Assessment of Quillbot Tool in English Education amongst Students in UAE Higher Education

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Abstract
This study looks at how students view the Quillbot app as a resource for enhancing their academic writing. The main objective is to evaluate how Quillbot's features help students improve their vocabulary, grammar, and writing abilities while also lowering their writing anxiety. 204 university students, ranging in educational level from diploma to post-doctoral, from public and private universities in Abu Dhabi and Al Ain participated in the study. A quantitative survey was used to gather the data, which was then subjected to descriptive statistics, T-tests, and ANOVA analysis. According to the findings, Quillbot was deemed user-friendly by most students, as seen by their mean accessibility score of 4.088. With a mean score of 4.044, Quillbot also assisted in enhancing writing productivity and results while lowering writing anxiety (4.014). Students said Quillbot's organizing and grammar capabilities enhanced the quality of their work (3.936). Perceptions depending on gender, region, or kind of institution did not differ significantly. By showcasing Quillbot's ability to enhance academic writing abilities and lessen writing anxiety, this study contributes to the conversation on sustainable digital innovation in education. It highlights how the tool promotes efficient and equitable learning, meeting the demands of contemporary education. The results provide insightful information for incorporating AI-powered solutions into environmentally friendly teaching methods.

Keywords: Academic Writing, English Writing, Quillbot Implementation, Sustainable Digital Innovation

Introduction
The way that technology has been incorporated into education has had a big impact on a lot of different parts of academic life lately, especially writing. Of all the digital tools out now, Quillbot is one that seems particularly promising for students who want to improve their academic writing abilities. The way that technology has been incorporated into education has had a big impact on a lot of different parts of academic life lately, especially writing. Of all the digital tools out now, Quillbot is one that seems particularly promising for students who want to improve their academic writing abilities. Understanding how students perceive and utilize Quillbot is crucial for educators, policymakers, and developers alike. By delving into students' perspectives, educators can better tailor instructional strategies to meet the evolving needs of learners in the digital age. Policymakers can use insights from this research to inform decisions regarding the integration of technology in educational settings. One of the most crucial writing genres to master is academic writing, which is applicable to all other fields where English is the international language and is thought of as an integral component of the English language learning process. As a result, through publishing scholarly writing, we will spread awareness of our interests and expand our network (Kurniati & Fithriani, 2022).

The possibility of artificial intelligence (AI) technologies to transform writing and enhance language proficiency has attracted the interest of scholars, educators, and authors. Prior research has examined how AI affects academic writing quality and satisfaction with it (Huang et al., 2021; Chen et al., 2020). The usefulness of Automated Writing Evaluation (AWE) applications for academic writing has been the subject of numerous studies (Ariyanti, 2021; Zhang, 2020). There is, however, a dearth of studies on the use of AI-powered technology as a digital tool to enhance students' academic writing. Among the many applications of artificial intelligence (AI), Quillbot is a particularly potent instrument for improving the productivity of academic writing. With the goal of streamlining the writing process and raising the standard of academic publications generally, Quillbot uses sophisticated language processing algorithms to offer automated writing help and criticism. Quillbot assists researchers, academics, and students in attaining exceptional writing competence and productivity by providing real-time ideas and corrections (Raheem et al., 2023). Understanding Quillbot's relative benefits and limits in supporting different writing activities is essential as the use of AI in academic writing continues to develop (Marzuki et al., 2023; Perkins, 2023).

The integration of artificial intelligence (AI) tools, such as Quillbot, has transformed the educational landscape, providing students with innovative solutions to overcome traditional challenges in academic writing. Academic writing requires precision, clarity, and structured expression, which often pose difficulties for students across various disciplines. Quillbot, with its advanced paraphrasing, grammar checking, and text organization features, empowers students to produce higher-quality work while reducing the anxiety associated with writing tasks. By offering tailored support, this tool fosters a more inclusive and equitable learning experience, ensuring that students from diverse educational and cultural backgrounds can thrive in their academic pursuits. This study aims to underscore the utility of Quillbot in enhancing writing skills and confidence among students, aligning with the broader objectives of integrating technology into education for sustainable innovation.

This study intends to ascertain how students perceive Quillbot as a digital tool for academic writing to close this empirical gap. The purpose of this study's conclusions is to help steer English as a Foreign Language (EFL) education and learning in the United Arab Emirates in the proper direction by considering the perspectives and knowledge of the students. By demonstrating the revolutionary potential of AI-powered tools like QuillBot in improving academic writing skills, this study adds to the expanding body of information on sustainable digital innovation in higher education. The results demonstrate the tool's capacity to boost output, lessen writing anxiety, and facilitate fair access to digital resources—all of which are in line with the more general objectives of encouraging creative and sustainable teaching methods.

Literature Review

English Academic Writing

Academic writing is challenging at practically all higher education levels. For undergraduate and graduate students, academic writing is more significant than other writing genres taught in middle and high schools. Writing for academic audiences requires formal, structured, and objective writing, as well as the use of terminology that is frequently abstract and technical (Kurniati & Fithriani, 2022). However, writing for academic purposes can be challenging because it calls for a lot of thought and writing skills (Lin & Morrison, 2021). Moreover, academic writing involves a number of components that are thought to constitute the foundation of excellent academic writing (Al Badi, 2015). Extensive study has been sparked by this difficulty, leading to writing interventions in higher education. Consequently, scholars worldwide have directed their inquiry towards a variety of problems associated with scholarly writing. Research conducted at Hong Kong universities by Lin and Morrison (2021) and Hyland (2018) examined the difficulties and disabilities faced by students when writing academically. Other research, which focuses on undergraduate and doctorate students, examined the needs, approaches, and experiences of students in long-term academic writing at several universities in the United Kingdom and Indonesia (Fatimah, 2018; Keumala, 2019).

English's prominence as an international language makes it essential for communication on a global scale. English has become the language of choice for people all over the world during the Fourth Industrial Revolution and Fifth Generation Society (Nurmayanti & Suryadi, 2023). Because language is so important in today's society, students should have faith in their ability to express themselves well in both written and spoken English. Because writing requires such a complex ability to express one's thoughts and feelings in words, students frequently find it to be one of the most difficult components of learning a new language (Meiningsih, 2021). Writing is a crucial skill for those studying English as a second language. For students to communicate effectively, these are necessary abilities to learn. able to convey ideas and talk Writing is frequently seen as challenging and necessitates good language and cognitive skills, despite its importance. Writing demonstrates speech and writing abilities. Writing is a means of communicating ideas, not just showcasing grammar, punctuation, and spelling abilities (Laila & Daulay 2024).

Digital Tool in English Academic Writing

The modern period offers a multitude of approaches to teaching and studying English because of evolving conditions. Digital tools and other forms of technology can be used to facilitate modern teaching and learning (Fithriani, 2021). According to Kurniati and Fithriani (2022),

students' personal learning process and overall understanding of English courses are enhanced by the use of digital technologies. For this reason, a lot of students, particularly those studying English, become proficient with technology and incorporate it into their education. An application with a single purpose, like automated writing evaluation (AWE), automated essay scoring (AES), and automated written corrective feedback (AWCF), was the beginning of technology. However, these days, those programs can be combined into a single software called "digital writing tools," which is accessible on mobile devices and powered by artificial intelligence. According to Nazari et al. (2021) this app can help students learn and strengthen their writing skills.

As technology develops, new opportunities for teaching and learning in the areas of assessment, tutoring, content creation, and feedback for educators and learners can be created using AI-powered technology. Quillbot is one application that provides an AI-powered product. One of the most widely used programs for paraphrasing is Quillbot. Using artificial intelligence, Quillbot provides a product that suggests paraphrases, grammar checkers, summarizers, and even plagiarism detectors (Kurniati & Fithriani, 2022). Quillbot is a powerful Artificial Intelligence (AI) tool designed to help students, researchers, and academics write more effectively. Its goal is to change academic writing. Quillbot provides several tools to increase writing productivity, enhance writing quality, and assist users in creating well-structured academic writing thanks to its strong language processing skills (Raheem et al., 2023). When educators and students lack the motivation to manually paraphrase written work, Quillbot offers a solution by assisting with the paraphrasing process. This tool is easy to use. After we write or paste texts, Quillbot rewrites them when we click the "Paraphrase" button.

Research Questions
The research questions guiding this study are strategically designed to address key aspects of students' perceptions of Quillbot.
1. What are students' Perceptions regarding the effectiveness of Quillbot features in assisting them with academic writing?
2. Are there significant differences in students' perceptions of academic writing in terms of gender diversity, place diversity, and type of institution?
3. Are there significant differences in students' perceptions of academic writing in terms of age, student education level, and student college?

Research Contribution
The present study adds significantly to the fields of academic writing and instructional technology in several ways: This study offers empirical support for the Quillbot application's efficacy as a digital writing instrument. The study illustrates how aspects of the program might boost writing productivity, lower anxiety, and improve academic writing skills by evaluating students' perceptions. Educators and software developers that want to improve digital writing tools will find this material useful. Moreover, the study contributes to ongoing conversations in the field by outlining specific areas for future research and laying the foundation for additional investigation into the use of digital writing tools in education. Additionally, the results of this study can help teachers understand the advantages of incorporating digital resources like Quillbot into their lesson plans. Teachers can better

support their students' academic performance by knowing how these tools might improve students' writing skills and confidence.

Research Methodology
The data analysis for this study on university students' perceptions of Quillbot in academic English writing in the UAE was meticulously carried out using IBM SPSS Statistics version 28. The research methodology employed in this study is structured to address the objectives effectively, focusing on understanding the perceptions of students regarding the effectiveness of the Quillbot application in academic writing. Below are the detailed components of the methodology:

Research Design and Population of the Study
The research strategy of this study is quantitative in order to collect and process numerical data in order to do a statistical analysis of the perceptions of the students. The methods used are cross-sectional surveys, which enable data collection from a wide range of individuals at one time. University students enrolled in a range of programs, such as diploma, bachelor's, master's, doctoral, and post-doctoral studies, make up the target group for this study. This group was selected because it is likely that they have used digital writing tools before and can offer pertinent feedback on how well the Quillbot app works. For research Sampling, the study employed a stratified random sample strategy to guarantee representation among varying educational levels. To get a wide range of opinions, the sample was selected from students enrolled in different universities, including both public and private ones. 204 students made up the entire sample, which was thought to be adequate to guarantee the results' statistical validity and dependability. This scale enables reliable analysis and conclusions that may be applied to the entire research population.

Data Collection and Data Analysis
An instrument designed to evaluate students' opinions of the Quillbot application was used to gather data: a structured questionnaire. In order to facilitate a quantitative study of opinions regarding the features, efficacy, and general satisfaction of the application, the questionnaire comprised closed-ended questions with a Likert scale (1 to 5) to quantify replies. Statistical software (SPSS) was used for data analysis to carry out a variety of studies, including descriptive statistics. The demographic information and replies on how people felt about the Quillbot application were summed up using means, standard deviations, and frequency distributions. Additionally, in order to find any significant differences, the study compared the mean perceptions across several demographic groups, such as gender and location, using T-tests. besides using ANOVA (Analysis of Variance): carried out to investigate perceptual discrepancies depending on educational attainment and ascertain whether there are any noteworthy distinctions between the various groups. Additionally, the study employed Post Hoc Tests, which were performed after an ANOVA to pinpoint particular group differences in cases where significant effects were discovered. All subjects gave their informed consent, as required by ethical guidelines for study. Participants were notified of their freedom to withdraw from the study at any time without facing any repercussions, and anonymity and confidentiality were upheld throughout the entire investigation.

Research Hypotheses

Based on the study problem and research questions, the hypotheses of the current research are as follows:

1. There are positive students' perceptions regarding the effectiveness of Quillbot features in assisting them with academic writing.
2. There are significant differences in students' perceptions of academic writing in terms of gender diversity, place diversity, and type of institution.
3. There are significant differences in students' perceptions of academic writing in terms of age, student education level, and student college.

Finding

Descriptive Analysis

A study sample's sociodemographic characteristics are shown in Table 1, which is divided into categories based on student education level, gender, age, location, and kind of institution, and student education level. The sample is mostly made up of women (89.2%) and people in the 18–23 age range (77.9%). The majority of respondents (70.6%) are from Abu Dhabi, and 76% of them attend government Institutions and 24% attend private ones. Bachelor's degree holders make up the majority of those with the highest level of education (85.8%), followed by master's (7.4%), post-doctoral (3.4%), and doctoral (2%) degrees. Just 1.5% of the sample is enrolled in the diploma program.

Table 1
Sociodemographic Variables

Statement		Frequency	Percentage
Gender	Male	22	10.8%
	Female	182	89.2%
Age	18-23 years old	159	77.9%
	24- 29 years old	38	18.6%
	30 years and more	7	3.4%
Place	Al Ain	60	29.4%
	Abu Dhabi	144	70.6%
Type of Institution	Government	155	76%
	Private	49	24%
Student Education Level	Diploma	3	1.5%
	Bachelor	175	85.8%
	Master	15	7.4%
	Doctoral	4	2%
	Post-Doctoral	7	3.4%

A descriptive analysis of the sociodemographic factors pertaining to the colleges attended by the students is given in Table 2. With 40.2% of the sample, the Education faculty has the biggest number of students. Business makes up 11.8%, and Humanities comes in second with 19.1%. IT (3.4%), Art and Science (7.4%), and Engineering (8.3%) are some noteworthy categories. Smaller student groups comprise the following fields: environment, aviation, graphic design, law, medicine (5.4%), nursing (1%), nutrition (1%), and nutrition (1%). These fields account for 0.5% of the sample as a whole.

Table 2
Descriptive Analysis of Student College Sociodemographic Variables

Statement		Frequency	Percentage
Student College	Art and Science	15	7.4 *%*
	Aviation	1	0.5 *%*
	Business	24	11.8 *%*
	Education	82	40.2 *%*
	Engineering	17	8.3 *%*
	Environment	1	0.5 *%*
	Graphic	1	0.5 *%*
	Humanities	39	19.1 *%*
	IT	7	3.4 *%*
	LAW	2	1 *%*
	Medicine	11	5.4 *%*
	Nursing	2	1 *%*
	Nutrition	2	1 *%*

Discussion Research Question 1

The usefulness of the Quillbot application's many features is perceived by the students, as shown in Table 3. The assertions that the students assessed are listed in the table together with the mean, standard deviation, minimum, and maximum values for each statement. Quillbot was regarded as a readily accessible digital tool by students, according to the results. The tool's ease of use was generally agreed upon by students, as seen by its mean score of 4.088 and standard deviation of 0.916. Furthermore, with a mean score of 4.044 and a standard deviation of 0.883, students felt that Quillbot improves their writing productivity and helps them produce better writing outcomes. This indicates their satisfaction with the app's capacity to improve writing efficiency. With a mean score of 4.014 and a standard deviation of 0.954, students also mentioned that Quillbot motivates them to write and lessens their writing anxiety, suggesting that many of them find the app beneficial in easing the tension associated with writing. Students, who scored an average of 4.009 with a standard deviation of 0.982, agreed that the program has a number of features that improve writing quality. With an average rating of 3.995 and a standard deviation of 0.8905, students also indicated that Quillbot's features significantly help them with academic writing, indicating a general consensus that the application is helpful in this situation. With a mean of 3.936 and a standard deviation of 0.967, the results indicate that many students saw progress in their grammar skills. In general, there are positive perceptions of students regarding the effectiveness of Quillbot's features in assisting them in academic writing, as the results show that the average responses from students exceeded the neutral point (3) on the Likert scale, as they ranged between (3.897) and (4.088), indicating that the general trend is to agree and strongly agree with students' perceptions about the benefits of using Quillbot in academic writing. Table 3 shows students' perceptions regarding the effectiveness of Quillbot features.

Table 3

Students' Perceptions regarding the effectiveness of Quillbot features

Ranking	Statement	Min	Max	Mean	SD
Q1	Quillbot is an easily accessible digital tool.	1.00	5.00	4.088	.916
Q10	I can write efficiently and my writing get better results when I use the Quillbot app.	1.00	5.00	4.044	.883
Q4	The Quillbot application encourages me to write and reduces my writing anxiety.	1.00	5.00	4.014	.954
Q3	The Quillbot application is effective because it includes several features that can help me improve the quality of my writing.	1.00	5.00	4.009	.982
Q2	Quillbot's features greatly assist me in academic writing.	1.00	5.00	3.995	.8905
Q8	Using the Quillbot application to write academic essays has improved my grammar skills.	1.00	5.00	3.936	.967
Q6	By using the Quillbot application my writing skills in organizing text have improved.	1.00	5.00	3.931	1.052
Q9	I prefer Quillbot over other apps.	1.00	5.00	3.921	.964
Q5	Using the Quillbot application boosts my confidence towards my writing.	1.00	5.00	3.897	1.133
Q7	Unconsciously, my vocabulary particularly the terms used in academic writing has increased.	1.00	5.00	3.897	1.043

Discussion Research Question 2

No statistically significant differences were found between the gender, location, and kind of institution in the T-tests on students' perceptions of academic writing. Men scored somewhat higher than women (mean of 4.17), with a mean of 4.23 for gender diversity. The T-value of 0.423 and the p-value of 0.673, however, show that there is no discernible difference between the two groups. In the same way, students from Abu Dhabi scored 4.21 and those from Al Ain scored 4.09 on the place diversity scale. A p-value of 0.164 and a T-value of -1.396 indicate that there is no discernible difference between these groups. Finally, the mean score of students from government institutions was 4.21, marginally higher than the mean score of students from private universities (4.07), but there was no discernible difference, according to the T-value of 1.230 and the p-value of 0.223. Consequently, the data shows that there are no considerable differences in students' opinions about academic writing based on their gender, place of residence, or kind of school. Table 4 presents the T-Test results of hypothesis 2 in the current study.

Table 4
T-tests on students' perceptions of academic writing in terms of gender diversity, place diversity, and type of institution

Diversity Types	Indicators	No.	Mean	SD	T	DF	Significant (2- tailed)	Finding
Gender Diversity	Male	22	4.23	0.383	0.423	202	0.673	Not Support
	Female	182	4.17	0.606				
Place Diversity	Al Ain	60	4.09	0.673	-1.396	202	0.164	Not Support
	Abu Dhabi	144	4.21	0.543				
Type of Institution	Government	155	4.21	0.534	1.230	202	0.223	Not Support
	Private	49	4.07	0.721				

Discussion Research Question 3

The findings of the ANOVA test demonstrate that, whereas age or college affiliation does not significantly affect students' evaluations of academic writing, education level does. Students in the 18–23 age group had the highest mean score (4.22), followed by those in the 30 and above age group (4.12) and the 24-29 age group (4.02). These differences were not statistically significant, though, with a p-value of 0.168 and an F-value of 1.801. However, as demonstrated by an F-value of 5.617 and a p-value of 0.001, there was a substantial difference in views based on educational level, with post-doctoral students scoring the lowest (3.41) and bachelor's students having the highest mean score (4.24). With business students displaying the highest mean score (4.32) and medical students the lowest (3.90), the analysis based on college affiliation did not show any significant differences. However, the F-value of 0.757 and p-value of 0.694 indicate that college diversity is not a significant factor in students' perceptions.

Table 5
ANOVA Test on students' perceptions of academic writing in terms of age, student education level, and student college

Diversity Types	Indicators	No.	Mean	SD	F-Value	P-Value	Finding
Age	18-23	159	4.22	0.565	1.801	0.168	Not Support
	24-29	38	4.02	0.676			
	30 and above	7	4.12	0.398			
Student Education Level	Diploma	3	4.20	0.529	5.617	0.001	Support
	Bachelor	175	4.24	0.531			
	Master	15	4.03	0.587			
	Doctoral	4	3.47	1.486			
	Post-Doctoral	7	3.41	0.474			
Student College	Art and Science	15	4.24	0.630	0.757	0.694	Not Support
	Aviation	1	4.00	-			
	Business	24	4.32	0.393			
	Education	82	4.11	0.483			
	Engineering	17	4.30	0.519			
	Environment	1	3.80	-			
	Graphic	1	4.8	-			
	Humanities	39	4.18	0.732			
	IT	7	4.30	0.500			
	LAW	2	4.25	0.212			
	Medicine	11	3.90	1.062			
	Nursing	2	4.60	0.424			
	Nutrition	2	4.40	0.848			

According to the Post Hoc Test results, post-doctoral and bachelor's students' judgments of academic writing differed significantly from one another. The mean difference between the perceptions of bachelor's students and post-doctoral students was 0.82686 (p = 0.002), indicating a considerably higher level of positivity. Perceptions did not significantly differ between diploma students and any other group, nor did they differ significantly between bachelor's, master's, or doctorate students. Likewise, there was no discernible difference between diploma, master's, and doctorate students and post-doctoral students. Overall, the results show that post-doctoral students have fewer positive opinions about academic writing than bachelor's students do, although other comparisons between educational levels did not reach statistical significance.

Table 6
Post Hoc Test of Student Education Level

Student_Education_Level	Student_Education_Level	Mean Difference (I-J)	Std. Error	Sig.
Diploma	Bachelor	-.04114	.32662	1.000
	Master	.16667	.35476	.990
	Doctoral	.72500	.42842	.441
	Post-Doctoral	.78571	.38708	.256
Bachelor	Diploma	.04114	.32662	1.000
	Master	.20781	.15091	.643
	Doctoral	.76614	.28365	.057
	Post-Doctoral	.82686*	.21621	.002
Master	Diploma	-.16667	.35476	.990
	Bachelor	-.20781	.15091	.643
	Doctoral	.55833	.31565	.395
	Post-Doctoral	.61905	.25676	.117
Doctoral	Diploma	-.72500	.42842	.441
	Bachelor	-.76614	.28365	.057
	Master	-.55833	.31565	.395
	Post-Doctoral	.06071	.35158	1.000
Post-Doctoral	Diploma	-.78571	.38708	.256
	Bachelor	-.82686*	.21621	.002
	Master	-.61905	.25676	.117
	Doctoral	-.06071	.35158	1.000

The Post Hoc Test results on students' opinions on academic writing at various educational levels are shown in Figure 1. According to the graph, bachelor's degree holders scored the highest on average, slightly above 4.20, compared to diploma holders, who scored somewhat lower. With a mean score of about 4.10, master's students performed worse. Doctorate students' views significantly declined, with their mean score falling to slightly over 3.60. The mean score of post-doctoral students was the lowest, slightly above 3.40. This graphic depiction supports the statistical results by highlighting the fact that post-doctoral students had the least positive opinions of academic writing and bachelor's students had the most positive opinions, with a substantial difference between the two groups.
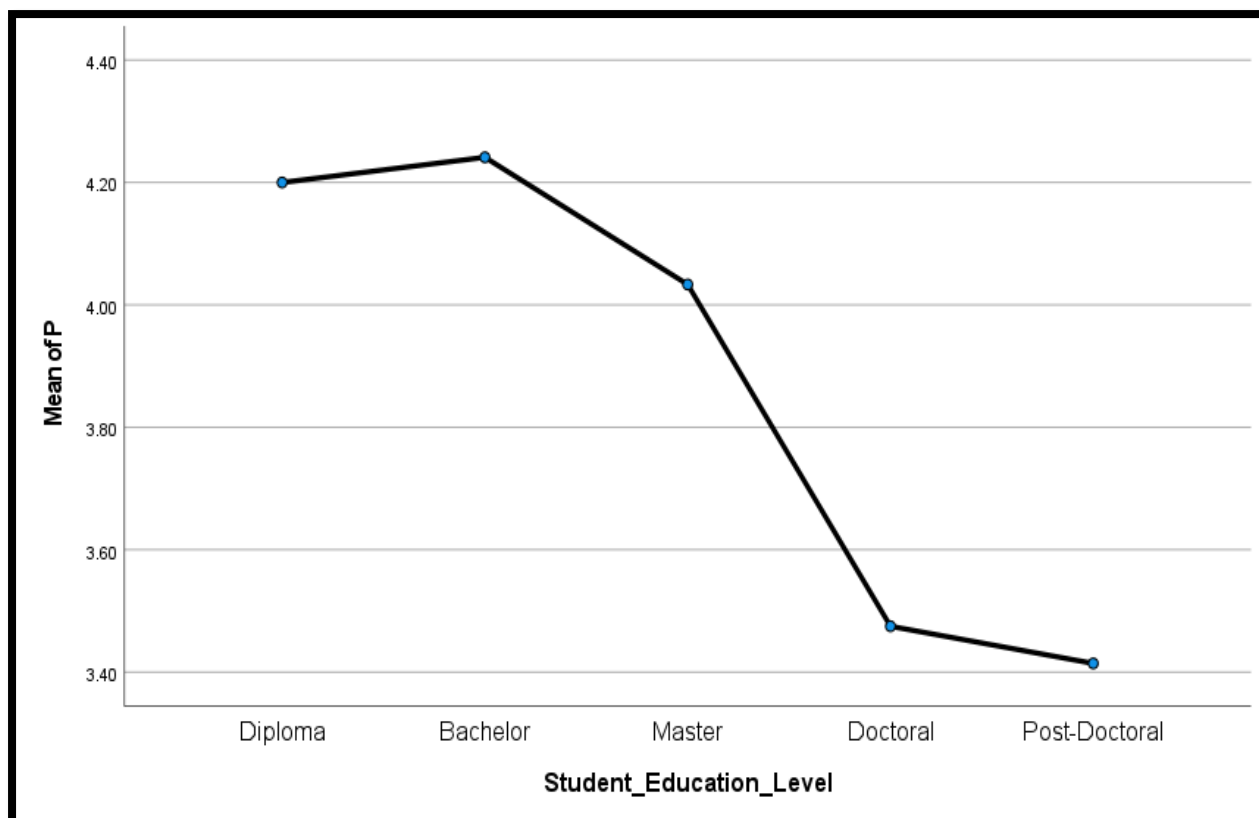
Figure 1 Post Hoc Test

Theoretical Implications
The study adds to the current corpus of knowledge about the use of digital tools in academic writing by highlighting students' perceptions of the Quillbot application's efficacy. According to the findings, students believe Quillbot to be both approachable and useful for increasing writing output, lowering anxiety, and strengthening vocabulary and grammar. This emphasizes how crucial it is to incorporate technology into the educational process and how important it is to use data analytic techniques to assess and understand students' impressions of education. Moreover, the idea that students gain equally from digital writing tools regardless of their demographic background adds to the theoretical understanding of educational equity.

Managerial Implications
The following is a summary of the current study's practical contributions. First, Curriculum Development: The study highlights how crucial it is to incorporate digital technologies into writing programs for academic purposes. The results can be used by educational institutions to guide the creation of curricula, guaranteeing that students have the knowledge and resources needed to succeed in their writing assignments. This can entail adding instructions on how to use Quillbot and other writing apps efficiently. Second, Assistance for the Development of Student Writing: Given Quillbot's favourable reviews for enhancing self-assurance and expanding vocabulary, teachers may choose to include this tool in their writing support curriculum. Institutions can improve the writing skills and general academic performance of their students by offering Quillbot-related training and tools.

Conclusion

To sum up, this study offers important new perspectives on how students use the Quillbot app as a digital writing aid and how it affects academic writing. According to the results, students see Quillbot as an approachable and useful tool that increases writing productivity, lowers anxiety, and raises the caliber of their academic work. The research shows a significant variation in perceptions based on educational levels, with bachelor's students expressing the most positive views compared to post-doctoral students, despite not finding any statistically significant differences in perceptions based on demographic factors like gender, location, or type of institution. Furthermore, the investigation emphasizes how important it is to encourage students' writing development with digital writing tools like Quillbot. These resources can assist students at different academic levels have a more pleasant writing experience by enhancing grammar, vocabulary, and overall writing confidence. This study not only highlights how important it is to include digital resources in writing curriculum, but it also lays the groundwork for further research on the usefulness of other digital tools in academic contexts.

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