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The Impact of Artificial Intelligence Tools on Students' Academic Performance at Eastern Technical University, Sierra Leone

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Abstract: Artificial Intelligence (AI) has rapidly shifted from futuristic theory to everyday reality in higher education. Across the globe, students now rely on AI-powered tools such as ChatGPT, Grammarly, Turnitin, and Quillbot for academic support. This study investigates the extent to which students at Eastern Technical University of Sierra Leone (ETU–SL) use AI, how it influences their academic performance, and what challenges they face. A descriptive survey design with mixed methods was adopted, targeting 385 undergraduate students across faculties through stratified random sampling. Data were collected using questionnaires and interviews, then analyzed using descriptive and inferential statistics alongside thematic interpretation. The results revealed that Grammarly (26.8%) and ChatGPT (26.5%) were the most frequently used tools, primarily for writing support, grammar correction, and research summarization. Students reported significant improvements in writing quality (67%), time management (65%), and understanding of academic concepts (60%). Yet, challenges emerged: plagiarism risks (75%), infrastructural barriers such as poor internet and electricity (73%), and reduced originality (56%). The findings suggest that AI can be both a catalyst for academic growth and a threat to academic integrity, depending on how it is used. The study concludes by recommending institutional AI policies, student training on responsible usage, and investment in infrastructure to ensure equitable access.

Keywords: *Artificial Intelligence; Academic Performance; Digital Literacy; Higher Education; Sierra Leone.*

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I. INTRODUCTION

Education is undergoing rapid transformation in the digital era, and Artificial Intelligence (AI) sits at the heart of this revolution. Tools once seen as luxuries have now become companions for students, offering everything from grammar correction to research support. Globally, more than 60% of students report using AI tools at least once in their studies (UNESCO, 2023). While these technologies offer enormous benefits, they also spark concerns over plagiarism, reduced critical thinking, and inequities in access.

In Sierra Leone, AI adoption is still at an early stage, largely driven by individual student initiatives rather than institutional policies. ETU–SL provides an excellent case to explore the dual nature of AI: it empowers learning but also challenges traditional academic practices. This study examines how students are engaging with AI and what it means for their academic journey.

II. LITERATURE REVIEW

Globally, studies confirm AI's potential to improve writing quality, research efficiency, and personalized learning (Johnson, 2023; Nkosi, 2022). However, issues of academic dishonesty, overdependence, and misinformation remain pressing (Lee, 2023; Baker, 2023).

In Africa, AI adoption is uneven. Nigerian students benefit from grammar and plagiarism tools but face issues of misuse (Afolabi, 2022). In Ghana, reliance on paraphrasing tools often limits deep engagement (Mensah, 2023).

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In Sierra Leone, no major studies exist yet, though anecdotal evidence suggests growing AI use in universities, especially for writing assignments. The absence of institutional policies makes this study particularly important.

III. METHODOLOGY

This study used a descriptive survey with mixed methods. The target population was approximately 8,000 undergraduates at ETU–SL. Using Yamane's (1967) formula, a sample size of 385 students was selected through stratified random sampling.

Data collection instruments included questionnaires (covering demographics, extent of AI usage, perceived impact, and challenges) and interviews with selected lecturers and students. Reliability testing using Cronbach's Alpha yielded values ≥0.70, confirming consistency.

Analysis combined descriptive statistics (percentages, frequencies) with inferential tests (correlation and regression), while interview responses underwent thematic analysis.

Ethical approval was granted by ETU–SL's Department of Information Technology and Computer Science.

IV. RESULTS AND DISCUSSION

➢ *Demographic Distribution*

Table 1 presents the demographic characteristics of the 385 respondents. Most were degree students (62.6%), and third-year students dominated the sample (50.1%). Male students were more represented (64.7%) than females (33.8%).

Table 1. Demographic Distribution of Respondents

Category	Variable	Frequency	Percent (%)
Faculty	Business & Entrepreneurship Studies	85	22.1
	Development Agriculture & Natural Resources	23	6.0
	Education	69	17.9
	Engineering & Innovation	41	10.6
	Health Sciences & Disaster Management	87	22.6
	Pure & Applied Sciences	43	11.2
	Vocational & Skills Development	37	9.6
Total		**385**	**100.0**
Program	Certificate	30	7.8
	Diploma	114	29.6
	Degree	241	62.6
Total		**385**	**100.0**
Year of Study	Year 1	48	12.5
	Year 2	104	27.0
	Year 3	193	50.1
	Year 4	40	10.4
Total		**385**	**100.0**
Gender	Male	249	64.7
	Female	130	33.8
	Prefer not to say	6	1.6
Total		**385**	**100.0**

➢ *Extent of AI Usage*

Students reported diverse usage of AI tools. Grammarly and ChatGPT were most common, each used by more than a quarter of students.

Table 2. Frequently Used AI Tools

AI Tool	Frequency	Percent (%)
Grammarly	103	26.8
ChatGPT	102	26.5
Turnitin/Meta AI	80	20.8
Quillbot	50	13.0
AI Translation	32	8.3
Deepseek	10	2.6
Other/Combined	8	2.0
Total	**385**	**100.0**

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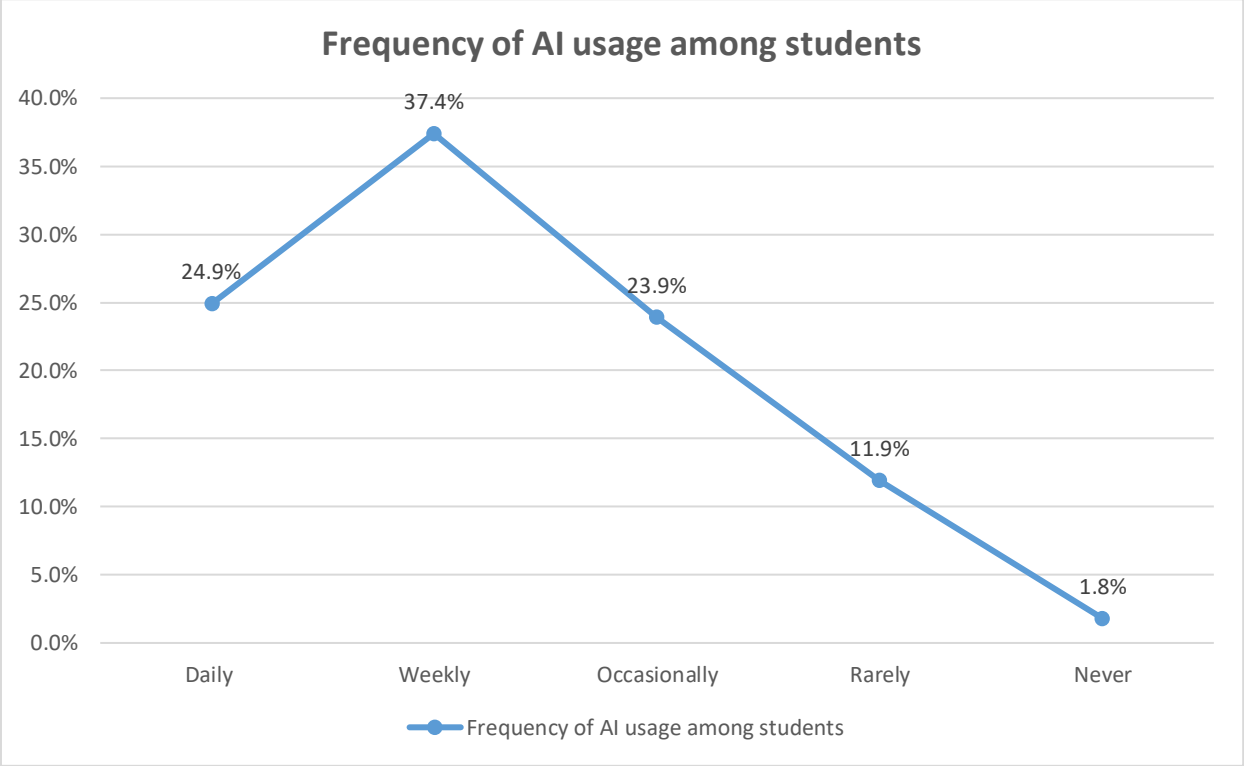
In terms of frequency of usage, 62% used AI daily or weekly.

Fig 1. Frequency of AI Usage Among Students



Purposes of use varied, with research/summarization and grammar correction leading.

Table 3. Purposes of AI Tool Usage

Purpose	Frequency	Percent (%)
Research/Summarization	112	29.1
Grammar/Spelling	100	26.0
Writing Assignments	68	17.7
Coding/Programming	45	11.7
Exam Preparation	26	6.8
Other/Combined	34	8.7
Total	**385**	**100.0**

➢ *Impact on Academic Performance*

AI was generally perceived as beneficial, especially in writing and time management.

Table 4. Perceived Impact of AI Tools on Academic Performance

Impact Area	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Improved writing quality	28.3%	38.7%	11.7%	11.7%	9.6%
Timely completion of assignments	25.7%	39.0%	18.2%	10.6%	6.5%
Enhanced understanding of concepts	23.9%	36.1%	15.3%	16.1%	8.6%
Better overall academic performance	22.6%	34.0%	12.5%	12.7%	18.2%

Around two-thirds of students believed AI improved their writing and efficiency, but one in five disagreed that it translated into overall better grades.

➢ *Challenges and Ethical Issues*

Students acknowledged serious concerns.

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Table 5. Challenges and Ethical Issues in AI Usage

Challenge/Issue	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Plagiarism risk	39.0%	35.8%	13.2%	7.8%	4.2%
Infrastructural challenges	19.7%	53.5%	10.4%	11.7%	4.7%
Reduced originality	20.3%	36.1%	25.2%	14.3%	4.2%
Lack of policy awareness	19.2%	29.6%	15.1%	28.6%	7.5%
Need for training	24.7%	31.7%	5.5%	6.2%	31.9%

Students are deeply aware of plagiarism risks and infrastructural limitations, but divided on whether training is necessary.

V. CONCLUSION

This study has shown that Artificial Intelligence is no longer a distant idea but a reality shaping the everyday academic lives of students at Eastern Technical University. For many, tools such as Grammarly and ChatGPT have become trusted companions, helping them write more clearly, manage their time better, and even understand difficult subjects that once felt overwhelming. Students see these tools as a source of support, almost like having a silent tutor at their side.

Yet, this new way of learning is not without its shadows. Alongside the benefits come serious concerns. The temptation to copy and paste AI-generated answers without thinking critically about them puts students at risk of plagiarism and academic dishonesty. The poor internet and electricity challenges faced in Sierra Leone make access unequal, leaving some students behind. There is also the worry that too much reliance on AI can dull creativity and weaken the very skills that education is meant to nurture, curiosity, problem-solving, and independent thinking.

What these findings tell us is simple but powerful: AI is here to stay, and the question is no longer whether students should use it, but how they should use it. Universities, lecturers, and policymakers have an important role to play in guiding this process. By creating clear policies, providing training, and investing in infrastructure, institutions can make sure that AI becomes a bridge to better learning, not a barrier to true education.

For Sierra Leone, this is more than just a university issue it is about preparing the next generation to thrive in a world where technology will define opportunity. If AI is embraced responsibly, it can empower students to compete globally, to think creatively, and to contribute solutions that the country and the world urgently need. But if left unchecked, it risks undermining the values of honesty, originality, and hard work that education stands for.

In the end, the story of AI at ETU–SL is a reminder that technology is only as good as how we choose to use it. With the right balance of innovation and integrity, AI can become a powerful tool for building not only smarter students, but also stronger societies.

RECOMMENDATIONS

- Policy Development: ETU–SL should establish clear guidelines for ethical AI use.
- Student Training: Workshops should be introduced to build AI literacy and promote responsible adoption.
- Infrastructure Investment: Better internet and power supply are critical for equitable access.
- Curriculum Integration: AI literacy should be embedded into courses to prepare students for a future where AI is unavoidable.

By taking these steps, Sierra Leone's universities can harness the promise of AI while safeguarding academic integrity and student creativity.

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