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**RESEARCH ARTICLE**

# Demystifying Generative Artificial Intelligence in Academic Classrooms: Students' Attitude and Critical Thinking

Joseph A. Villarama[1*], Bench G. Fabros[2], Abegail V. Dela Fuente[3], Verjun J. Dilla[4], Emmanuel DG. Villa Agustin[5], Bashar Abdulkareem Alali[6], Ulfa Mutia Alrasyid[7]

[1,2,3,4] College of Education, Central Luzon State University, Philippines
[5] Sto. Domingo National Trade School, Department of Education-Nueva Ecija, Philippines
[6] Department of English Language and Literature, International Islamic University Malaysia
[7] The Language Center, Universitas Negeri Gorontalo, Indonesia

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***Corresponding Author:**

villaramajoseph120294@clsu.edu.ph

**ABSTRACT**

Generative artificial intelligence (GenAI) is known to have advanced computational tools, which generate content based on data they were trained on including texts, images, music, and other forms of media. Over time, these tools become more sophisticated and used in various fields including educational environments. This study examined the attitudes of 123 university students across various disciplines in Indonesia, the Philippines, Malaysia, Nepal, and Syria, toward the use of GenAI in academic classrooms and explored how these technologies impact their critical thinking skills. It utilized a convergent mixed-methods approach, combining quantitative assessments using a descriptive survey with that of qualitative insights stemming from semi-structured interviews, to provide an all-encompassing picture of educational impact of GenAI. Findings revealed students generally perceived GenAI positively as it is helpful in streamlining their academic tasks and enriching their learning experiences; however, concerns surfaced on its potential to undermine development of autonomous critical thinking. This dichotomy underscored the need for educational strategies that not only embrace technological advancements but also reinforce critical engagement and ethical usage to prevent over dependency. This research adds a critical perspective to the evolving discourse on integrating GenAI in education, advocating for a balanced approach that fosters ethical use and enhances rather than replaces traditional or conventional learning paradigms.

## INTRODUCTION

The integration of generative artificial intelligence (GenAI) in educational environments sparked significant shifts in teaching practices, learning strategies, and development of academic resources. GenAI, which includes platforms such as ChatGPT, Canva, among others, become a prominent tool in classrooms, enabling the creation of texts, graphics, and other forms of content from existing data. This technological evolution prompted ongoing discussions on its impact on academic integrity, collaboration, and critical thinking. As GenAI tools continue to gain prevalence, understanding students' attitudes towards these technologies and their effects on critical thinking skills becomes essential for maximizing their potential in educational settings. GenAI holds considerable promise in fostering critical thinking, which is foundational to academic success. The ability to synthesize

information, engage in problem-solving, and critically evaluate data can be enhanced through the use of GenAI tools that promote deeper cognitive engagement, creativity, and real-time feedback (Ruiz-Rojas et al., 2024; Torres et al., 2024; Fabros & Ibanez, 2023; Muthmainnah et al., 2022; Villarama et al., 2022). GenAI's ability to facilitate interactive learning experiences—where students engage with diverse perspectives and generate responses—has been shown to stimulate reflective thinking and creativity (Villarama et al., 2024; Javaid et al., 2023; Villarama et al., 2022). However, while these tools improve critical thinking, their success in doing so is contingent upon how they are incorporated into the curriculum and level of guidance students receive in using them effectively.

Previous studies explored the role of GenAI in education, revealing both its benefits and challenges. For instance, AI has been noted for its capacity to personalize learning experiences, adapting content to individual student needs (Villarama et al., 2024; Guettala et al., 2023; Villarama et al., 2023). At the same time, concerns were raised on the risks of over-reliance on AI, which hinder students' development of independent critical thinking skills (Çela et al., 2024). Chan and Hu (2023) found that while students appreciate the convenience and efficiency of GenAI tools, they also express concerns that these tools encourage passive learning; thus, diminishing opportunities for deep cognitive engagement. Further, Dodel and Mesch (2018) highlighted the digital divide in AI accessibility, emphasizing that unequal access to these technologies could exacerbate existing educational disparities. In light of these findings, existing literature and studies suggest a complex and nuanced relationship between GenAI and critical thinking. GenAI has the potential to support cognitive growth by offering personalized feedback and enhancing student engagement, especially in volatile, uncertain, complex, and ambiguous (VUCA) world, but it also raises concerns about shallow learning and dependency on technology (Villarama et al., 2025; Luckin & Cukurova, 2019). Understanding students' attitudes towards GenAI, as well as their experiences and strategies for utilizing these tools, is critical for fostering an environment where GenAI genuinely contributes to the development of critical thinking skills in academic contexts. Despite the growing body of research on GenAI in education, there remains a significant gap in the understanding of how students perceive and interact with GenAI, particularly in terms of attitudes and critical thinking abilities. While previous studies focused on specific tools for language learning (Mohamed & Alian, 2023), or on the general impact of AI on creativity (Altares-López et al., 2024), comprehensive investigations into university students' attitudes toward GenAI and its influence on critical thinking are limited; thus, calls for further exploration to inform effective strategies for integrating GenAI into higher education.

This research addresses this gap by examining the attitudes of university students toward the use of GenAI in academic classrooms and exploring how these technologies impact their critical thinking skills. By gaining a deeper understanding of these factors, this research provides significant information on the integration of GenAI technologies in educational settings and contributes to the ongoing conversations about the ethical, practical, and cognitive implications of GenAI in learning environments.

## MATERIALS AND METHODS

### Design

This research employed convergent mixed method design. The descriptive survey design utilized a four-point Likert scale researcher-made survey questionnaire. The contents were validated and reviewed for internal consistency. Meanwhile, qualitative data were collected through semi-structured interviews that further investigated, assessed, and validated the responses, which coincided with the quantitative data. Convergent mixed method design is a research method that entails both quantitative and qualitative data simultaneously, and then contrasting the results to come up with a conclusion and a better understanding of the problem.

### Context, Participants, and Sampling

There were 123 University-level student-participants selected purposely, who were at least 18 years old, used generative artificial intelligence (GenAI), and enrolled in degree programs such as Education, Humanities, Language and Literature, and Social Sciences, from Indonesia, Philippines, Malaysia, Nepal, and Syria. All the participants in the study consented, based on protocols set by the Central Luzon State University Ethics Research Committee (CLSU-ERC).

### Instrument

A 14-item researcher-made instrument, with a high internal consistency and reliability (Cronbach α = 0.84), was utilized in this research. The instrument was composed of three parts: (1) Attitude and Critical Thinking towards GenAI; (2) Utilization of GenAI; and (3) Interview guide questions. The first and second parts observed a four-point Likert scale (4-Strongly Agree, 3-Agree, 2-Disagree, and 1-Strongly Disagree) while the third part with four open-ended questions served as a guide for the semi-structured interview. The research instrument was reviewed and validated by five (5) professionals who are language experts, statisticians, and psychologists.

### Data Collection Procedures

The quantitative data for this research were obtained online through Google Forms while the interview responses were gathered through Google Meet, an online interview platform. As part of the protocol, the research intent was explained to all the participants along with the data privacy clause and consent secured at the beginning. It was estimated that the online survey was accomplished within 20 minutes while each interview session lasted for an hour for a total of four weeks. Online surveys were completed by the participants depending on their pace while the online interviews were conducted based on their availability and willingness of the participants.

### Data Analysis Procedures

In determining the university students' attitude and critical thinking towards utilizing generative artificial intelligence in academic classrooms, descriptive statistics were used such as mean and standard deviation. A thematic narrative content analysis determined and demystified the university students' manner of utilization of generative artificial intelligence. A thematic analysis allows the identification of common themes between cases (Fabros et al., 2023), while a narrative analysis may be more appropriate for analyzing differences in cases and describing the dynamics of individual narratives in their unique context. The researchers ensured the accuracy, reliability, and credibility of information and findings through the implementation of data cross-checking and triangulation.

## RESULTS

This section presents the summary of the students' attitude, critical thinking, and manner of utilization of generative artificial intelligence (GenAI). Descriptive statistics (mean and standard deviation) were used with their corresponding descriptions as shown in Table 1, whereas Figure 1 capitalized the qualitative findings with four major themes and eight sub-themes in total.

**Table 1. Attitude, critical thinking, and GenAI utilization**

| | Mean | SD | Description |
|---|---|---|---|
| Attitude and Critical Thinking Towards GenAI | 3.09 | .608 | Agree |
| Utilization of GenAI | 3.04 | .61 | Agree |

Legend: 1.00-1.75 (Strongly Disagree); 1.76-2.50 (Disagree); 2.51-3.25 (Agree); 3.26-4.00 (Strongly Agree)

The belief mean score is 3.09, indicating that students generally "Agree" with the statements about GenAI tools. The standard deviation of 0.608 shows moderate variability, suggesting that most

students share similar beliefs about GenAI tools. Further, the usage mean score is 3.04, reflecting moderate utilization of GenAI tools in academic contexts. The standard deviation of 0.61 indicates moderate variation in how students use GenAI, suggesting differences in familiarity, accessibility, and individual preferences.

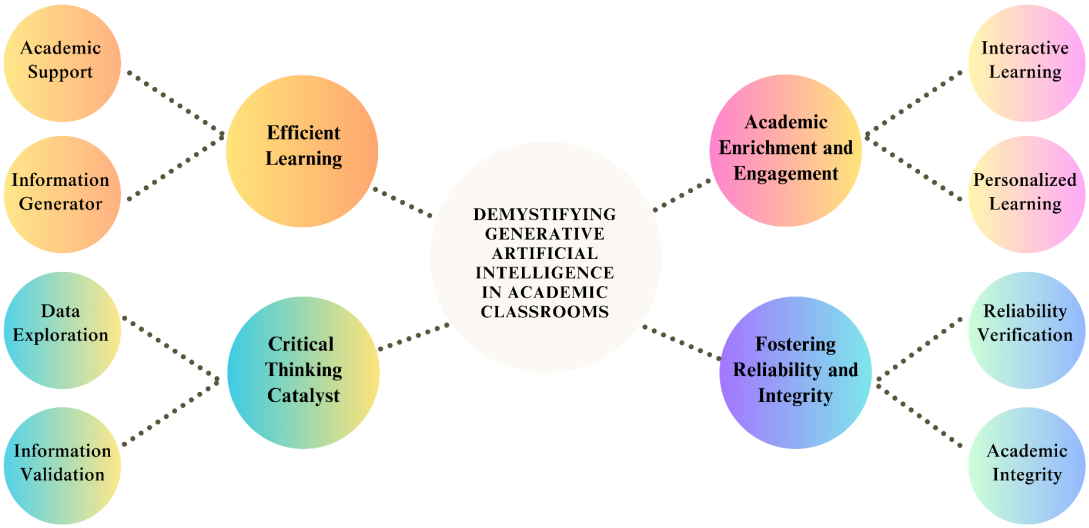


**Figure 1. Students' manner of GenAI utilization**

With the bulk academic workload of students, they utilize the generative artificial intelligence (GenAI) to generate information and to support their academic undertakings for more efficient learning.

"I used GenAI to help me research information so I can save time in answering and accomplishing difficult assignments and projects at school because for me it is beneficial to support my learning, (R23)."

While GenAI explores a large volume of data depending on the search needs of students, they manage to validate information, which capacitates their critical thinking skills and academic honesty.

"GenAI is helpful for us because most of the students are engaged in technology and it encourages deeper critical thinking among users because it necessitates them to further analyze and verify the ideas generated from the tools, making them more responsible and critical thinkers who do not just copy and paste information, (R46)."

The presence of GenAI in students' academic lives provided interactive and personalized learning experiences, which enriched their academic engagements.

"I support the integration of GenAI to augment the traditional classroom to be at par with modern classroom demands, by interactively using GenAI to explain and simplify concepts in classroom discussions, to help me instantly understand at my own pace the lessons, and to provide examples, situations, and additional references for everyone, (R67)."

In line with the constant academic landscape alongside the presence of GenAI, students remain challenged to verify the reliability of information generated through GenAI, which tests their academic integrity as students.

"When using GenAI, people get results that match the questions or instructions they prompt to the GenAI, and so just as people want accurate information from reliable sources, they have to do their parts to ensuring the reliability of information and sources they get from GenAI in order to maintain academic integrity while easing academic tasks through responsible use of GenAI, (R84)."

## DISCUSSION

This undertaking determined the students' attitude and critical thinking towards utilizing generative artificial intelligence (GenAI) in academic classrooms and demystified the students' manner of utilization of generative artificial intelligence. Table 1 above shows that students see GenAI tools as important for enhancing multifaceted academic experiences. The top mean score (M = 3.17, SD = 0.539) reveals the perceived ability of GenAI to elevate meaningful understanding of the course material, harmonizing with the findings of Zawacki-Richter et al. (2019), which convey that AI tools can scaffold learning by tailoring feedback and encouraging exploration of complex topics. Similarly, the ability of GenAI to support academic tasks, such as writing and problem-solving (M = 3.16, SD = 0.502), echoes findings by Khamis et al. (2022), who reported improved efficiency and creativity in academic contexts through AI integration.

Yet, the lower mean for ethical concerns (M = 3.14, SD = 0.637) and critical evaluation of AI-generated content (M = 3.02, SD = 0.665) accentuate ongoing challenges. These outcomes are positioned with concerns raised by Luckin (2018) regarding ethical dilemmas, including plagiarism and reliance on AI without proper validation. Although students acknowledge the importance of these issues, the relatively higher standard deviations suggest varied experiences or understanding among respondents.

Further, confidence in integrating GenAI into collaborative activities attained the lowest (M = 2.98, SD = 0.691). This might reflect apprehension about using emerging technologies in social or group settings, a phenomenon documented by Singh et al. (2024), who found that users often lack confidence in their ability to effectively incorporate AI tools.

The results underscore the expanding reliance on GenAI tools for academic purposes, with all statements rated as "Agree." The highest mean (M = 3.11, SD = 0.598) highlights the utility of GenAI in supporting academic activities, including research, assignments, and classroom learning. This coincides with the findings of Lainjo and Tmouche (2024), Ahmad et al. (2022), and Ahmad et al. (2021), emphasizing the growing role of AI being integrated into academic activities. Similarly, the use of GenAI in brainstorming ideas, and providing alternative explanations for challenging complex concepts (M = 3.09, SD = 0.528).

Contrary to the statement on approaching GenAI as a complementary aid rather than a replacement scored relatively lower (M = 3.03, SD = 0.652), suggesting variability in how students balance AI use with critical thinking. This reflects concerns raised by Luckin (2018), who cautions against over-reliance on AI, advocating for its integration as a supplement to human effort rather than a substitute. The relatively high standard deviation here may indicate differing levels of understanding among students regarding the role of GenAI in maintaining academic integrity.

Interestingly, the integration of GenAI tools into study routines to enhance productivity (M = 2.89, SD = 0.663) recorded slightly lower than creative and task-oriented uses. This inferred that while GenAI is recognized for enhancing outcomes, its significant influence on time management and scholastic performance is perceived as less pronounced. Ahn (2024) closely found that while AI tools boost task-specific performance, their overall influence on productivity depends on user expertise and training.

Bolstering the quantitative findings, the experiences of students on the utilization of GenAI are further qualified highlighting the relevance of efficient learning with the help of any AI tool in

generating academic information to support the students' academic pursuits. With the integration of technology in education, students' academic lives become more efficient since they can focus their attention on learning lessons instead of worrying on how to approach their assignments and projects (Capatina et al., 2024; Mesiono et al., 2024). Through the use of GenAI in academic tasks, students deal with an incredible amount of data, which are available online, and so students are left with the responsibility to check the validity of the data because some information generated through AI tools remain questionable (Kim et al., 2025; Sison et al., 2024). While students fact-check information from AI tools, they are given the opportunity to enhance their critical thinking skills because they do not just rely solely on the AI tools but they also analyze and evaluate the accuracy and relevance of the information (Liu et al., 2024; Musi et al., 2024).

As students check the veracity of information fetched from AI tools, their academic honesty is challenged given that their learning shifted to being personalized since they have the assistance of GenAI. In this sense, the academic classrooms became more interactive through the intervention of AI tools being welcomed by many today, which supplemented various academic engagements globally. The utilization of AI tools in classroom-based activities helped students to become more engaged, especially during difficult tasks like research writing, presentation, and reports (Liu et al., 2024; Zhang, 2024). Since students maximize the use of GenAI in their academic endeavors like research studies, essays, academic reports, among others, they are cautioned to follow ethical standards (Rana et al., 2024), to verify the reliability of data (Rasul et al., 2024), and to maintain academic integrity (Yusuf, 2024), which are paramount on top of the academic presence of GenAI in today's academic environment.

## CONCLUSION AND RECOMMENDATIONS

Attitude and critical thinking towards GenAI are slightly higher than utilization towards GenAI, this implies that while students have positive belief of GenAI, their actual usage does not fully align with their perception. This difference could be credited to the extraneous variables such as lack of training and institutional support, and internal factors like confidence and ethical concerns. Outcomes pondered the call for academic institutions to come up with structured frameworks in utilizing GenAI tools responsibly. Training programs that address ethical considerations, encourage critical evaluation of AI outputs, and foster confidence in collaborative contexts are essential. Moreover, future studies could explore longitudinal impacts of GenAI on academic integrity and whether its benefits are equitably distributed across diverse student populations. By addressing these areas, educators harness the full potential of GenAI while mitigating its risks. Findings suggest a strong recommendation of GenAI tools in academic settings, particularly for tasks requiring creativity and problem-solving. However, the relatively lower scores for integrating AI tools as complementary aids highlight a need for educational interventions to foster critical engagement with AI outputs. Universities should consider workshops that promote ethical AI usage and critical thinking, ensuring students view GenAI as a tool for collaboration rather than substitution. Training for both students and educators on the effective use of GenAI should not only focus on how to use these tools but also on understanding the importance of critical engagement with the content they generate. Institutions should strive for a balanced approach in integrating GenAI tools into the curriculum. While these tools enhance learning, they should not replace conventional learning methods like lecture and discussions, textbook learning, standardized tests and face to face instruction. Develop and implement clear guidelines on ethical use of GenAI emphasizing the importance of academic honesty and the need for critical evaluation of AI generated contents. Future studies should see how prolonged use of GenAI affects academic integrity, cognitive development, and students' confidence in their ideas and original work. There should also be efforts to ensure equitable access to GenAI tools in the universities to prevent widening the gap or digital divide among learners. Further, exploring the variability in perceptions across disciplines could inform tailored AI integration strategies.

## AUTHORS' CONTRIBUTIONS

All authors contributed equally to the conception and design of study, and all other parts: Conceptualization, JAV, BGF, and EDGVA; Methodology, BGF and JAV; Instrument, JAV, BGF, and AVDF; Validation, JAV, BGF, and VJD; Formal Analysis, BGF, JAV, and AVDF; Investigation, JAV, BGF, AVDF, VJD, EDGVA, BA, and UMA; Writing–Original Draft Preparation, JAV, BGF, EDGVA, and UMA; Writing–Review & Editing, JAV, BGF, AVDF, VJD, EDGVA, BA, and UMA; Supervision, JAV.

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