

Generative AI Changing Ghanaian Universities: New Challenges for Information Experts

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Abstract

The adoption of Generative Artificial Intelligence (GenAI) tools is rapidly transforming higher education worldwide; however, empirical research on their use in African universities remains limited. This study investigated GenAI adoption among postgraduate students in Ghana to inform ethical academic practices and the role of information professionals. A quantitative descriptive survey was conducted using structured questionnaires administered to 394 postgraduate students at the University of Ghana, Kwame Nkrumah University of Science and Technology, and the University of Cape Coast. The instrument demonstrated high reliability, with Cronbach's alpha coefficients ranging from 0.78 to 0.89, and ethical clearance was obtained from the Institutional Review Board of the University of Ghana. Findings revealed a high adoption rate, with 97.3% of respondents having used GenAI. ChatGPT was the most recognized and used platform (95.1% and 84.7%, respectively). Mobile phones were the primary access device (62.9%), reflecting their affordability and accessibility. The main drivers of GenAI use included ease of access (72.8%) and efficiency (72.2%), while unreliability of information was the main deterrent. Awareness of ethical considerations was high (83.7%), with plagiarism, misinformation, academic integrity, and copyright violations being key concerns. Payment restrictions (59.1%) and limited internet access (38.4%) were the primary challenges, and verification of GenAI outputs was inconsistent. The study concludes that GenAI offers significant opportunities for enhancing academic productivity, but its widespread adoption introduces challenges related to ethics, equity, and information reliability. For information professionals, the implications are clear: institutions should integrate AI literacy into information services, develop policies regulating GenAI use, and train students to critically evaluate AI-generated outputs.

Keywords: Generative Artificial Intelligence (GenAI); ChatGPT; Higher Education; Ghanaian Universities; Information Professionals.

INTRODUCTION

In the 21st century, the fast pace of digital evolution is transforming the way people interact, communicate, and learn. In the field of education, Information and Communication Technology (ICT) has become an essential tool for knowledge sharing, engagement, evaluation, and collaboration [24][51][2]. Artificial Intelligence (AI) is at the forefront of this transformation, enabling computers to perform complex tasks such as decision-making, problem-solving, and learning [12][44]. Within this domain, Generative Artificial Intelligence (GenAI) focuses on producing human-like content in the form of text, images, audio, and video through advanced language models and neural networks. Applications such as ChatGPT, DALL·E, and Google Bard are increasingly used for academic writing assistance, research summarization, coding support, translation, and idea generation [23][52][34][44].

Despite the significant opportunities associated with GenAI integration, challenges persist, particularly in African contexts where technological infrastructure and capabilities are still developing [57][53]. In the Ghanaian higher education system, the adoption of GenAI is increasing as students seek improved efficiency and academic performance in their studies and research [50]. Many students perceive GenAI as enhancing their academic outcomes [9][4][1]. However, concerns remain regarding plagiarism, authorship, overdependence on AI-generated content, and the potential erosion of critical thinking and analytical skills [16][20][40].

Additionally, limited understanding of ethical issues such as data privacy, content ownership, and algorithmic bias further complicates the integration of GenAI [6]. Gaps in digital literacy and institutional readiness also hinder effective adoption [37].

Globally, the post-COVID-19 surge in GenAI usage has intensified debates surrounding academic integrity, including cheating, plagiarism, and reduced independent thinking [17][35][32][46]. Existing studies have examined adoption patterns, ethical concerns, and learning dynamics among students [8][47][27][11][25], with evidence indicating high adoption rates, often within unclear or evolving policy frameworks [18].

In Africa, research remains limited, with insufficient understanding of GenAI among academics and underdeveloped policy frameworks [57][30][42]. In Ghana, the complexity of GenAI usage increases with students' academic levels, highlighting the need for stage-specific guidance and responsible use policies to ensure academic rigor and ethical compliance [19][7]. However, despite the growing adoption of GenAI among students, there is limited research on its implications for information professionals, including librarians and other experts responsible for teaching research skills, promoting digital literacy, and safeguarding academic integrity [42][41]. With the rapid transformation of information creation and retrieval driven by GenAI, these professionals face increasing pressure to adapt to evolving challenges in information literacy, instructional support, and policy development. This study therefore examines the adoption of GenAI among university students in Ghana and explores its implications for information professionals in terms of emerging roles, responsibilities, and preparedness to ensure ethical use and maintain academic integrity.

Objectives of the Study

The study is guided by the following specific objectives:

1. To examine the types of Generative AI (GenAI) applications or platforms that postgraduate students frequently use and explore variations in adoption across institutions.
2. To analyze the factors influencing postgraduate students' use of GenAI tools, including ease of access, efficiency, and socio-cultural conditions.
3. To evaluate postgraduate students' knowledge and perceptions of ethical issues associated with GenAI use, such as plagiarism, bias, and misinformation.
4. To investigate the challenges postgraduate students encounter in using GenAI tools and assess how these challenges affect their academic engagement and performance.

Theoretical Perspective

The study is anchored in the Unified Theory of Acceptance and Use of Technology (UTAUT) [31], which provides a robust framework for explaining users' intentions to adopt technology and predicting actual usage behavior. The model integrates several earlier theories of technology acceptance, including the Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), Theory of Planned Behaviour (TPB), and Innovation Diffusion Theory (IDT), into a comprehensive approach for understanding technology engagement. UTAUT identifies four core constructs that determine technology adoption: performance expectancy, effort expectancy, social influence, and facilitating conditions.

Performance expectancy refers to the degree to which an individual believes that using a system will enhance performance, incorporating perceived usefulness and relative advantage [14][31]. Effort expectancy relates to the perceived ease of use and complexity of a system, which influences the willingness to adopt technology [31]. Social influence captures the extent to which individuals perceive those important others believe they should use a particular system, including subjective norms and social pressures [31]. Facilitating conditions refer to the availability of organizational and technical infrastructure to support system use, including resources, compatibility, and behavioral control [31]. The model further incorporates four moderating variables gender, age, experience, and voluntariness of use which influence the strength of relationships between the core constructs and technology adoption. These moderators highlight the role of demographic and contextual factors in shaping user behavior.

In the context of this study, UTAUT provides a useful lens for examining how university students in Ghana adopt and use Generative Artificial Intelligence (GenAI) tools, as well as the benefits and challenges associated with their usage. Additionally, the framework helps to explain how information professionals, particularly librarians, can support ethical and effective adoption, promote responsible use, safeguard academic integrity, and adapt to the evolving digital information environment. Figure 1 illustrates the UTAUT model, showing the relationships between the four core constructs, the moderating variables, and their influence on behavioral intention and actual use behavior.

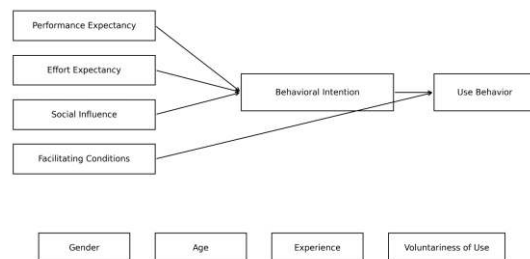


Figure 1: Unified Theory of Acceptance and Use of Technology (UTAUT) Model

Source: Venkatesh et al., 2003

LITERATURE REVIEW

Concept of Generative Artificial Intelligence (GenAI)

Generative Artificial Intelligence (GenAI) represents a significant advancement in the field of artificial intelligence, enabling the autonomous generation of text, images, audio, and video through deep learning models such as neural networks [10]. Existing literature highlights its capacity to replicate human creativity and enhance academic practices [1]. However, much of this scholarship remains descriptive rather than evaluative, often emphasizing benefits without critically examining potential drawbacks. For instance, although GenAI is widely recognized for supporting research and writing processes, there is limited critical analysis of its

impact on students' independent thinking and the risks of overdependence on machine-generated content. Furthermore, most existing studies are situated in Western contexts, leaving a gap in understanding its adoption within African higher education systems, where infrastructural and socio-economic conditions differ significantly. This study addresses this gap by focusing on postgraduate students in Ghana.

Types of GenAI Applications

Research on GenAI applications identifies a wide range of models, including task-agnostic systems such as Generative Adversarial Networks (GANs), diffusion models, and Variational Autoencoders (VAEs), as well as general-purpose large language models (LLMs) such as GPT, LLaMA, and PaLM 2 [25]. Despite this diversity, existing studies often lack critical evaluation of the suitability of these technologies for educational purposes. For example, while GANs and diffusion models are highly effective for image generation, their relevance to academic writing and research support remains limited. Conversely, LLMs are widely used for text-based tasks but raise concerns related to bias, misinformation, and limited transparency in reasoning processes. Another limitation of current scholarship is its strong focus on technical explanations rather than empirical investigation of actual usage among students and educators. This creates a gap between theoretical capabilities and practical adoption. By examining real-life experiences of postgraduate students using GenAI tools such as ChatGPT and similar platforms, this study bridges this gap by providing empirical insights into actual usage patterns.

Usage and Benefits of GenAI in Higher Education

GenAI is increasingly viewed as a transformative force in higher education, with potential applications in personalized learning, innovative assessment methods, and administrative efficiency. Empirical studies indicate that GenAI is primarily used for cognitive learning strategies, such as explaining complex concepts and summarizing information, while metacognitive uses, including self-regulation, remain less common [49]. Systematic reviews highlight its potential to reshape personalized learning and assessment practices [21]. However, such reviews often synthesize existing claims without direct empirical validation, leaving real-world adoption patterns insufficiently explored. Other studies reveal mixed student perceptions, combining enthusiasm with concerns about overreliance and the implications for academic value and integrity [11]. High levels of usage have also been reported, with a significant proportion of students using GenAI tools frequently and intending to continue usage [27]. While this indicates deep integration into academic routines, it also raises questions about dependency and its effects on critical thinking. In the African context, conceptual studies suggest that GenAI could transform teaching and learning processes by reducing cognitive workload and enhancing instructional delivery [40]. However, such claims are often theoretical and lack empirical validation.

Factors that Influence Students' Use of GenAI

Several factors influencing GenAI adoption have been identified across different contexts. Institutional readiness, perceived benefits, and cultural acceptance have been found to significantly affect adoption patterns [28]. However, studies relying on institutional-level data may overlook individual student experiences. Perceived usefulness and ease of use remain key predictors of adoption, consistent with established technology acceptance models [4]. Cost has also been identified as a potential barrier, particularly in resource-constrained settings. Interestingly, some studies report that factors such as information accuracy and hedonic motivation may not significantly influence adoption intentions, while others highlight their importance, indicating contextual variation [48]. Further research reveals cultural differences in adoption patterns, including variations in tool preferences and usage behaviors, alongside similarities in ethical concerns [56]. Regional studies emphasize the importance of digital literacy and infrastructural differences in shaping adoption [26]. In African contexts, factors such as trust, social influence, effort expectancy, and performance expectancy have been found to significantly influence behavioral intention, alongside price value and facilitating conditions [38]. Similar findings in other developing regions highlight the importance of trust and social networks in shaping technology adoption [43]. These findings suggest that determinants of GenAI adoption vary significantly across contexts, with social and trust-related factors playing a more prominent role in developing environments.

Challenges Faced by Students in the Use of GenAI

The literature identifies a wide range of challenges associated with the use of GenAI in higher education. Structural issues such as inequality and bias have been highlighted, including disparities in access and the potential reinforcement of existing socio-economic inequalities [22]. These challenges raise concerns about the widening digital divide if access remains uneven. Other studies identify key issues such as plagiarism, accountability, privacy, safety, bias, and the potential loss of essential soft skills [36]. However, much of this evidence is based on secondary data, limiting insights into actual student experiences. Beyond structural challenges, social and psychological concerns have also been reported. The use of GenAI may lead to stigma, with users perceived as less capable or independent [33]. Overreliance on AI tools has been associated with reduced autonomy, diminished critical thinking, and concerns related to accuracy, intellectual property, and data privacy [55]. Ethical concerns, including academic integrity and overdependence, remain central to ongoing debates about GenAI in education [54]. In developing contexts, these challenges are compounded by infrastructural limitations such as poor internet connectivity and limited access to digital devices, which disproportionately affect marginalized students. Additionally, the lack of representation in AI training data may further disadvantage underrepresented groups.

If unaddressed, these challenges may hinder the effective and equitable integration of GenAI in higher education, particularly in developing countries.

METHODS

The research utilized a quantitative methodological approach with a descriptive survey design to provide a thorough insight into the usage trends, perceptions, and professional impacts of GenAI. Quantitative data were collected using structured questionnaires administered to postgraduate students at the University of Ghana (UG), Kwame Nkrumah University of Science and Technology (KNUST), and the University of Cape Coast (UCC), which were chosen based on their technological advancement and varied academic settings. The target population for the research consisted of 28,355 postgraduate students, and the sample size of 394 was calculated using the Yamane formula, with simple random sampling methods used to ensure equal representation of the population in the three institutions. To improve the reliability and validity of the research, a pilot test was conducted among 30 postgraduate students, which assisted in modifying the wording and structure of the items, and content validity was established through expert reviews. Reliability was determined by the Cronbach alpha values for the multi-item scales used to measure the usage patterns, perceptions, and ethical issues related to GenAI, which ranged from 0.78 to 0.86, indicating satisfactory internal consistency. Construct validity was established by factor analysis, which revealed suitable item loading on their respective factors. The quantitative information gathered was coded and analyzed using the Statistical Package for Social Sciences (SPSS), where descriptive statistics such as frequencies, percentages, and means were employed to describe demographic information and general usage trends, while inferential statistics such as Chi-Square tests of independence and Analysis of Variance (ANOVA) were used to explore relationships and differences among institutions in terms of students' perceptions, experiences, and issues encountered in the use of GenAI. The results were displayed in tables and figures to make them clearer and easier to interpret, and the reliability and validity tests carried out ensured that one was confident in the results. This study was carried out in line with the required ethical standards for research involving human subjects.

Approval was sought from the Institutional Review Board (IRB) of the University of Ghana, Legon, through the College of Education Ethics Committee (Approval Reference No.: UG-CE/IRB/2025/014). Furthermore, approval was sought from the relevant authorities at Kwame Nkrumah University of Science and Technology (KNUST) and the University of Cape Coast (UCC) to conduct the questionnaires among postgraduate students. Taking part in the study was voluntary, and all respondents gave their consent. Anonymity and confidentiality were guaranteed, and no personal details were required. This helped ensure that the rights, privacy, and well-being of the participants remained protected throughout the research process.

RESULTS

Demographic Characteristics of Respondents

The survey targeted respondents from three of the biggest Ghanaian universities: KNUST, UG, and UCC. The largest number of respondents came from KNUST (39.0%), followed by UG (35.4%) and UCC (25.6%). The gender representation for the three institutions was relatively balanced, with a slight male dominance (51.2%) over female respondents (48.4%). However, UG had the highest number of female respondents, UCC had more males, and KNUST had roughly equal numbers. As for age, the largest number of respondents (45.0%) were 33 years and above, indicating a mature population, while only 5.2% were aged 18-22 years. This was true for all three institutions, with UCC having the highest number of older respondents. Finally, most respondents (61.0%) were pursuing MA/MSc/MPH degrees, indicating a robust postgraduate population. PhD students comprised the smallest group (6.3%). KNUST had the largest number of students pursuing MA/MSc, while UCC had a substantial number of students pursuing MPhil alongside MA/MSc. Finally, the analysis of the field of study showed that the largest number of respondents (33.0%) were from the Social Sciences, followed by Business (27.0%). The Fine Arts had the lowest number (4.9%). KNUST had the largest number of students from Business and STEM fields, while UCC had a substantial number of students from the Social Sciences and Education fields. UG also had a substantial number of students from the Social Sciences.

Table 1: Demographic Characteristics of Respondents by Institution

Variable	Category	KNUST (n=143)	UCC (n=94)	UG (n=130)	Total (%)
Gender	Male	72 (50.3%)	52 (55.3%)	64 (49.2%)	188 (51.2)
	Female	71 (49.7%)	42 (44.7%)	66 (50.8%)	179 (48.8)
Age	18-22 yrs	10 (7.0%)	5 (5.3%)	4 (3.1%)	19 (5.2)
	23-27 yrs	50 (35.0%)	12 (12.8%)	30 (23.1%)	92 (25.1)
	28-32 yrs	29 (20.3%)	24 (25.5%)	38 (29.2%)	91 (24.8)
	33+ yrs	54 (37.8%)	53 (56.4%)	58 (44.6%)	165 (45.0)
Academic Level	MA/MSc	104 (72.7%)	45 (47.9%)	75 (57.7%)	224 (61.0)
	MBA/EMBA/MPA	15 (10.5%)	4 (4.3%)	14 (10.8%)	33 (9.0)
	MPhil	17 (11.9%)	41 (43.6%)	29 (22.3%)	87 (23.7)
Field of Study	PhD	7 (4.9%)	4 (4.3%)	12 (9.2%)	23 (6.3)
	STEM	49 (34.3%)	7 (7.4%)	16 (12.3%)	72 (19.6)
	Business	56 (39.2%)	19 (20.2%)	24 (18.5%)	99 (27.0)
	Social Sciences	23 (16.1%)	40 (42.6%)	58 (44.6%)	121 (33.0)
	Fine Arts	9 (6.3%)	1 (1.1%)	8 (6.2%)	18 (4.9)
	Education	6 (4.2%)	27 (28.7%)	24 (18.5%)	57 (15.5)

Type of GenAI Applications or Platforms Students Frequently Use

The results show that there is a high adoption rate of Generative AI (GenAI) applications among the students in the three selected institutions. In general, 97.3% of the respondents admitted to having used GenAI applications in the past, with UCC adopting GenAI applications at 100%, UG at 96.9%, and KNUST at 95.8%. The remarkably low percentage of non-users indicates a high degree of awareness and adoption of GenAI applications in academic circles. The students got aware of GenAI applications from social media (83%) and friends/peers (55.6%), indicating the informal means of awareness creation. In awareness, ChatGPT was the most recognized application (95.1%), followed by Meta AI (75.5%), Google Bard/Gemini (43.6%), and Microsoft Copilot (42.2%). Although ChatGPT had near universal awareness, there were differences among the institutions, with UG having the highest awareness of ChatGPT and KNUST having relatively higher awareness of Microsoft Copilot. ChatGPT was the most widely used GenAI tool (84.7%), followed by Meta AI (45%), Microsoft Copilot (21.8%), and Google Bard/Gemini (19.6%). UG reported the highest

percentage of students who frequently used ChatGPT and Copilot, while UCC reported a stronger affinity for Meta AI. The findings are consistent with ChatGPT's popularity but also reflect institutional differences in tool preference. Knowledge levels were not uniform across institutions. Almost half the respondents (47.5%) assessed themselves as knowledgeable about GenAI, with UCC being the institution where all respondents reported some level of knowledge. KNUST, however, reported a significant percentage of students who claimed to be very knowledgeable. Frequency of use is another area that exemplifies the integration of GenAI into the lives of students. Approximately 44.4% of the respondents used GenAI daily, while 28-34% used it on a weekly basis. The UG and KNUST had the highest level of daily usage, while UCC had relatively balanced levels of both daily and weekly usage. The use of GenAI applications was mainly done through mobile phones (62.9%), followed by laptops/desktops (34.3%). The use of tablets (1.4%) and wearable technology (0.5%) was minimal. This is an indication of the mobile-first approach to technology adoption among Ghanaian students, where mobile phones are the main entry point for GenAI applications.

Table 2: Type of GenAI Applications or Platforms Students Frequently Use

Variable	Category	KNUST n (%)	UCC n (%)	UG n (%)	Total n (%)
Usage of GenAI	Yes	137 (95.8)	94 (100)	126 (96.9)	357 (97.3)
	No	6 (4.2)	0 (0.0)	4 (3.1)	10 (2.7)
How students learnt about GenAI	Social media	81 (56.6)	47 (50.0)	86 (66.2)	214 (58.3)
	Friends/Peers	69 (48.3)	53 (56.4)	82 (63.1)	204 (55.6)
	Lecturers/Academic sources	41 (28.7)	30 (31.9)	43 (33.1)	114 (31.1)
	Online tutorials/courses	45 (31.5)	23 (24.5)	36 (27.7)	104 (28.3)
GenAI applications heard of	Library orientation	8 (5.6)	11 (11.7)	12 (9.2)	31 (8.4)
	ChatGPT	138 (96.5)	82 (87.2)	129 (99.2)	349 (95.1)
	Meta AI	101 (70.6)	73 (77.7)	103 (79.2)	277 (75.5)
	Google Bard (Gemini)	59 (41.3)	42 (44.7)	59 (45.4)	160 (43.6)
	Microsoft Copilot	63 (44.1)	36 (38.3)	56 (43.1)	155 (42.2)
GenAI frequently used	Snapchat AI	43 (30.1)	24 (25.5)	44 (33.8)	111 (30.2)
	ChatGPT	122 (85.3)	77 (81.9)	112 (86.2)	311 (84.7)
	Meta AI	53 (37.1)	48 (51.1)	64 (49.2)	165 (45.0)
	Microsoft Copilot	23 (16.1)	23 (24.5)	34 (26.2)	80 (21.8)
	Google Bard (Gemini)	27 (18.9)	21 (22.3)	24 (18.5)	72 (19.6)
Knowledge of GenAI	Perplexity	20 (14.0)	11 (11.7)	28 (21.5)	59 (16.1)
	Extremely knowledgeable	8 (5.6)	8 (8.5)	8 (6.2)	24 (6.5)
	Very knowledgeable	44 (30.8)	12 (12.8)	20 (15.4)	76 (20.7)
	Knowledgeable	67 (46.9)	47 (50.0)	61 (46.9)	175 (47.7)
	Somewhat knowledgeable	21 (14.7)	27 (28.7)	39 (30.0)	87 (23.7)
Frequency of GenAI use	Not knowledgeable	3 (2.1)	0 (0.0)	2 (1.5)	5 (1.4)
	Daily	67 (46.9)	37 (39.4)	59 (45.4)	163 (44.4)
	Weekly	48 (33.6)	27 (28.7)	32 (24.6)	107 (29.2)
	Monthly	8 (5.6)	15 (16.0)	10 (7.7)	33 (9.0)
Devices used	Rarely	20 (14.0)	15 (16.0)	29 (22.3)	64 (17.4)
	Mobile phone	94 (65.7)	63 (67.0)	76 (58.5)	231 (62.9)
	Laptop/Desktop	47 (32.9)	28 (29.8)	52 (40.0)	126 (34.3)
	Tablet	1 (0.7)	2 (2.1)	2 (1.5)	5 (1.4)
	Wearable device	1 (0.7)	1 (1.1)	0 (0.0)	2 (0.5)

Association Between Students' Perceptions and Experiences of GenAI Use and Their Institutions

The inferential analysis was conducted to test whether the students' perceptions and experiences of the use of GenAI were significantly different between the three institutions, UG, KNUST, and UCC. The Chi-Square test results indicated that there were statistically significant differences in the students' perceptions of the benefits of GenAI ($\chi^2 = 12.45, p = 0.002$) and the difficulties involved in the use of GenAI ($\chi^2 = 7.63, p = 0.022$). This means that the students from the three institutions do not have a common perception about the benefits and difficulties of using GenAI. However, the test also showed that there was

no significant difference in the use of GenAI ($\chi^2 = 2.15, p = 0.342$), which means that although the students from the three institutions have different perceptions, they use GenAI tools at similar rates.

Table 3: Chi-Square Test Results on Students' Perceptions of GenAI Use by Institution

Variable	Institution	χ^2 (Chi-Square)	df	p-value
Perceived Benefits of GenAI	UG, KNUST, UCC	12.45	2	0.002
Challenges of GenAI Use	UG, KNUST, UCC	7.63	2	0.022
Frequency of GenAI Use	UG, KNUST, UCC	2.15	2	0.342

The ANOVA test further supported the existence of differences among the institutions in students' perceptions of GenAI. Significant differences were found in the respondents' perceptions of the benefits

($F = 5.72, p = 0.004$) and challenges ($F = 4.05, p = 0.019$) posed by the use of GenAI. This implies that the students' experiences with what GenAI has to offer, as well as the challenges they face, are institution-dependent. However, the results for the frequency of use ($F = 1.15, p = 0.319$) were not statistically significant, and thus, despite the differences in perceptions, the students in the three institutions use GenAI tools at a similar frequency.

Table 4: ANOVA Results on Students' Perceptions of GenAI Use by Institution

Variable	Sum of Squares	df	Mean Square	F	p-value
Perceived Benefits of GenAI	24.56	2	12.28	5.72	0.004
Challenges of GenAI Use	18.34	2	9.17	4.05	0.019
Frequency of GenAI Use	6.45	2	3.22	1.15	0.319

Factors influencing the use of GenAI by Students

The second objective was to identify the factors that shape the use of GenAI by students. Table 4.6 above provides a comprehensive list of these factors, which include motivations, reasons for discontinuing, main uses, frequency of use, perceptions of performance improvement, efficiency of assignments, ease of use, peer influence, and trust. The results show that the use of Generative Artificial Intelligence (GenAI) by students is largely shaped by convenience and performance considerations. Ease of access was the most important motivation, with 267 students (72.8%), followed closely by efficiency and speed, which were identified by 265 students (72.2%).

Table 5: Factors Influencing the Use of GenAI by Students

Variable	Category	KNUST n (%)	UCC n (%)	UG n (%)	Total n (%)
Motivation to Use GenAI	Ease of access	99 (69.2)	70 (74.5)	98 (75.4)	267 (72.8)
	Efficiency/speed	103 (72.0)	61 (64.9)	101 (77.7)	265 (72.2)
	Free accessibility	75 (52.4)	45 (47.9)	50 (38.5)	170 (46.3)
	Academic pressure	58 (40.6)	44 (46.8)	64 (49.2)	166 (45.2)
	Curiosity	50 (35.0)	28 (29.8)	45 (34.6)	123 (33.5)
Discontinuation Factors	Org. support/infrastructure	24 (16.8)	8 (8.5)	23 (17.7)	55 (15.0)
	Lecturers/school authorities	25 (17.5)	7 (7.4)	9 (6.9)	41 (11.2)
	Peer influence	13 (9.1)	10 (10.6)	8 (6.2)	31 (8.4)
Primary Uses of GenAI	If unreliable	116 (81.1)	78 (83.0)	108 (83.1)	302 (82.3)
	If paid	78 (54.5)	40 (42.6)	58 (44.6)	176 (48.0)
	If banned by university	44 (30.8)	39 (41.5)	40 (30.8)	123 (33.5)
Frequency of GenAI for Academic Use	Academic research	119 (83.2)	80 (85.1)	106 (81.5)	305 (83.1)
	Idea generation	88 (61.5)	53 (56.4)	87 (66.9)	228 (62.1)
	Writing assignments/essays	83 (58.0)	53 (56.4)	71 (54.6)	207 (56.4)
	Content creation	26 (18.2)	22 (23.4)	34 (26.2)	82 (22.3)
	Social media engagement	28 (19.6)	11 (11.7)	37 (28.5)	76 (20.7)
GenAI improves academic performance	Programming/coding	28 (19.6)	11 (11.7)	20 (15.4)	59 (16.1)
	Always	54 (37.8)	40 (42.6)	41 (31.5)	135 (36.8)
	Sometimes	74 (51.7)	43 (45.7)	73 (56.2)	190 (51.8)
GenAI helps complete assignments efficiently	Rarely	15 (10.5)	11 (11.7)	16 (12.3)	42 (11.4)
	Agree	76 (53.1)	56 (59.6)	56 (43.1)	188 (51.2)
	Strongly agree	23 (16.1)	19 (20.2)	25 (19.2)	67 (18.3)
Ease of learning/using GenAI	Neutral	35 (24.5)	13 (13.8)	36 (27.7)	84 (22.9)
	Disagree/Strongly disagree	9 (6.3)	6 (6.4)	13 (10.0)	28 (7.6)
	Agree	75 (52.4)	50 (53.2)	60 (46.2)	185 (50.4)
	Strongly agree	23 (16.1)	22 (23.4)	28 (21.5)	73 (19.9)
	Neutral	32 (22.4)	15 (16.0)	27 (20.8)	74 (20.2)
Peer influence	Disagree/Strongly disagree	13 (9.1)	7 (7.4)	15 (11.5)	35 (9.5)
	Agree	91 (63.6)	58 (61.7)	70 (53.8)	219 (59.7)
	Strongly agree	28 (19.6)	17 (18.1)	36 (27.7)	81 (22.1)
	Neutral	18 (12.6)	16 (17.0)	19 (14.6)	53 (14.4)
	Disagree/Strongly disagree	6 (4.2)	3 (3.2)	5 (3.9)	14 (3.8)
Trust in GenAI outputs	Neutral	40 (28.0)	29 (30.9)	43 (33.1)	112 (30.5)
	Disagree/Strongly disagree	54 (37.8)	37 (39.4)	55 (42.3)	146 (39.8)
	Agree/Strongly agree	49 (34.3)	28 (29.8)	32 (24.6)	109 (29.7)
Trust in GenAI outputs	Neutral	67 (46.9)	42 (44.7)	64 (49.2)	173 (47.1)
	Agree/Strongly agree	65 (45.5)	43 (45.7)	46 (35.4)	154 (41.9)
	Disagree/Strongly disagree	11 (7.6)	9 (9.6)	20 (15.3)	40 (10.9)

Free accessibility was identified by 170 students (46.3%), and academic pressure by 166 students (45.2%). On the other hand, unreliability was the most important reason for discontinuing the use of GenAI, with 302 students (82.3%) indicating that they would stop using GenAI if it became unreliable, compared to 176 students (48.0%) who would stop due to paid accessibility and 123 students (33.5%) who would stop due to institutional bans. The main purpose of using GenAI was academic research, as indicated by 305 participants (83.1%), followed by idea generation, writing assignments, and content creation, with 228 (62.1%), 207 (56.4%), and 82 (22.3%) participants, respectively. Based on usage rate, most participants used GenAI "sometimes," which accounted for 190 participants (51.8%), followed by "always" used by 135 participants (36.8%), and "rarely" used by 42 participants (11.4%). Most participants agreed that GenAI enhances the efficiency of assignments, as indicated by 185 participants (50.4%), of whom 73 (19.9%) strongly agreed. Similarly, 219 participants (59.7%) agreed that GenAI tools are easy to learn and use, of whom 81 (22.1%) strongly agreed. Peer influence was minimal, as indicated by 112 participants (30.5%), who were neutral, and 105 (28.6%), who disagreed that peers influenced their use. Trust in the information generated by GenAI was moderate, as indicated by 173 participants (47.1%), who were neutral, and 135 (36.8%), who agreed.

Knowledge of Ethical Issues Regarding GenAI Usage

The third objective was to assess the knowledge of the students on the ethical issues surrounding the application of Generative Artificial Intelligence (GenAI). The findings show a high degree of knowledge among the three universities selected, with 307 students (83.7%) claiming to be aware, as opposed to 60 (16.3%) who claimed otherwise. At KNUST, 119 (83.2%) were aware, 81 (86.2%) at UCC, and 107 (82.3%) at UG. The major ethical issue was plagiarism, identified by 317 students (86.4%), followed by misinformation by 208 students (56.7%), academic dishonesty by 203 students (55.3%), and copyright infringement by 153 students (41.7%). At UCC, the major concern was plagiarism, identified by 86 students (91.5%), followed by academic dishonesty by 58 students (61.7%), while at UG, the concern was relatively greater for misinformation by 80 students (61.5%), and at KNUST, the concern was greater for copyright infringement by 59 students (41.3%).

Turning to the verification of information produced by GenAI, a majority indicated doing so at least occasionally. To be specific, 141 (38.4%) indicated “sometimes,” 109 (29.7%) “always,” 54 (14.7%) “often,” 48 (13.1%) “rarely,” and 15 (4.1%) “never.” Slightly differing by university, the highest percentage of “always” verification was found at UG, with 52 (40.0%), followed by UCC with 34 (36.2%), indicating “sometimes” as the most frequent, and then KNUST with 61 (42.7%) respondents. Finally, there is overwhelming support for the establishment of institutional policies regarding the use of GenAI. To be specific, 310 (84.5%) supported the establishment of policies, while 57 (15.5%) were opposed. At KNUST, 119 (83.2%) supported policies, at UCC 80 (85.1%), and at UG 111 (85.4%). This shows an overwhelming consensus across all institutions on the need for formal policies to ensure that GenAI is used ethically and responsibly in universities.

Table 6: Knowledge of Ethical Issues Regarding GenAI Usage

Variable	Category	KNUST n (%)	UCC n (%)	UG n (%)	Total n (%)
Awareness of Ethical Concerns	Yes	119 (83.2)	81 (86.2)	107 (82.3)	307 (83.7)
	No	24 (16.8)	13 (13.8)	23 (17.7)	60 (16.3)
Ethical Concerns Associated with GenAI	Plagiarism	119 (83.2)	86 (91.5)	112 (86.2)	317 (86.4)
	Misinformation	80 (55.9)	48 (51.1)	80 (61.5)	208 (56.7)
	Academic dishonesty	72 (50.3)	58 (61.7)	73 (56.2)	203 (55.3)
	Copyright infringement	59 (41.3)	41 (43.6)	53 (40.8)	153 (41.7)
	Data privacy concerns	44 (30.8)	32 (34.0)	47 (36.2)	123 (33.5)
Verification of Accuracy of GenAI Outputs	Always	25 (17.5)	32 (34.0)	52 (40.0)	109 (29.7)
	Often	29 (20.3)	12 (12.8)	13 (10.0)	54 (14.7)
	Sometimes	61 (42.7)	34 (36.2)	46 (35.4)	141 (38.4)
	Rarely	25 (17.5)	12 (12.8)	11 (8.5)	48 (13.1)
	Never	3 (2.1)	4 (4.3)	8 (6.2)	15 (4.1)
Support for Clear Policies on GenAI Use	Yes	119 (83.2)	80 (85.1)	111 (85.4)	310 (84.5)
	No	24 (16.8)	14 (14.9)	19 (14.6)	57 (15.5)

Challenges in Using GenAI

The research aimed to determine the challenges that students face when using Generative AI (GenAI) applications. The results show that the least accessible advanced functionality because of payment constraints, is the most dominant challenge in all institutions, cited by 59.1% of respondents. This challenge was consistent in all universities, with UG having the highest percentage (60.7%), followed by KNUST (58.7%) and UCC (57.4%). The second significant challenge is related to ethical issues, cited by 44.1% of respondents. Again, UG had the highest percentage of students complaining about ethical issues (47.7%), followed by UCC (45.7%) and KNUST (39.9%). The third significant challenge is the lack of internet access, which affects 38.4% of respondents in total, with UCC having the highest percentage (46.8%), followed by KNUST (37.8%) and UG (33.1%). Lastly, the challenge of inaccurate or biased information was cited by 34.9% of respondents, with UG (37.0%) and KNUST (34.3%) having slightly higher percentages than UCC (33.0%).

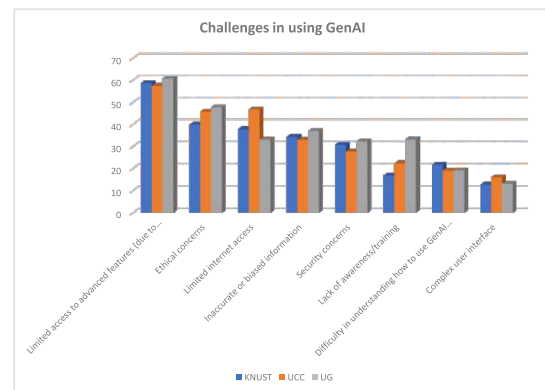


Figure 2: Challenges in using GenAI

Association Between Institutions and Challenges in Using GenAI

The chi-square test of independence was used to determine if the problems faced by students in using GenAI applications are significantly different between KNUST, UCC, and UG. The findings indicated that none of the problems such as limited access to advanced features, ethical issues, misinformation, security problems, difficulties in using tools, and complex interfaces were significantly different between the institutions ($p > 0.05$).

This suggests that these problems are shared by students across institutions, and students do not face any significant differences in these problems, irrespective of their institution. However, there was a statistically significant difference with respect to lack of awareness and training ($\chi^2 = 8.73$, $df = 2$, $p = 0.013$). This problem was more prevalent among UG students compared to their counterparts in KNUST and UCC, which suggests that while UG students are actively exploring GenAI, they may not have proper training or institutional support to use the technology effectively.

Table 8: Chi-Square Test of Association between Institutions and Challenges in Using GenAI

Challenge	χ^2 (Chi-square)	Df	N	p-value
Limited access to advanced features	0.42	2	367	0.811
Ethical concerns	2.75	2	367	0.253
Limited internet access	5.92	2	367	0.052
Inaccurate or biased information	1.27	2	367	0.530
Security concerns	0.89	2	367	0.641
Lack of awareness/training	8.73	2	367	0.013
Difficulty in using GenAI effectively	0.48	2	367	0.786
Complex user interface	0.67	2	367	0.713

*Significant at $p < 0.05$

DISCUSSIONS

Type of GenAI Applications or Platforms Students Frequently Use

The findings reveal a high adoption rate of Generative Artificial Intelligence (GenAI) tools among students, with many first encountering these technologies through social media and peer networks. This pattern reflects global trends, where positive attitudes and continued usage intentions have been widely reported [27][11]. In Ghana, similar patterns of integration have been observed within educational contexts, particularly in teacher training and academic support environments [40]. Among the various platforms, ChatGPT emerged as the most widely recognized and frequently used tool, followed by Meta AI, Microsoft Copilot, and Google Bard. The dominance of ChatGPT can be attributed to its ease of use, accessibility, and overall performance. These factors align with key constructs of the Unified Theory of Acceptance and Use of Technology (UTAUT), including performance expectancy, effort expectancy, facilitating conditions, and social influence. Additionally, features such as its freemium model, mobile compatibility, and widespread social visibility have further strengthened its adoption. Established technology adoption theories also support these findings, emphasizing the importance of perceived usefulness, relative advantage, and compatibility with user needs [14][45]. Access patterns indicate that mobile phones are the primary devices used to engage with GenAI tools. This reflects both affordability and the widespread penetration of smartphones in developing contexts. Such findings are consistent with existing research highlighting the influence of device availability and socio-cultural factors on technology adoption [20]. In terms of usage frequency, a substantial proportion of students reported daily engagement (44.4%), while others accessed these tools on a weekly basis (29.2%). This aligns with previous studies indicating high-frequency usage and sustained engagement with GenAI tools [27][49].

The regularity of usage can be explained by habit formation processes associated with repeated interaction with digital technologies [48]. However, this high level of engagement also raises concerns about overdependence and its potential impact on critical thinking skills. Prior research has highlighted the risks associated with excessive reliance on GenAI, including reduced cognitive engagement and diminished analytical abilities [55]. Variations in adoption patterns across different institutional contexts suggest that regulatory frameworks, ethical guidelines, and academic policies play a significant role in shaping usage behaviors [15]. Institutions with stricter policies tend to exhibit more controlled adoption patterns, reflecting the influence of governance structures on technology use. From the perspective of information professionals, GenAI tools particularly ChatGPT have become deeply embedded in postgraduate academic practices. Students increasingly rely on these tools not only as support mechanisms but, in some cases, as substitutes for independent effort, especially under time constraints. This aligns with findings that highlight the role of GenAI in simplifying complex academic tasks and supporting knowledge acquisition [29][27].

Factors Influencing the Use of GenAI by Students

The study found that the major factors influencing postgraduate students' use of Generative Artificial Intelligence (GenAI) include ease of access (72.8%), efficiency and speed (72.2%), and free accessibility (46.3%). Additional motivating factors include academic performance pressure and personal curiosity. These findings align with international studies that identify perceived usefulness, system readiness, and ease of use as key determinants of GenAI adoption [28][4][48]. They are also consistent with established theoretical frameworks such as the Unified Theory of Acceptance and Use of Technology (UTAUT), the Technology Acceptance Model (TAM), and the Diffusion of Innovations theory, all of which emphasize performance expectancy and effort expectancy as major drivers of technology adoption [14][45]. In the Ghanaian context, the importance of free accessibility reflects broader socio-economic conditions, where affordability significantly influences technology engagement. Similar patterns have been observed in other African contexts, where cost and access constraints shape digital technology adoption [20]. Despite the widespread use of GenAI, the perceived unreliability of information (82.3%) emerged as the most significant deterrent to continued usage. This concern reflects growing skepticism about the accuracy, credibility, and autonomy of AI-generated content, as documented in prior studies [11][55][15]. Although trust is not explicitly included as a core construct in UTAUT, extensions of the model (UTAUT2) recognize trust as a critical factor in sustaining technology use, particularly in contexts involving information uncertainty.

These findings suggest that while GenAI is widely perceived as useful and efficient, users still engage in critical evaluation of outputs, highlighting the need for cautious and informed use.

In terms of usage purpose, students primarily employ GenAI for academic research (83.1%), idea generation (62.1%), and assignment writing (56.4%). Most respondents reported that GenAI improves both academic performance and efficiency. These findings align with previous studies that emphasize GenAI's role in summarization, brainstorming, and supporting cognitive learning processes [29][35][13][49]. The Ghanaian results therefore reflect global trends in higher education, where GenAI is increasingly integrated into academic workflows and learning practices. From the perspective of information professionals, the use of GenAI among students is largely driven by convenience, time pressure, and academic workload demands. While this enhances productivity, it also raises concerns about overdependence and reduced engagement in metacognitive learning processes. Prior studies suggest that such reliance may undermine the perceived value of independent learning and academic integrity [40][11]. Additionally, excessive dependence on GenAI may lead to the perception of reduced autonomy among students, potentially resulting in academic stigma [33]. Conversely, other perspectives argue that GenAI has the potential to significantly transform teaching and learning by enhancing access to knowledge and supporting academic development [21].

Knowledge of Ethical Issues Regarding GenAI Usage

The findings indicate a high level of awareness of ethical issues related to Generative Artificial Intelligence (GenAI) among postgraduate students, with 83.7% acknowledging potential risks associated with its use. The most frequently identified concerns were plagiarism (86.4%), misinformation (56.7%), and academic dishonesty (55.3%), followed by copyright infringement and data privacy issues. However, despite this high level of awareness, students' actual practices regarding verification of GenAI-generated content were inconsistent. While some students reported occasionally checking outputs for accuracy, a small proportion (4.1%) indicated that they never verify information generated by GenAI tools. This suggests a gap between awareness and critical engagement, highlighting the need for structured training and continuous awareness programmes to strengthen responsible usage. Notably, students expressed strong support for the development of institutional guidelines on the ethical use of GenAI. This reflects a collective recognition of the importance of formal policies in promoting academic integrity and regulating emerging technologies in higher education. These findings are consistent with existing literature, which identifies plagiarism, privacy concerns, accountability, and data protection as major ethical challenges associated with GenAI use in academic settings [36][22]. Additional concerns such as bias, inequity, and data security have also been widely documented [22]. Similarly, concerns regarding overdependence on GenAI and its potential to devalue higher education have been reported in other contexts, particularly where academic integrity frameworks are still evolving [11].

The prominence of plagiarism as a key concern aligns with evidence suggesting that excessive reliance on AI tools may undermine student autonomy and academic authenticity [33].

Within the African context, studies have also highlighted widespread concerns about plagiarism among educators and the need for culturally appropriate policy frameworks to guide responsible AI integration in education systems [5]. The relatively weak verification practices observed among students may be attributed to limited digital literacy, insufficient institutional training, and the recent and largely unregulated introduction of GenAI tools in Ghanaian higher education. This gap underscores the urgent need for targeted AI literacy programmes in universities to bridge the divide between ethical awareness and responsible practice. From a theoretical perspective, these findings align with the Unified Theory of Acceptance and Use of Technology (UTAUT). Social influence is evident in students' recognition of plagiarism and academic integrity as reflections of institutional norms and expectations. Facilitating conditions are also relevant, as the absence of clear policies, structured training, and monitoring mechanisms was identified as a key institutional gap. Therefore, the establishment of comprehensive guidelines, training programmes, and monitoring systems is essential to promote ethical behaviour and ensure the responsible use of GenAI in higher education.

Challenges in Using GenAI

The study identified several challenges affecting the effective use of Generative Artificial Intelligence (GenAI) among postgraduate students. The most significant challenge was limited access to advanced features due to payment requirements, reported by 59.1% of respondents. This was followed by ethical concerns (44.1%), limited internet access (38.4%), and the possibility of inaccurate outputs (34.9%). Other challenges included security concerns, lack of awareness and training, difficulties in using GenAI tools, and the complexity of user interfaces. The issue of affordability reflects broader socio-economic conditions in developing contexts. Similar findings have highlighted cost and equity as major determinants of technology adoption in resource-constrained environments [4][20]. In contrast, studies in more developed settings suggest that factors such as performance expectancy and habit may outweigh cost considerations in influencing adoption [48]. Ethical concerns, particularly plagiarism and academic integrity, align with global research that identifies these issues as central challenges in the use of GenAI in education [36][55][11]. Regional studies have also emphasized similar concerns, highlighting the need for culturally sensitive policies to regulate responsible AI use in academic settings [5]. Infrastructure-related challenges, especially limited internet access, are consistent with evidence from developing regions, where connectivity constraints significantly affect digital tool usage among students [20].

Issues related to accuracy and bias also reflect broader global concerns, with research indicating a general lack of trust in GenAI-generated outputs among students [15]. Additional challenges such as security risks, inadequate training, and system complexity further highlight the need for structured AI literacy programmes and institutional support systems [37][42]. These findings suggest that successful integration of GenAI in higher education requires more than access to tools; it requires capacity building and institutional readiness. From a theoretical perspective, these challenges are well explained by the Unified Theory of Acceptance and Use of Technology (UTAUT). Facilitating conditions are particularly relevant, as infrastructural and institutional limitations serve as major barriers to effective use. Effort expectancy is reflected in the complexity of tools and lack of user support, which affects ease of adoption. Performance expectancy is influenced when users perceive GenAI outputs as inaccurate or biased, reducing trust in the technology. Social influence is also evident, particularly in ethical concerns related to plagiarism and academic misconduct, which are shaped by institutional norms and academic expectations.

CONCLUSION

The quick pace of technological change has resulted in the widespread use of Generative Artificial Intelligence (GenAI) tools in higher education. These tools are transforming the way students engage with learning, research, and academic work by providing rapid and tailored assistance and facilitating effective problem-solving. The use of these tools is impacted by factors such as usability, performance, word-of-mouth, and organizational factors. Yet, awareness of ethics is patchy, with concerns such as plagiarism, bias, and misinformation being major risks. Although GenAI presents many opportunities, challenges such as cost, limited internet access, and training are still present. The role of information professionals in this context is critical. Future studies should employ longitudinal research designs to examine the dynamics of students' adoption of GenAI over time, especially when university policies and AI literacy initiatives are more developed. Intervention studies can be conducted to assess the efficacy of training programs aimed at enhancing ethical understanding and critical engagement with GenAI outputs. Another area of interest would be to examine faculty views, as faculty members and instructors play a pivotal role in ensuring responsible adoption and integrating GenAI into the curriculum. Comparative research studies across various international settings would also be informative, shedding light on the impact of socio-economic factors, cultural values, and policy structures on adoption trends. In addition, research studies can examine the significance of differences in disciplines, investigating whether students pursuing STEM, business, or social science programs adopt GenAI differently and how these impacts learning outcomes. Lastly, research studies should examine the long-term implications of GenAI adoption on academic integrity, critical thinking, and professional preparedness, ensuring that GenAI adoption enhances rather than compromises higher education.

Universities should establish institutional policies on the use of GenAI, including guidelines on academic integrity, plagiarism, and ethical use. They should also invest in AI literacy training to enable students to critically assess the outputs. Information professionals, including librarians, should conduct training workshops on the responsible use of GenAI, adapting information literacy curricula to include AI literacy. Governments should establish national guidelines for AI integration in education, ensuring equal access to the technology and overcoming affordability issues. Infrastructure development is also important in overcoming connectivity issues in developing countries. This research contributes to the existing literature on GenAI in higher education institutions by providing evidence from Ghanaian universities, a region where there is a need for more empirical research. It also provides an insight into both the opportunities and challenges of GenAI adoption, with a focus on the role of information professionals in promoting ethical use. From a practical perspective, the results of this study are important in that they provide insights for universities and policymakers on the need for the development of policies and infrastructure support. From a theoretical perspective, the study is significant in that it applies the Unified Theory of Acceptance and Use of Technology (UTAUT) to the adoption of GenAI. This is important in that it shows how the constructs of performance expectancy, effort expectancy, social influence, and facilitating conditions influence the behavior of students.

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