Journal of Digital Educational Technology
2025, 5(1), ep2508
e-ISSN: 2752-5503
https://www.jdet.net/

Research Article

OPEN ACCESS

Generative AI in teacher education: Teacher educators' perception and preparedness

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Citation: Akanzire, B. N., Nyaaba, M., & Nabang, M. (2025). Generative AI in teacher education: Teacher educators' perception and preparedness. *Journal of Digital Educational Technology, 5*(1), ep2508. https://doi.org/10.30935/jdet/15887

ARTICLE INFO

Received: 23 Sep. 2023

Accepted: 25 Dec. 2024

ABSTRACT

This rapid study explores teacher educators' perceptions of generative artificial intelligence (GenAI) in teacher education, conducted through a descriptive survey involving 55 teacher educators from two colleges of education in Ghana. A convenience sampling technique was adopted for data collection, and a data analysis using *exploratory factor analysis* was used to identify primary factors shaping perceptions and preparedness of GenAI integration. Key findings reveal a generally positive perception among the teacher educators, who recognize GenAI's potential to support academic achievement, increase student engagement, and improve communication within teacher education settings. The findings further indicate that the teacher educators' background factors, such as age, years of teaching experience, department, and college, do not significantly predict their perceptions of GenAI. Since none of these measured background factors were significant predictors, this suggests that training and resources for using GenAI should be broadly prioritized, accessible, and not heavily tailored to specific demographic groups. However, the study identified significant concerns within the *barriers and challenges* factors, including ethical issues, fairness in student assessment, and possible adverse effects on the teacher educator-student relationship. The *communication and independence* factors highlight a need for professional development, with teacher educators emphasizing the importance of training in GenAI usage to optimize its educational potential. The study concludes that while teacher educators generally support GenAI's potential benefits, there are essential ethical and practical challenges to address. Recommendations include establishing clear policies and guidelines to guide GenAI implementation and ensure ethical usage. We further recommend the expansion of this research with a larger sample to gather comprehensive insights from the teacher educators and their acceptance levels of GenAI.

Keywords: generative AI, perception, preparedness, concerns, teacher educators, Ghana

INTRODUCTION

Generative artificial intelligence (GenAI) tools such as ChatGPT, Microsoft Copilot, and Bard have emerged as a transformative force across various industries, and the field of teacher education is no exception (Nyaaba, 2024b). GenAI holds tremendous potential to revolutionize the way teachers interact with their students and enhance the overall learning experience (Susnjak, 2022; Zhai, 2024). However, this rapid integration of GenAI into educational settings has raised important questions and concerns about its impact on teachers' roles and responsibilities (Nyaaba et al., 2024a). The perception of GenAI among educators is a complex and evolving topic, as teachers including teacher educators grapple with the benefits and challenges that GenAI brings to the classroom (Mogavi et al., 2023). They possess the necessary knowledge and skills to effectively incorporate technology in teaching practices, and it is assumed that their proficiency in these areas greatly influences their ability to transmit this expertise to pre-service teachers (PSTs) (Angeli & Valanides, 2009). Consequently, the impact of teacher educators' views towards emerging GenAI is significant, as it directly affects their subsequent acceptance of GenAI (Adarkwah, et al., 2023; Huang et al., 2024). Perceptions, as a psychological construct, encompass an individual's beliefs, attitudes, and interpretations of a particular phenomenon (Venkatesh et al., 2003). In the context of technology integration, teacher educators' perceptions play a vital role in shaping their acceptance and subsequent use of it in their instructional practices (Ertmer et al., 2006).

This research aims to broadly investigate the perceptions of teacher educators and their preparedness and concerns towards integrating GenAI in teacher education programs in

Ghana. This follows a nationwide webinar that was organized between AI4STEM Education Center and teacher education institutions in Ghana to sensitize teacher educators on GenAI during the emergence of ChatGPT. Based on this, the research was found on the following questions and hypotheses:

1. What is the perception and concerns of teacher educators towards GenAI implementation in teaching?
2. What background factors predict teacher educators' perception of GenAI in education?

LITERATURE REVIEW

Potentials of GenAI in Education

GenAI has emerged as a game-changing technology with the potential to transform a wide range of sectors including education. GenAI is a machine learning framework that effortlessly develops artificial inventions by analyzing existing digital content such as movies, images/graphics, text, and audio (Baidoo-Anu & Ansah, 2023; Zhai, 2023). The effects of GenAI have been felt in a wide range of academic disciplines.

GenAI has a wide range of educational applications, including learning management, intelligent tutoring systems, assessment and evaluation, and prediction of student performance (Crompton & Burke, 2023). The use of GenAI, such as ChatGPT, in the medical industry extends to medical education, where it provides realistic case scenarios and immediate feedback to medical students on their treatment and diagnosis choices. Additionally, GenAI helps explain complicated medical and pharmacological ideas simply to students, which aids in their understanding (Hsu et al., 2023; Sallam et al., 2023). The capacity of GPT-3 to produce a variety of code explanations (MacNeil et al., 2022), demonstrates the enormous potential that AI tools in computer science have for coding education.

The influence of GenAI has sparked a wide range of arguments on a variety of subjects, including its ability to change learning and teaching techniques (Rahman & Watanobe, 2023), its function in assisting research activities, and its critical factors of ethics and academic integrity in its application (Kooli, 2023). GenAI highlights intriguing possibilities for lesson planning, individualized learning support, quick assessment and evaluation, and answering learners' questions in the teaching domain (Rahman & Watanobe, 2023). A unique GenAI tool dubbed "GPTeach," created exclusively for teacher training by Markel et al. (2023) has also been released. It enables prospective teachers to practice their teaching techniques with GPT-powered virtual students. These discussions will surely influence how knowledge is transmitted, and learning is fostered in the future in an educational environment that is always changing as the revolutionary impact of AI in education continues to emerge.

Challenges of GenAI

GenAI is an evolving field that holds tremendous potential for various applications, including natural language processing, image generation, and creative arts. However, GenAI models' development and widespread adoption are not without challenges and barriers. This literature review explores the key obstacles hindering the progress of GenAI, drawing insights from expert opinions. Inadvertent biases in training data can be learned by GenAI models, resulting in biased outputs that reinforce existing socioeconomic disparities. Ensuring the ethical development and usage of GenAI models is a critical challenge that necessitates careful thought and appropriate practices (Jobin et al., 2019).

GenAI models are vulnerable to adversarial attacks, in which minor changes in input data can result in huge changes in output. A critical concern is ensuring the security and robustness of GenAI models (Akhtar & Mian, 2018). Further, large-scale GenAI model training and deployment necessitate significant computational resources and energy usage. It is critical to address these resource limits to make GenAI models more accessible and sustainable (Strubell et al., 2019). GenAI shows great promise, but various obstacles must be overcome before it can reach its full potential. Some of the primary problems that researchers and developers must solve to support the responsible and successful usage of GenAI models are ethical issues, data quality, explainability, security, and resource limits.

Digital Efficacy of Teacher Educators

Teacher educators need to understand information and communication technologies (ICTs) and how to use them properly and efficiently in the classroom. ICTs must be sufficiently mastered and used with confidence for a teacher educator to employ them in their teaching. When using ICTs, personal aspects like self-efficacy beliefs are better demonstrated in practice. However, teachers' use of ICT tools in teaching and learning is influenced by personal variables such as competence, confidence, resistance to ICT usage, lack of time, number of years of teaching experience, unfavorable attitudes, etc. (Gbemu et al., 2020; Nyaaba & Sandawey, 2021). Teachers in Ghana have a positive attitude towards the use of digital technologies in teaching and learning but face several challenges in using digital technologies, including lack of access to computers and the internet, lack of teacher training, and lack of technical support (Natia & Al-Hassan, 2015; Quaicoe & Pata, 2018). Therefore, teacher educators in Ghana have low self-efficacy in their ability to use ICTs in teaching but have higher levels of ICT self-efficacy and are more likely to use ICTs in their teaching (Gbemu et al., 2020).

METHOD

This study involved a descriptive survey which was conducted to ascertain teacher educators in the various colleges of education perception towards the emergence of GenAI and its integration into education (Borenstein & Howard, 2021; Creswell & Plano Clark, 2011). Teacher educators from two colleges in the northern region of Ghana, Gambaga College of Education and Bagabaga College of Education constituted the population. These two colleges were used mainly due to their convenience to the researchers.

Participants

A convenient sampling technique was employed to sample the fifty teacher educators within two colleges of education, in

Table 1. Descriptive statistics and factor loadings for GenAI tools in teacher education

Variable	Mean	SD	Overal Mean	Overall SD
Factor 1. Academic improvement and engagement				
GenAI tools can assist tutors in improving academic achievement and grades among students.	4.10	0.872	4.16	0.975
GenAI tools may assist in making teaching and learning interesting and enjoyable.	4.24	0.925		
Students' motivation may increase as a result of using GenAI in teaching.	4.06	1.049		
GenAI may assist in activating teaching and learning during difficult lessons.	4.14	0.764		
GenAI tools may help tutors to meet different needs in the classroom.	3.90	1.026		
Using GenAI tools may help tutors to acquire more content knowledge.	3.82	1.302		
Factor 2. Barriers and challenges				
Inadequate knowledge of ethical issues of GenAI discourages me from its usage.	3.27	1.238	3.29	1.201
Insufficient facilities discourage me as a tutor from using GenAI tools.	3.35	1.052		
GenAI tools may lead to parity of academic assessment among students making it difficult to assess them.	3.41	1.039		
Students become more independent learners as a result of GenAI and may not value the prowess of tutors.	3.10	1.418		
Tutors and students can interact and communicate differently with the help of GenAI tools.	3.82	1.112		
Factor 3. Communication and independence				
Tutors and students can interact and communicate differently with the help of GenAI tools.	3.82	1.112	4.13	0.897
Tutors need to learn how GenAI tools can be used appropriately and how they can be integrated into the current curriculum effectively.	4.76	0.434		
GenAI tools may affect the traditional approaches valuable for students' learning.	3.86	1.041		

Ghana. The participants' ages varied between 25 and 60 years. A significant portion, 47.1%, were between the ages of 36 and 45, while 41.2% were aged 46 to 60. A smaller group, 11.8%, fell into the 25–30 age range. This distribution suggests that many of the teacher educators likely have substantial experience, either in college-level instruction or predominantly pre-tertiary teaching experiences. The largest group, comprising 43%, has between 1 to 5 years of experience in teaching in the college of education. The subsequent group, representing 33.3%, possesses over 15 years of experience teaching at the college level. The remaining participants have teaching experience ranging from 6 to 15 years.

Instruments

We developed a survey instrument to investigate the teacher educators' views and concerns about GenAI in their learning and teaching. The instrument consisted of three sections with 14 items inspired by the works of Cojean et al. (2023) and Nazaretsky et al. (2022) (see **Table 1**). The first section contained four items to collect participants' background information (i.e., age, department, year of teaching experience, and name of college). The second section contained 13 items that measured participants' views and concerns about using GenAI in their teaching. We further conducted an exploratory factor analysis (EFA) to categorize these items. These include five items for measuring PSTs' attitude towards GenAI for their learning, five items measuring PSTs' attitude towards GenAI for their teaching, and two items measuring their general view about GenAI on ethics and the possibility of incorporating it in their course of study. Given the instrument's 14 items, the sample size meets the commonly recommended ratio for EFA, which suggests at least 5–10 participants per item. This equates to a minimum sample size of 70–140 for robust analysis. While the sample size of 50 is slightly below this range, it remains sufficient to provide meaningful insights when combined with the study's exploratory nature.

Data Collection

The census selection was used in selecting all participants for the study. We utilized Google Forms as the primary method for data collection, considering its convenience and ability to collect data efficiently. Participants were contacted through various WhatsApp platforms. The survey sought their consent, guaranteed participant anonymity and confidentiality, and explained the voluntary nature of their participation. The participants were allowed to respond at their convenience within two weeks.

Analysis

The EFA was performed to determine the items and factors contributing to the perceptions (views) and preparedness (concerns) of the teacher educators towards the utilization of GenAI in teaching. This began with the preparation of the data, where Likert scale responses were recorded into numeric values to facilitate the computation. This recording converted responses such as "strongly disagree" to 1 and "strongly agree" to 5. The dataset was then cleaned by removing any rows with missing values, ensuring that the analysis was based on complete cases only. The cleaned data was used to calculate the correlation matrix, which provided the relationships between all pairs of variables.

To assess the suitability of the data for the EFA, the *Kaiser-Meyer-Olkin* (KMO) measure of sampling adequacy and Bartlett's test of sphericity were performed. The KMO result indicated the proportion of variance in the variables that might be caused by underlying factors, while Bartlett's test checked the hypothesis that the correlation matrix was an identity matrix, thus verifying the appropriateness of EFA. Upon confirming the adequacy, an initial factor analysis was carried out to examine the eigenvalues and determine the number of factors to extract. A parallel analysis was also conducted to compare the observed eigenvalues with those obtained from randomly generated data. Based on the results, three factors were retained for further analysis. Varimax rotation was used

to simplify the interpretation of factors by making the structure as clear as possible, was applied to the extracted factors. The rotated factor loadings were reviewed, focusing on loadings greater than 0.3, to interpret the factors meaningfully and identify the key dimensions underlying the data. Even though the Varimax rotation is used, there might still be some interconnections between the constructs, which future research could explore further.

The regression analysis involved loading and preparing the data, recoding categorical variables, calculating a composite score for perception variables (referred to as *views concerns*), and fitting a regression model to explore the relationships between background factors and the composite score in R. Initially, we loaded the dataset from an Excel file, ensuring that it contained both background factors and Likert scale items. The background factors included variables such as the name of the college, department, years of teaching, and age. The Likert scale items measured various perceptions of GenAI tools in education. We then converted these Likert scale responses from categorical text to numeric values, which is necessary for statistical analysis. This recording was done using a predefined mapping where responses like "*strongly disagree"* were assigned a value of 1, *"disagree"* a value of 2, and so on up to *"strongly agree*" which was assigned value of 5.

The next step was to recode categorical background variables into numeric form to facilitate regression analysis. For instance, the "years of teaching" variable was recoded with "1 to 5 years" assigned a value of 1, "6 to 10 years" a value of 2, "11 to 15 years" a value of 3, and "above 15 years" a value of 4. Similarly, the "department" and "name of college" variables were recoded using specified numeric mappings. After ensuring that all relevant variables were in numeric form, we calculated a composite score for the attitude variables, referred to as *views_concerns*. This composite score was obtained by taking the means of all recoded Likert scale items for each respondent, effectively summarizing their overall attitude towards AI tools in education. We performed a regression analysis to understand the relationship between the background factors and the *perception_concerns composite score*. The regression model used can be expressed, as follows:

$$Views_{concerns} = \beta_0 + \beta_1\,(name\ of\ college) + \beta_2\,(department) + \beta_3\,(years\ of\ teaching) + \beta_4\,(age) + \epsilon\ views_{concerns}$$

where β_0 is the intercept, $\beta_1, \beta_2, \beta_3, \beta_4$ are the coefficients for each predictor, and ϵ is the error term.

The model was fitted using the *lm* function in R, which estimates these coefficients to minimize the sum of squared residuals. We further interpreted the significance and strength of each predictor's relationship with the *perception_concerns composite score*. This comprehensive approach enabled us to quantify and interpret how the different background factors predict the teacher educators' perceptions of GenAI tools in teacher education.

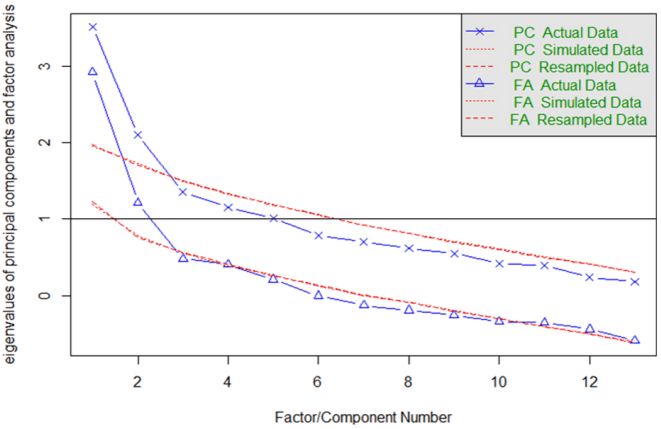

Figure 1. Parallel analysis scree plot of EFA (Generated by the authors using R)

FINDINGS

Exploratory Factor Analysis

The parallel analysis screen plot was utilized to determine the appropriate number of factors to retain in the EFA of teacher educators' views of integrating GenAI tools in education (Acquah & Nyaaba, 2019). The plot compares the eigenvalues of the actual data against those obtained from simulated and resampled data, providing a robust method to identify significant factors.

Based on the screen plot, three factors were retained for further analysis. This decision was supported by the observation that the first three eigenvalues from the actual data were above the eigenvalue threshold of 1 (factor 1: 3.5, factor 2: 2.5, and factor 3: 2.0) and significantly higher than those from the simulated and resampled data. The actual data eigenvalues drop sharply after the first factor, with subsequent eigenvalues gradually decreasing below the threshold (see **Figure 1**). This indicates that these three factors capture meaningful variance in the data, representing distinct dimensions of teacher educators' views and concerns about integrating GenAI tools. The identified factors were then subjected to Varimax rotation to enhance interpretability, confirming the presence of three coherent and significant dimensions: academic improvement and engagement, barriers and challenges, and communication and independence. **Table 2** presents a clear view of how each item loads onto the different factors. Higher absolute values indicate stronger relationships between items and factors.

Teacher Educators' Perception of GenAI

From **Table 1**, the descriptive statistics for teacher educators' perception of GenAI tools in teacher education, categorized into three factors; ***academic improvement and engagement*** factor shows high *mean* scores, ranging from 3.82 to 4.24, indicating a positive perception among educators regarding the potential of GenAI tools to enhance academic achievement, make teaching and learning more enjoyable, and address diverse classroom needs. The overall mean (*M*) for this factor is 4.16 (standard deviation [SD] = 0.975), reflecting strong agreement and moderate variability among responses.

Table 2. Factor loadings for each item

Item	Factor 1	Factor 2	Factor 3
Using GenAI tools may help tutors to acquire more content knowledge.	0.35	−0.13	0.26
Tutors and students can interact and communicate differently with the help of GenAI tools.	0.13	−0.17	0.80
GenAI tools can assist tutors in improving academic achievement and grades among students.	0.75	0.02	0.18
GenAI tools may assist in making teaching and learning interesting and enjoyable.	0.76	0.08	0.15
Students' motivation may increase as a result of using GenAI in teaching.	0.69	0.05	0.07
GenAI may assist in activating teaching and learning during difficult lessons.	0.61	−0.27	0.02
GenAI tools may help tutors to meet different needs in the classroom.	0.66	0.13	0.00
GenAI tools may affect the traditional approaches valuable for students' learning.	0.04	0.24	0.07
Inadequate knowledge of ethical issues of GenAI discourages me from its usage.	−0.29	0.79	−0.19
GenAI tools may lead to parity of academic assessment among students making it difficult to assess them.	−0.27	0.40	−0.04
Students become more independent learners as a result of GenAI and may not value the prowess of tutors.	0.12	0.39	−0.31
Insufficient facilities discourage me as a tutor from using GenAI tools.	0.17	0.60	0.01
Tutors need to learn how GenAI tools can be used appropriately and they can be integrated into current curriculum effectively.	0.12	0.15	0.39

Table 3. Regression analysis of background factors predicting teacher educators' perception of GenAI

Variable	B	SE B	β	t	p
Intercept	3.706	0.358	-	10.37	< .001***
Name of college	−0.204	0.174	-	−1.18	0.248
Department	0.050	0.051	-	0.99	0.331
Years of teaching	0.081	0.062	-	1.31	0.201
Age	−0.030	0.125	-	−0.24	0.812

These findings highlight the potential for GenAI tools to significantly improve academic outcomes and engagement in educational settings.

Barriers and challenges identifies significant concerns related to the use of GenAI tools. Mean scores for this factor range from 3.10 to 3.82, with the highest concern being the difficulty in assessing students fairly (M = 3.41, SD = 1.039). The overall mean of 3.29 (SD = 1.201) suggests mixed perceptions and considerable variability, indicating apprehensions about ethical issues, insufficient facilities, and potential negative impacts on tutor-student dynamics.

Communication and independence emphasizes the importance of effective interaction and the need for tutors to learn how to integrate GenAI tools into the curriculum. With an overall mean of 4.13 (SD = 0.897), this factor demonstrates strong and consistent agreement on the positive aspects of GenAI-facilitated communication and the necessity for professional development. The highest mean score within this factor is for the need to learn how to use GenAI appropriately (M = 4.76, SD = 0.434), underscoring the critical role of training and education in leveraging GenAI tools effectively.

Regression Analysis of Background Factors and Perception

To determine the background factors that predict the teacher educators' views of GenAI, we established two hypotheses, as follows:

Ho: There is no statistically significant relationship between each of the independent variables (name of college, department, years of teaching, and age) and the teacher educators' views.

Ha: There is a statistically significant relationship between at least one of the independent variables (name of college, department, years of teaching, and age) and teacher educators' views.

The significance at the 0.05 level indicates that there is no statistically significant prediction of the background factors toward teacher educators' views of GenAI in teacher education. This means that we reject the null hypothesis. For the other variables (name of college, department, years of teaching, and age), the *p-values* are greater than 0.05. This means that we fail to reject the null hypothesis and cannot conclude that there is a statistically significant relationship between these variables and the dependent variable at the 5% significance level (**Table 3**).

DISCUSSION

The findings show insights regarding the integration of GenAI in teacher education programs. With an overall mean of 4.13 (*SD* = 0.897), there is a strong and consistent agreement among tutors on the positive aspects of GenAI-facilitated communication and necessity for professional development. The highest mean score within this factor pertains to the need to learn how to use GenAI appropriately. Most of the teacher educators believe that GenAI has the potential to enhance communication between them and their students. This belief is particularly focused on pedagogy in the classroom, where students are increasingly eager and curious about technology-enhanced teaching, coming to class with numerous questions to clear their minds (Guilherme, 2019; Lee et al., 2022). Consequently, this scenario might necessitate tutors to stay current with their teaching content to match the levels of the ever-growing GenAI tools, enabling effective communication with their students.

The finding further supports the assertion that GenAI has the capability to promote communication between teachers and students (Kohnke et al., 2023; Lee et al., 2023). It contradicts findings that suggest student autonomy might diminish the essence of teacher-led teaching but aligns with

Nyaaba et al. (2024b), who found that although students use GenAI for their research work, they still advocate for supervision from their teachers. The positive outlook on GenAI's role in enhancing communication is crucial as it prepares tutors to be more adept and updated with their teaching methodologies (Guilherme, 2019; van den Berg & du Plessis, 2023).

Despite the positive perceptions by the teacher educators on GenAI in teacher education, the findings indicate mixed perceptions and considerable variability, suggesting apprehensions about ethical issues, insufficient facilities, and potential negative impacts on tutor-student dynamics (Brand, 2023; ÓhÉigeartaigh et al., 2020). Ethical concerns regarding GenAI have been one of the significant setbacks in its use in education (Nyaaba et al., 2024a). These findings confirm Nyaaba and Zhai (2024) that indicates that teacher educators lack an understanding of how GenAI systems operate, how data is safeguarded, and how these tools meet academic integrity and quality assurance standards and therefore advocate for professional development on explainable AI. The findings further support Nyaaba et al.'s (2024c) research on the digital divide and the biases present in GenAI technologies, thereby demonstrating the concept of digital neocolonialism. This supports the assertion that teachers in Ghana have a positive attitude towards the use of digital technologies in teaching and learning but face several challenges in using digital technologies, including lack of access to computers and the internet, lack of teacher training, and lack of technical support (Natia & Al-Hassan, 2015; Quaicoe & Pata, 2018).

However, recent studies show that some institutions have begun establishing policies to control some of these issues regarding GenAI use in education (Almaraz-Menéndez et al., 2022). In addition, the development of culturally and context-specific GPTs have emerged as one of the innovative approaches of mitigating biases and ethical challenges (Nyaaba & Zhai, 2025; Nyaaba et al., 2024c). Despite these efforts, the ethical challenges continue to be a significant concern, stretching the boundaries of what is acceptable and safe in the use of GenAI in educational settings. The development and implementation of comprehensive policies and guidelines are essential to ensure the ethical and responsible use of GenAI in education.

Moreover, these findings highlight the potential for GenAI tools to significantly improve academic outcomes and engagement in educational settings (Ali et al., 2023; Nyaaba, 2024a, 2024b). This belief contributes to the growing body of research advocating for the integration of GenAI in educational practices. Many studies have proved that GenAI has the potential to enhance personalized learning, assessments, and scoring in teacher education (Bewersdorff et al., 2024). This further confirms the assertion that GenAI has the possibilities for lesson planning, individualized learning support, quick assessment and evaluation, and answering learners' questions in the teaching domain (Markel et al. (2023; Rahman & Watanobe, 2023).

Interestingly, there is no statistically significant prediction of background factors on teacher educators' views of integrating GenAI. This finding has several implications for the implementation of GenAI in teacher education programs. The lack of a statistically significant relationship indicates that GenAI integration could be achieved within the mainstream factors of teacher education with necessary adjustments (Younes-Aziz & Mouncif, 2023). This aligns with studies that assert GenAI integration requires professional development rather than personal development (Nyaaba & Zhai, 2024).

CONCLUSION AND IMPLICATIONS

This study was conducted as a rapid assessment to ascertain teacher educators' views about GenAI in the context of Ghana. At the time of data collection, the awareness level of GenAI was relatively low. However, the study leveraged a series of webinars organized to raise awareness and provide professional development opportunities for teacher educators regarding GenAI. Despite the limited exposure, the findings revealed that teacher educators generally hold positive perceptions about GenAI's potential to enhance communication and academic outcomes. However, the study also highlights significant concerns about ethical issues surrounding the use of GenAI. These concerns emphasize the need for the development and implementation of comprehensive policies and guidelines to ensure the responsible integration of GenAI into teacher education practices. Additionally, the findings indicate that teacher educators' background factors, such as age, years of teaching experience, department, and college, do not significantly predict their perceptions of GenAI. Since none of these factors were significant predictors, this suggests that training and resources for using GenAI should be broadly prioritized, accessible, and designed without tailoring to specific demographic groups. Finally, the study recommends conducting a more extensive empirical investigation involving a larger and more diverse population of teacher educators. Such research would help ascertain broader acceptance levels and readiness for GenAI adoption in educational contexts.

Limitations

The study sample was relatively small because, at the time of data collection, GenAI was not widely known by many educators in Ghana. Consequently, only the few who were aware of GenAI might have responded to the survey questions. While we acknowledge that convenience sampling, a non-probabilistic method, can be used in quantitative research, it is susceptible to issues with representativeness, thus diminishing the statistical power of the sample. These factors indicate that the study's findings cannot be generalized to the broader population. Therefore, future research should utilize probabilistic sampling techniques to ensure a fair representation of the population.

Author contributions: Bismark Nyaaba Akanzire: conceptualization, data collection, writing – reviewing & editing; **Matthew Nyaaba:** formal analysis, methodology, writing – original draft, writing – review & editing, visualization; **Macharious Nabang:** data collection, methodology, writing – original draft, writing – review & editing. All authors approved the final version of the article.

Funding: No external funding is received for this article.

Ethics declaration: The authors declared that the study was approved by Gambaga College of Education and Bagabaga College of Education in Ghana and the research was conducted within a

professional setting among adult participants who were the researchers' colleagues, and the nature of the study posed minimal or no risk to participants. The authors further declared that the study was conducted in accordance with the highest ethical principles, including informed consent, data privacy, and confidentiality of the participants. Informed consent was obtained from all participants, who were provided with comprehensive details about the study and their rights, including the option to withdraw at any time without consequences. Confidentiality and privacy of participant data were ensured through anonymization and restricted access to authorized researchers.

Declaration of interest: The authors declare that they have no competing interests.

Availability of data and materials: All data generated or analyzed during this study are available for sharing when appropriate request is directed to corresponding author.

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