



Assessing tertiary students' awareness, acceptance, and use of generative artificial intelligence as a tool for academic work

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Abstract

Generative Artificial Intelligence, such as ChatGPT, has garnered significant attention and profoundly impacted human lives in various ways, including the education sector. Higher education increasingly uses artificial intelligence (AI), which offers several advantages for revolutionizing teaching and learning. Despite the global call for GenAI and its wide potential benefits in education, a significant empirical gap remains in understanding how students specifically perceive, accept, and use GenAI tools in their academic work. The researchers employed a mixed-methods sequential explanatory design to investigate tertiary students' awareness, acceptance, and use of GenAI tools, such as ChatGPT and other AI-powered platforms, in their academic assignments. The study found a generally high level of acceptance of GenAI among tertiary students. Gender plays a significant role in the adoption and use of GenAI among Tertiary students. Age and degree type were statistically insignificant predictors of GenAI use among tertiary students. The tertiary students use GenAI tools for various tasks, including answering academic questions, Conducting Research, summarizing, Brainstorming and Idea Generation, generating academic ideas, Supporting Mathematics, and essay writing. The researchers recommend that tertiary institutions and stakeholders provide formal training and policies on the ethical use of GenAI in education.

Keywords:

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1. Introduction

Artificial intelligence has become an increasingly integral part of human life in recent years, driven by advancements in processing capabilities and the deployment of intelligent agents. Higher education students' increased use of artificial intelligence (AI) offers several advantages for the revolutionization of teaching and

learning. McCarthy, Minsky, Rochester, and Shannon (2006) a Stanford University professor, first coined the term Artificial Intelligence in 1955, defining it as “the science and engineering of making intelligent machines.” Artificial intelligence refers to the capacity of computers or computer programs to accurately replicate human behavior or natural intelligence (Mohammed & Nell'Watson, 2019). Often referred to as conversational GenAI bots, generative artificial intelligence chatbots are intelligent agents that can engage in discussions through voice or text, as if they were sentient entities. These chatbots have gained popularity in recent years, following the launch of ChatGPT in 2022, owing to their utility across domains such as personal support and education. Generative Artificial Intelligence (GenAI) can comprehend and interpret human language input by using natural language processing (NLP) techniques (Khanna, Kim, & Lu, 2015). According to Lokman and Ameen (2018) the appeal of GenAI is particularly evident among younger generations, who prefer concise communications for immediate, one-on-one connections.

This study aims to evaluate awareness, acceptance, and use of Generative Artificial Intelligence (GenAI) as a tool to enhance academic performance among tertiary students. This study investigates how students adopt and use GenAI tools, such as ChatGPT and other AI-powered platforms, in their academic assignments. By examining these factors, the researchers will assess tertiary students' awareness of the capabilities and potential applications of using GenAI in academic work. It also analyzes tertiary students' opinions on adopting GenAI for learning, including their openness and perceptions of the technology's potential to enhance academic productivity and achievement.

1.1. Research Problem and Significance of the Study

Generative Artificial Intelligence, such as ChatGPT, has garnered significant attention and profoundly impacted human lives in various ways, including the education sector. According to Fareed, Bou Nassif, and Nofal (2024) artificial intelligence (AI), such as GenAI, offers a range of options and serves as a transformative pedagogical tool that can change the face of education today. Despite the global call for GenAI and its wide potential benefits in education, a significant empirical gap remains in understanding how students specifically perceive, accept, and use GenAI tools in their academic work. In the Ghanaian context, where the study was conducted, the lack of empirical data on how students accept and use GenAI tools for academic work is a significant concern and a critical factor contributing to the challenges faced in the Ghanaian educational system. Furthermore, there is an inadequate nationwide policy framework governing the use of AI in Ghanaian tertiary institutions. The absence of empirical data on Ghanaian Tertiary students' awareness, factors influencing their acceptance, and usage patterns of GenAI for academic work remains significant concern for the Ghanaian higher education system. As a result of the urgent need for research and evidence-based data that can inform higher education stakeholders to develop practical, student-centric AI integration and policies in Ghana, the study will contribute to the literature on AI integration in higher education by assessing Ghanaian tertiary students' awareness, acceptance, and use of Generative Artificial Intelligence (GenAI) as a tool for enhancing academic work.

This research is significant in providing critical empirical evidence on the adoption of GenAI in Ghana's higher education context, informing educational stakeholders, university administrators, and policymakers about tertiary students' readiness, use, and challenges in integrating GenAI into academic work. Methodologically, employing a mixed-methods approach through both quantitative and qualitative methods enables readers to gain a more comprehensive understanding of the research problem and the study's findings.

1.2. Research Questions

To explore the topic comprehensively, combining quantitative and qualitative approaches, the research is guided by the following research questions.

1.2.1. Qualitative Research Questions

1. Are tertiary students aware of using Generative AI (GenAI) tools and applications in their academic work?

1.2.2. Quantitative Research Questions

2. What is the level of acceptance of tertiary students of Generative AI (GenAI) as a tool for academic tasks?
3. What factors determine tertiary students' usage of GenAI as a tool for enhancing academic work?

1.2.3. Integration Research Question

4. How do tertiary students' level of awareness and acceptance contribute to their usage of GenAI as a tool for enhancing academic work?

2. Literature Review

2.1. History of Artificial Intelligence (AI)

Artificial intelligence (AI), according to [Haenlein and Kaplan \(2019\)](#) is generally understood to be "a system's ability to interpret external data correctly, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation." Advancements in artificial intelligence have led to the introduction of self-driving cars, smart speakers, and image recognition technology. AI's first recognition as an area of study dates to the 1950s, but for over 50 years, scientists have largely overlooked it, resulting in limited practical applications. Large-scale data has also become a focal topic of discussion in both the public and business spheres, primarily due to its rapid growth and its role in advancing artificial intelligence. [Haenlein and Kaplan \(2019\)](#) stated that, depending on the cognitive, emotional, and social intelligence it demonstrates, artificial intelligence (AI) can be divided into three categories: human-inspired, analytical, and humanized. The foundations of artificial intelligence can be traced to the 1940s, specifically to 1942, when American science fiction author Isaac Asimov published the novel "Runaround" ([Haenlein & Kaplan, 2019](#)). The story of Runaround is centered on the Three Laws of Robotics and the development of a robot by engineers Mike Donovan and Gregory Powell. In 1950, the English mathematician Alan Turing wrote a groundbreaking article titled "Computing Machinery and Intelligence." In the paper, Turing explained how intelligent machines could be built and, more specifically, demonstrated how to assess their intelligence using the [Turing \(2009\)](#). The Turing Test remains a standard for determining whether an artificial system is intelligent.

In the Turing Test, if a human interacting with a machine and another human cannot tell the difference, then the machine is considered intelligent. In 1956, six years after the Turing Test, Marvin Minsky and Stanford computer scientist John McCarthy organized the Dartmouth Summer Research Project on Artificial Intelligence (DSRPAI) at Dartmouth College in New Hampshire for eight weeks, marking the first time the term "artificial intelligence" was employed ([McCarthy et al., 2006](#)). DSRPAI aims to reunite scholars from various disciplines to establish a new field of study focused on creating machines that can mimic human intelligence.

Despite the growth, applications, and increasing interest in AI, significant challenges and difficulties existed in its early years of development. In 1973, three years after the DSRPAI, the U.S. Congress strongly condemned excessive spending on AI research. James Lighthill, a British mathematician, also questioned the rosy prognosis provided by AI researchers in a paper he published that same year. AI critics, such as Lighthill, argued that robots would never have the capability to reason in a common-sense way and would only ever be able to match the performance of an "experienced amateur" at chess.

2.2. The Era of Generative Artificial Intelligence (GenAI)

Deep Learning and artificial neural networks are the foundation for most applications categorized as artificial intelligence. Smart speakers, self-driving cars, and image recognition algorithms used by numerous social media platforms rely on AI speech recognition as their foundation. The advent of deep learning and machine learning in the early 2000s has made significant strides, enabling computers to comprehend and interpret data in various formats, including text, images, audio, and video. Large information technology companies aggressively advanced artificial intelligence by leveraging computing power to solve complex problems. Large datasets and growing confidence in machine learning algorithms have made it easier to implement artificial intelligence systems in real-world settings, thereby improving user experiences. The ability of GenAI to process complex instructions and provide human-like output has sparked increased study and interest in integrating these technologies across various industries, including education. This development has opened new avenues for research into how students use and benefit from AI tools in the classroom. Following the launch of ChatGPT, a Generative Pre-trained Transformer platform in 2022, the AI market has expanded rapidly ([Teubner, Flath, Weinhardt, Van Der Aalst, & Hinz, 2023](#)). Through ChatGPT's interactive interface, users can explore and access research advances in developing conversational agents using sophisticated large language models (LLMs) for multi-turn conversations.

2.3. Artificial Intelligence in Education

Despite the long history of research in Artificial Intelligence in Education (AIED), the recent integration of AI into education has sparked significant global debate. The involvement of artificial intelligence in education dates back many decades, with a history of bridging emerging technologies with educational theories. As the AI field expanded in the 1990s and 2000s, AI research deepened through exploration of various aspects of its integration into higher education. Most of these research studies focused on adaptive learning, personalized learning environments, intelligent tutoring systems, and collaborative learning environments. Although educational departments and international organizations, such as the [OECD \(2021\)](#) have been influenced by evidence-based policy to raise awareness of the potential for integrating AI into global education, gaps remain. According to [Bond et al. \(2024\)](#) for AI to achieve its intended purpose in education, governments worldwide are taking action to address the emerging challenges of AI integration. For instance, the EU AI Act's adoption marked a historic milestone as the first comprehensive AI policy. Australia recently

initiated a task force to develop a framework for integrating GenAI in education. According to Choi (2021) the U.S. Department of Education also advocates for an AI Bill to establish a practical strategy for integrating AI into education. The increasing number of publicly available AI chatbots, including Generative Artificial Intelligence (GenAI) chatbots such as ChatGPT, has both shocked and captivated users (Bozkurt, 2023). The integration of GenAI into education has sparked discussions about ethics, reliability, and significance, as well as the need for regulation, governance, and training to keep pace with the rapid, massive transformation of teaching and learning. As an educator, I believe that the rapid expansion of artificial intelligence in higher education necessitates a strong foundation in AI research across all levels of education.

2.4. Benefits of AI in Education

Emerging technological developments will continue to permeate human lives and the education sector. Thus, higher education institutions must accommodate these emerging technological developments, as Karsenti (2019) claims. Since the 1960s, artificial intelligence has played an important role in education, primarily through the development of intelligent tutoring systems. As a result, AI in education has become a significant area of study. Many educational stakeholders have focused on the outcomes, applications, and products that artificial intelligence will bring into the world's educational system. Pedro, Subosa, Rivas, and Valverde (2019) suggested using artificial intelligence as a dual-teacher paradigm in the context of individualized education, noting that secondary teachers will be able to spend more time supervising students and interacting with them one-on-one by utilizing artificial intelligence-powered classroom helpers, resulting in reduced yet efficient contact hours. Bond et al. (2024) conducted a comprehensive study examining the types and extent of research on artificial intelligence in higher education (AIHED). The study's conclusions indicated that higher education primarily uses AI for valuable purposes, such as supporting personalized learning and adaptive systems.

According to Robert and Meenakshi (2024) many scholars have argued that the responsibilities of teachers, educational institutions, and other educational stakeholders will shift as research on the integration of artificial intelligence in classrooms receives greater attention. According to studies, the introduction of AI in education will present new benefits, drawbacks, and opportunities for educational institutions, instructors, and educators. Researchers and educators have expressed concerns about the future of education, despite most AI users holding positive views of AI technology. Haseski (2019) discussed educational research on AI and argued that using AI in education would reduce teacher strain, provide students with necessary learning experiences, help students identify their abilities, enhance creativity, and personalize learning. Other educational opinions on the potential benefits of AI include the ability to track, assess, and predict a student's future career. Despite the prevailing fact that human teachers are essential for effective education, especially in terms of personalization, artificial intelligence aims to enhance and complement education while maintaining quality at all levels (Grosz & Stone, 2018).

2.5. The Nature of the Ghanaian Tertiary Education System

Tertiary institutions in Ghana have increased significantly over the last 20 years, particularly those owned by the private sector. As of 2024, Ghana's National Accreditation Board (NAB) has accredited around 310 public and private tertiary institutions. Ghana's tertiary education is categorized into universities, colleges, professional institutions, technical universities, polytechnics, colleges of agriculture, colleges of education, nursing, and midwifery training colleges (NAB, 2024).

2.6. Theoretical Framework

This study is guided by the comprehensive and widely adopted framework for understanding and predicting user behavior toward new technologies known as the Unified Theory of Acceptance and Use of Technology (UTAUT), propounded by Venkatesh, Morris, Davis, and Davis (2003). The UTAUT combines constructs from eight other technology acceptance theories to provide a robust model for predicting technology use. The core theoretical model of UTAUT posits that actual use is determined by behavioral intention, which is influenced by four key constructs:

Performance Expectancy (PE): This construct describes "the degree to which an individual believes that using the system will help him or her to attain gains in job performance." Effort Expectancy (EE): Defined as "the degree of ease associated with the use of the system." Social Influence (SI): This refers to "the degree to which an individual perceives that important others believe he or she should use the new system." Facilitating Conditions (FC): This construct relates to "the degree to which users perceive the presence of technical and organizational infrastructure that supports system usage" (Venkatesh et al., 2003).

According to Venkatesh et al. (2003) the effects of these predictors are often influenced by factors such as age, gender, experience, and voluntariness of use. UTAUT has been successfully applied to investigate college students' use of GenAI in mathematics learning and their adoption of ChatGPT in higher education contexts, underscoring its relevance to this study.

3. Methodology

The researchers employed a mixed-methods approach in this study, using a sequential explanatory design that combined quantitative and qualitative methods. In a sequential explanatory design, the researcher collects and analyzes quantitative data first, then collects qualitative data to give more explanation and elaborate on the quantitative findings (Creswell, 2014). These chosen approaches provide a detailed and holistic understanding of the complex phenomenon of GenAI adoption. It also combines the breadth and generalizability of quantitative data with in-depth insights into qualitative data.

3.1. Population

The study population comprises Ghanaian tertiary students, including undergraduate and postgraduate students, from diverse academic disciplines and backgrounds, as well as various tertiary institutions across Ghana. The population comprises both private and government Universities, Technical Universities, Colleges of education, Nursing colleges, and other higher education institutions awarding undergraduate and graduate degrees.

3.2. Quantitative Research Method

In the quantitative research method, the researchers employed a cross-sectional survey. In a cross-sectional survey, researchers analyze data collected from the population at a single point in time. Specifically, a non-experimental design was used to gather quantitative data. A cross-sectional survey was used over other methods because cross-sectional studies are relatively inexpensive, quick to conduct, and can provide valuable preliminary data (Creswell, 2014). This approach helps delve into the breadth and generalizability of quantitative data, such as quantifying relationships, testing hypotheses, and generalizing findings to draw conclusions about larger populations.

For the quantitative data sampling, only students from Ghanaian tertiary institutions who completed the questionnaire were included in the study. The researchers used simple random sampling to select participants from the population for the study. A questionnaire was created using Google Forms as an instrument for qualitative data collection and posted on WhatsApp groups and other social media platforms for tertiary students. The questionnaire was in English, with concise wording for easy comprehension. The questionnaire contained 27 closed-ended items, ranging from 5-point (Strongly agree, Agree, Neutral, Disagree, Strongly Disagree) and 2-point (Yes and No, Familiar and Not Familiar) Likert scales, to measure quantitative data. The first section outlined the study's objectives, participant consent, and the participants' demographic background, including age, sex, type of tertiary institution attended, educational level, and academic area of study. The second part of the questionnaire comprises items that collect data on participants' awareness, acceptance, and use of Generative Artificial Intelligence (GenAI) to enhance academic work.

3.2.1. Quantitative Reliability and Validity of Instrument

The instrument's reliability measures the internal consistency of the constructs in the study. According to Hair, Ringle, and Sarstedt (2013) a construct is reliable if Cronbach's alpha α is greater than 0.70. The construct reliability of the different constructs is provided in the Table 1.

Table 1. Reliability results.

Construct	No. of Items	Cronbach's alpha (α)
Awareness	10	0.83
Acceptance	10	0.89
Usage	10	0.79

The validity of the instrument was ensured by giving the designed instruments to subject experts and colleagues in the field for their review, input, and suggestions. The experts' suggestions were used to review the instrument, leading to the dropping or restructuring of items.

3.2.2. Hypotheses

H₀: Tertiary students' characteristics do not predict their usage of GenAI for academic work.

H₁: Tertiary students' characteristics predict their usage of GenAI for academic work.

3.2.3. Quantitative Data Analysis

The quantitative data was cleaned using manual screening and descriptive statistics to identify incomplete and missing values, which were then addressed through deletion or imputation. All variables were coded and labeled correctly for quantitative analysis. The researchers used the Statistical Package for Social Sciences (SPSS) version 30 to analyze the participants' demographic backgrounds. Frequencies, percentages, and other measures of central tendency were used as descriptive statistics to analyze the data, providing an overview and describing key features of the data obtained from the study participants. A regression analysis was conducted

to assess whether tertiary students' familiarity with GenAI and age predict their use of GenAI in their academic work. Specifically, since the dependent variable is binary, a logistic regression model is appropriate for this analysis. Assumptions such as linearity, multicollinearity, outliers, and independence of variables were ensured. A total of 353 tertiary students answered and submitted the questionnaires. Of the 353 questionnaires, 13 were excluded from the study because the respondents were non-tertiary students, the questionnaires were duplicates, or the responses were incomplete. A total of 340 participants' responses were used for the final quantitative analysis.

3.3. Qualitative Research Method

In the qualitative research method, the researchers employed a case study approach. The case study approach is an in-depth exploration of a specific phenomenon within its real-world context, using multiple data sources to understand the research subjects' experiences and perspectives (Creswell, 2007). The researchers employed a convenience sampling method to select subjects from the population who were readily available and easily accessible. This sampling technique is straightforward and accelerates data collection by using only available and willing participants. Twenty-one respondents were randomly selected to participate in the qualitative data collection. The researchers developed a semi-structured interview instrument to collect qualitative data. The interview items comprise questions that elicit respondents' awareness of, acceptance of, and use of Generative Artificial Intelligence (GenAI) tools in academic work. Only respondents who were willing were interviewed without coercion.

3.3.1. Qualitative Reliability and Validity of Instrument

The reliability and validity of the qualitative research method were ensured by establishing a transparent research process. The researchers ensured that the qualitative data accurately represented the participants' perspectives. The researchers ensured that participants reviewed and validated their interpretations of the participants' responses. The researchers also employed bracketing to ensure that their preconceptions, biases, and assumptions about the research topic were bracketed out, thereby enhancing the reliability and validity of the qualitative data and findings. Participants' responses were also quoted verbatim to support qualitative data.

3.3.2. Qualitative Data Analysis

The researchers transcribed the interview data to examine patterns in the respondents' responses. The researchers then employed thematic analysis using NVivo 14 to identify themes and patterns. The interview transcript was analyzed using NVivo 14, employing codes and themes to reveal meaningful insights and answer your research questions.

4. Results and Findings

4.1. Quantitative Results and Findings

4.1.1. Demographic Background of Participants

Table 2 shows the participants' demographic characteristics. The sample was predominantly male (220 participants [64.70%]), whereas females comprised 120 participants (35.30%). The age demographics show that the largest age group is 20-29, accounting for 286 participants (84.12%). A smaller proportion of 17 participants (5.00%) were aged 19 and below. Also, 37 participants (10.90%) were within the 20-39 age range. The degree-type findings indicate that undergraduate students comprised the largest share of the sample (233; 68.53%), whereas graduate students accounted for 107 (31.47%).

Table 2. Demographic Information of Participants.

Characteristics	Category	Frequency (f)	Percentage (%)
Gender	Male	220	64.70
	Female	120	35.30
Age (years)	19 and below	17	5.00
	20 – 29	286	84.12
	20 – 40	37	10.90
Degree Type	Undergraduate	233	68.53
	Graduate	107	31.47

Source: Field data.

4.1.2. Acceptance of Generative AI (GenAI) in Academic Work

Table 3 shows participants' acceptance of Generative AI (GenAI) in academic work based on research question two: What is the level of acceptance of Ghanaian tertiary students of Generative AI (GenAI) as a tool for academic tasks?

Table 3. Participants' Acceptance of GenAI for Academic Work.

Statement	Mean	SD
GenAI tools (e.g., ChatGPT, Copilot, Bard) are useful for academic tasks.	4.18	1.14
Using GenAI tools makes academic work more efficient.	3.90	1.59
I prefer using GenAI tools when completing assignments or studying.	3.58	1.50
I am willing to learn more about how to use GenAI tools effectively for academic purposes.	4.81	0.39
If allowed by my school or instructors, I would use GenAI tools regularly for academic tasks.	4.70	0.45

Note: (Strongly agree, Agree, Neutral, Disagree, Strongly Disagree).

Source: Field data.

The findings in Table 4 indicate a generally high level of acceptance of GenAI among tertiary students in Ghana. The participants strongly agreed that they were willing to learn more about how to use GenAI tools effectively ($M = 4.81$, $SD = 0.39$). Similarly, students expressed a strong willingness to use GenAI regularly for academic work if permitted by their institutions ($M = 4.70$, $SD = 0.45$), suggesting that institutional policies will play a significant role in their use of GenAI. Students also agreed that GenAI tools are useful for academic tasks ($M = 4.18$, $SD = 1.14$), although responses varied. When asked about the efficiency of GenAI tools, the mean score was 3.90, with a relatively high SD of 1.59, indicating that although many rated GenAI efficient, perceptions varied across students.

4.1.3. Usage of GenAI for Academic Work

To answer research question 3: What factors determine Ghanaian tertiary students' usage of GenAI as a tool for enhancing academic work? A binary logistic regression is conducted to answer research question 3. Students' characteristics, such as age, gender, and degree type, are used as independent variables to predict the dependent variable, which indicates whether a student uses GenAI for academic work. GenAI usage is binary (Yes/No). The results of the logistic regression are provided below.

Table 4. Chi-Squared Test.

Chi ²	df	p
9.05	3	0.029

Table 4, the Chi-Square table, summarizes the results of a likelihood-ratio test in logistic regression to determine whether a model that includes independent variables fits the data significantly better than the null model (which contains no independent variables). A p-value of 0.029 indicates that the result is considered significant. Therefore, we reject the null hypothesis and conclude that the predictors make a statistically significant contribution to the prediction of the dependent variable.

Table 5. Regression Model.

	Coefficient B	Standard error	z	p	Odds Ratio	95% conf. interval
Constant	3.57	1.16	3.07	.002	35.44	3.64 - 344.83
Age	-0.06	0.04	1.5	.133	0.94	0.87 - 1.02
Gender	-0.81	0.33	2.48	.013	0.44	0.23 - 0.84
Degree Type Undergraduate	-0.04	0.32	0.11	.912	0.97	0.51 - 1.81

This table presents the results of a binary logistic regression analysis examining how the independent variables (gender, age, and academic level) affect the likelihood of the dependent variable (GenAI Usage). The p-value of 0.013 indicates that gender is statistically significant, suggesting it plays a role in the adoption and use of GenAI among Ghanaian Tertiary students. In contrast, age ($p = 0.133$) and degree type ($p = 0.912$) were statistically insignificant predictors of GenAI use among Ghanaian tertiary students in this model. These findings indicate that when developing strategies for GenAI integration in Ghanaian higher education, it is important to consider gender-specific factors.

4.2. Qualitative Results and Findings

4.2.1. Awareness of Generative Artificial Intelligence (GenAI) for Academic Work

The interview data indicated that many students are aware of GenAI as a tool for academic work and learn about it independently, without formal training. The participants also express these sentiments during the interview. Some of the interview excerpts are quoted below:

Participant 19: There has been significant growth in generative AI tools like ChatGPT, Gemini, and Copilot over the last year. I initially became aware of these technologies through social media, particularly

TikTok and Twitter (now X), where tech pages and influencers demonstrated how AI could answer arithmetic problems and create essays. (Source: Field data 2025).

Participant 11: I was doubtful at first, but I decided to try something out of curiosity. I use it to generate ideas for projects and summarize lengthy passages. Many of my classmates are doing the same thing. To the best of my knowledge, there are no formal policies regarding the use of generative AI at my university, despite its widespread use. (Source: Field data 2025).

Participant 7: I have found ChatGPT, Gemini, and Copilot to be helpful generative AI tools for my coursework. I mostly use them for research and summarizing because they save me hours of reading, allowing me to distill lengthy articles or textbooks into their essential parts quickly. I occasionally use AI to generate essay ideas or outlines when I am stuck on a task, but I always edit the results personally to prevent plagiarism. (Source: Field data 2025).

4.2. Integration of Quantitative and Qualitative Findings

During integration, the quantitative and qualitative findings were compared to identify where they converge, diverge, or expand one another. According to Creswell, Klassen, Plano Clark, and Smith (2011) integration occurs through linking the methods of data collection and analysis. The statistical patterns, alongside themes, narratives, and contextual insights, were examined to determine how each strand illuminates distinct aspects of the same phenomenon. The integration phase seeks to understand how qualitative and quantitative strands relate, align, contradict, and where qualitative insights explain or complicate quantitative outcomes. Interpretive linkages were established through joint displays to generate meta-inferences explaining what the combined qualitative and quantitative evidence reveals. Integrated findings were examined in light of the research questions to reveal the influences of the two strands shaping the observed patterns. This approach helps produce a richer and more accurate understanding of the phenomenon and informs stronger recommendations for practice, policy, and future research.

Table 6. Data integration (Joint display table).

	Research question	Results	Interpretation
Quantitative	What is the level of acceptance of Ghanaian tertiary students of Generative AI (GenAI) as a tool for academic tasks?	GenAI acceptance: (M = 4.81, SD = 0.39). Useful for academic tasks: (M = 4.18, SD = 1.14)	QUAN expands QUAL: The results indicate a generally high level of acceptance of GenAI among tertiary students in Ghana.
	b. What factors determine Ghanaian tertiary students' usage of GenAI as a tool for enhancing academic work?	Chi ² P = .029 Gender (P = 0.013) Age (P = 0.133) Degree type (P = 0.912)	Some characteristics are statistically significant predictors of GenAI use in academic work among Ghanaian tertiary students. Gender plays a significant role in the adoption and use of GenAI among Ghanaian Tertiary students. Age and degree type were statistically insignificant predictors of GenAI use among Ghanaian tertiary students in this model.
Qualitative	Are Ghanaian tertiary students aware of using Generative AI (GenAI) tools and applications in their academic work?	Students have a high level of awareness of GenAI as an academic tool and use it for various tasks, including answering academic questions, Conducting Research, Summarizing, Brainstorming and Idea Generation, generating academic ideas, Supporting Mathematics, and essay writing.	QUAL and QUAN converge: Participant 11: I was doubtful at first, but I decided to try something out of curiosity. I use it to generate ideas for projects and summarize lengthy passages. Many of my classmates are doing the same thing. To the best of my knowledge, there are no formal policies regarding the use of generative AI at my university, despite its widespread use.
	How do Ghanaian	GenAI acceptance:	QUAL expands QUAN:

Integration	Tertiary students' level of awareness and acceptance contribute to their usage of GenAI as a tool for enhancing academic work?	(M = 4.81, SD = 0.39). Useful for academic tasks: (M = 4.18, SD = 1.14) Participant 7: I have found ChatGPT, Gemini, and Copilot to be helpful generative AI tools for my coursework. I mostly use them for research and summarizing because they save me hours of reading, allowing me to distill lengthy articles or textbooks into their essential parts quickly.	Students' awareness of and acceptance of GenAI significantly contribute to their use of GenAI as a tool to enhance academic work.
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5. Conclusion

In conclusion, the study finds that Ghanaian tertiary students are familiar with GenAI and its use in their educational tasks. The findings of the research align with those of Bond et al. (2024) who found that higher education students utilize GenAI in numerous valuable ways for their academic work. The study also reveals that, despite Ghanaian tertiary students' access to and use of GenAI, there are no institutional policies governing its use. It is recommended that Ghana's tertiary institutions and stakeholders provide formal training and policies on the ethical use of GenAI for educational purposes. The findings also support Karsenti (2019) assertion that students consistently utilize emerging technologies in their academic work. Institutions must establish achievable structures and accommodate these technological developments, taking into account factors such as age, gender, and experience. As Fareed et al. (2024) noted, AI offers various opportunities for students. It is therefore necessary for Ghana's tertiary students and faculty to be trained on GenAI and its integration in education, as well as to address all related ethical concerns. As one participant stated during the interviews, "I have found ChatGPT, Gemini, and Copilot to be helpful generative AI tools for my coursework." This indicates that students are already using generative AI for their academic work, despite the absence of policies and ethical safeguards.

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