation).**

Briefly, the results suggest that ChatGPT is a significant resource for students due to its multiple affordances, which offer genuine benefits in certain areas. More importantly, real concerns are raised about its potential downsides. Careful consideration and responsible use are deemed essential to maximize its positive impact.

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Discussion

This study aimed at investigating Moroccan undergraduate students' experiences with ChatGPT as a writing tool with respect to satisfaction levels (RQ1), influencing factors (RQ2), usage patterns (RQ3, RQ6), perceived benefits (RQ4), and the relationship between satisfaction and engagement (RQ5). The results provide ample insights into how this globally prevalent technology is being perceived and utilized within the study particular educational setting.

RQ1: Levels of Student Satisfaction

The results showcased a complex picture of student satisfaction (RQ1). In this regard, a significant plurality of students (42.57%) reported neutral satisfaction with substantial portions and expresses either dissatisfaction (combined 34.65%) or satisfaction (combined 22.77%). Such a mixed result, more particularly the large neutral group, indicates that many Moroccan undergraduates are perhaps still forming definitive opinions about ChatGPT. A possible *explanation* for this might be that the novelty of widespread generative AI use in education (Baidoo-Anu & Ansah, 2023). These results are seem to be slightly inconsistent with other research which found that AI assistants could increase satisfaction (Sajjad, 2024). This inconsistency may be due to the fact that ChatGPT, in its current form or usage context, has not yet fully met student expectations or needs as an efficient writing tool. Such a neutrality echoes the historical caution observed with adopting new educational technologies wherein perceived benefits do not immediately translate into enthusiastic adoption or high satisfaction (Boser & Daugherty, 1998; Hartshorne & Ajjan, 2009; Kirkwood & Price, 2005; Rogers, 2000). It is noteworthy to state that he similarly high neutrality observed regarding engagement (42.57%) implies the process of an ongoing evaluation by target students.

RQ2: Factors Influencing Student Satisfaction

Importantly, this study has been able to reflect the factors (trends) that influence user satisfaction (RQ2), largely seen in the wider literature. Positive drivers included perceived ease of use and efficiency (time-saving). This results supports core principles of technology acceptance for AI tools (Almulla, 2024; Granić & Marangunić, 2019; Imtiaz & Maarop, 2014; Teo, 2011a, 2011b; Xing & Jiang, 2024; Yu et al., 2024; Zaineldeen et al., 2020). To reaffirm, specific benefits noted by participants (help with idea generation, grammar, structure, writer's block, and paraphrasing) are consistent with advantages observed elsewhere (Anshori & Fauziah, 2024; Dempere et al., 2023; Hasanein & Sobaih, 2023; Song & Song, 2023). Conversely, the most obvious result to emerge from the analysis is the set of concerns raised as barriers to satisfaction. Worry about information accuracy was the most prevalent issue (59.4% unsure/concerned), a limitation broadly discussed in research across education, medicine, and other domains (Chan & Hu, 2023; Christy et al., 2024; Kasneci et al., 2023; Lingard, 2023; Safdar et al., 2024). Comparison of the quantitative results with those of qualitative results also underscore ethical issues and fears of over-dependence. The latter manifest itself in various ways such as laziness or skill destruction (if you do not use it, you lose it). Such results echo academic warnings about integrity, deskilling, and the necessity of critical engagement (Farrokhnia et al., 2024; Gültekin Talayhan et al., 2023; Roe & Perkins, 2023; Zhou & Zhang, 2024) It seems possible that these results are due to an ongoing push and pull between utility (perceived benefits) and risk (perceived harm). The push and pull process is pivotal to understanding the discrepant satisfaction levels reported.

RQ3 & RQ6: Frequency and Types of Use (including Gender)

We found high adoption rates. Nearly two-thirds (64.36%) of students have used ChatGPT for writing (RQ3). Such a rapid uptake among Moroccan undergraduates is consistent with global observations (Bhullar et al., 2024). It is important to note that usage frequency varied considerably. It has been reported that students integrate ChatGPT into their writing workflows to for different tasks and to different degrees.

In terms of specific uses, creative writing (30.69%) and academic writing (25.74%) were the most common applications followed by emails (22.77%). These results are in accord with recent studies indicating the increasing popularity of the tool and its correspondingly recognized strengths in so far as drafting and idea generation (Anshori & Fauziah, 2024; Črček & Patekar, 2023; Fitria, 2023; Tseng & Warschauer, 2023). With reference to task usage, ChatGPT was frequently used for vocabulary improvement (39.6%) and moderately used for brainstorming (27.7%). Interestingly enough, grammar improvement showed more polarized usage among female and male participants (20.8% frequent vs. 30.7% never). Such outcome calls for the investigate academic writing tasks in more specific terms and approach the writing task not as a single category (Anshori & Fauziah, 2024; Imran & Almusharraf, 2023). There are, however, other possible explanations. We can possibly posit, grounded on qualitative evidence, that low reliance on ChatGPT for grammar echoes the tool accuracy and credibility worries of its limits among end-users.

Respecting gender differences (RQ6), only slight variations emerged in task types (females used it for academic work/emails, males more for creative writing) and usage frequency (females tended towards more frequent use). Undeniably, these differences were small. Thus, primary ChatGPT applications were broadly similar for male and female students. Importantly, subsequent statistical analysis revealed no significant gender difference regarding the tool perceived impact on writing confidence. In contrast to earlier findings, which unravel valid concerns about AI potential to widen equity gaps (Lodge et al., 2023; Kasneci et al., 2023), our results indicate that both genders reported similar effects of ChatGPT on their writing confidence within this specific student cohort.

RQ4: Perceived Benefits for Writing Skills and Academic Performance

Students expressed conflicting views in terms of ChatGPT impact on their writing skills and academic performance (RQ4). A slim majority reported positive effects on both writing skills (52.48%) and performance (52.5%). In stark contrast, a substantial portion (nearly half) held negative or uncertain opinions. Such a division mirrors the ongoing debate found in the existing pool of knowledge on the topic, the potential of AI tools to improve writing skills (Ciampa et al., 2023; Song & Song, 2023) and the corresponding risks of deskilling or hindering critical thinking (Baron, 2023; Sandu et al., 2024).

Areas where students saw improvement, such as grammar, clarity, organization, and vocabulary (detailed in Table 7 & Table 11), are similar to the functions depicted in other research (Anshori & Fauziah, 2024). It is interesting to note that overall confidence level remained moderate, with "somewhat confident" being the most common response, which pinpoints to the fact that students generally perceive ChatGPT as a writing *aid* or *assistant* (Zhou & Zhang, 2024) rather than a substitute for developing their own abilities. Along the same lines of reasoning, qualitative supporting quotes reinforced this notion. Reportedly, students indicated that they value the tool for its ease of use and efficiency with regards to getting started or refining specific aspects

of their writing. Meanwhile, they voiced concerns over over-reliance that could possibly impede genuine skill acquisition and development.

RQ5: Correlation Between Satisfaction and Engagement

In retrospect, quantitative analysis revealed a strong, statistically significant positive correlation (r=0.776) between student satisfaction with ChatGPT and their self-reported engagement with the tool (RQ5). This result directly addresses the identified research gap concerning the lack of integration between these two constructs. As shown previously, it empirically supports the intuitive and theoretically grounded notion (related to UX models cited by Almulla, 2024; Xing & Jiang, 2024; Yu et al., 2024) that users who find a tool more satisfying are more likely to engage with it, and potentially vice-versa. These results corroborate the importance of latent factors which substantially influence satisfaction (discussed under RQ2) as potential levers to encourage productive engagement and come to terms with how negative experiences impacting satisfaction led to disengagement.

Conclusion

In general, therefore, it seems that Moroccan undergraduate students exhibit a complex relationship with ChatGPT as a writing tool. Such conflicting results send conflicting messages, which call for the need to put in place educational approaches that "join" rather than simply "beat" these tools. This research suggests that the success of AI-powered writing tools depends not only on their technological capabilities, but also on the pedagogical strategies implemented alongside them. This study provides a crucial, context-specific to understand these dynamics within Moroccan higher education. Further research is much wanted to explore the long-term effects of AI on writing skills, the development of critical thinking abilities, and the evolution of student attitudes towards AI in education. Such initiatives are most welcome to inform future educational practices and policy development in era marked by the rise of AI chatbots.

Limitations, Implications, and Recommendations

Limitations

There is no perfect research. A number of limitations need to be noted regarding the present study. Limitations include the use of convenience sampling, which affects the generalizability of results to all Moroccan students. The sample size (N=101) may also not involve the full range of student viewpoints. Likewise, the exclusive focus on ChatGPT imply that current results might not translate directly to other AI writing platforms.

Implications for Educators and Policymakers

The results have several implications for educators and policymakers with respect to the integration of AI writing tools. Table twelve summarizes the key recommendations. These recommendations tend to accentuate the ascendency of critical thinking skills, ethical considerations, scaffolding and guidance, and personalized learning (Table 13).

Table 12. *Implications for Educators and Policymakers*

Implication	Description
1) Promote Critical Thinking	– Educators are invited to encourage students to critically assess AI-generated content, understand its limitations, and develop critical thinking skills.

2)	Address Ethical Concerns	–	Educators and policymakers are called upon to not ignore the risks and take ethical concerns related to academic integrity, plagiarism, and data privacy into great account.
3)	Provide Scaffolding and Guidance	–	Students are to be supported to effectively use AI writing tools. Educators should design guides and manuals for AI informed usage in academic writing.

Future Research Directions

The current study pinpoints several key areas for future exploration. Future work should include cross-cultural analyses to investigate the relationship of cultural and technological factors in shaping student views on AI writing tools. Prospective research should be undertaken to explore how the actual impact of these tools on writing quality and originality. Similarly, longitudinal research should be conducted to track long-term effects on student learning and skill development. More work needs to be done to develop and evaluate pedagogical strategies centred on responsible AI integration into higher education.

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Appendices

Appendix A

Table 1. *Respondent attitudes towards new technologies (AI Chatbots)*

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I believe it is important to try out new technologies even if I am not sure how useful they will be.	5.0%	7.9%	30.7%	43.6%	12.9%
I am comfortable learning how to use new technologies, even if they seem complex at first.	8.9%	5.0%	14.9%	47.5%	23.8%
I generally consider myself an early adopter of new technology.	5.9%	18.8%	35.6%	25.7%	13.9%
I am hesitant to use new technology until others have proven its effectiveness.	11.9%	29.7%	23.8%	25.7%	8.9%
When presented with a new writing tool, I am excited to explore its capabilities.	4.0%	7.9%	22.8%	44.6%	20.8%
New technologies can significantly improve the way I learn and complete tasks.	6.9%	7.9%	14.9%	45.5%	24.8%
I trust that new technologies will be designed to be user-friendly and reliable.	5.9%	13.9%	25.7%	37.6%	16.8%
Before using a new technology, I feel the need to research its effectiveness and potential problems.	5.9%	7.9%	21.8%	41.6%	22.8%
I am more likely to try a new technology if my friends or classmates recommend it.	7.9%	9.9%	21.8%	48.5%	11.9%
I do not feel pressured to use new technologies just because others are doing so.	7.9%	11.9%	21.8%	35.6%	22.8%

Appendix B

Table 2. *Participant Use of ChatGPT for Writing Tasks*

Statement	Very Frequently	Frequently	Occasionally	Rarely	Never
ChatGPT helps me to generate ideas for my writing assignments.	12.9%	19.8%	27.7%	20.8%	18.8%
ChatGPT helps me to improve the grammar in my writing.	5.9%	14.9%	28.7%	19.8%	30.7%
ChatGPT helps me to structure my writing (e.g., organize paragraphs, introductions, conclusions).	10.9%	16.8%	25.7%	19.8%	26.7%
ChatGPT helps me to find relevant sources for my writing.	11.9%	21.8%	26.7%	14.9%	24.8%
ChatGPT helps me to improve my vocabulary and word choice.	16.8%	22.8%	29.7%	13.9%	16.8%
ChatGPT helps me to overcome writer's block and get started on my writing	11.9%	19.8%	23.8%	23.8%	20.8%
ChatGPT helps me to paraphrase and rephrase my sentences to avoid plagiarism.	12.9%	15.8%	26.7%	18.8%	25.7%

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ChatGPT helps me to check for factual accuracy in my writing. (Consider adding this if plagiarism is a concern)	7.9%	15.8%	28.7%	18.8%	28.7%
Other Uses	4.0%	7.9%	25.7%	20.8%	41.6%

Appendix C

Table 11. *QUAN -QUAL Results Mixed*

Theme/Finding	Quantitative Data	Qualitative Data	Triangulation Insights
ChatGPT Adoption	– Most popular AI chatbot (75.25%) – Over 2/3 of students used for writing	– Time-saving tool, streamlines tasks	– Significant resource for writing, especially for speed and information gathering.
Student Satisfaction	Majority neutral towards ChatGPT	– Concerns about over-reliance, accuracy, and impact on independent thinking	– Complex relationship: values benefit but recognizes downsides.
Impact on Writing Skills	– Divided on positive impact. – Perceived improvements in grammar, clarity, organization	– Concerns about dependence and sacrificing originality	– May be beneficial for specific tasks but requires careful use to avoid dependence.
Grammar and Writing Mechanics	– Moderately used for grammar improvement	– Acknowledges ChatGPT assistance	– May not be primary tool for grammar; students likely rely on their own skills.
Idea Generation	– Most frequently used for generating ideas	– Perceived as a creative springboard	– Valuable for stimulating creativity and overcoming writing hurdles.