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RESEARCH ARTICLE

Generative AI as a catalyst for instruction in higher education: A study on relevance and effectiveness

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ABSTRACT

Technologies such as ChatGPT have brought new opportunities for individualized learning, automated assessments, and student engagement. The introduction of generative AI in education has represented a momentous shift in the way that teaching and learning processes are handled. This exploratory paper discussed the implications of generative AI in higher education. Higher education teachers (n=15) from Visayas, Philippines were purposively sampled to be interviewed about their experiences in using ChatGPT in the classroom. Narratives were collected to deconstruct how generative AI could shape and transform learning experiences in the classroom. Findings indicated that college teachers were primarily positive about the applications of generative AI in higher education. Teachers reported that AI-enabled technologies improved the efficiency and interactivity of lessons, helping students better understand complex topics through personalized, real-time feedback and simulations. AI was also found to inspire creativity, with students developing unique ideas and presenting their work more critically and innovatively. However, concerns were raised about the potential overreliance on AI, with some educators worried it could diminish their role and lead to a dilution of students' learning experiences. There were also concerns about the possible devaluation of human creativity and critical thinking in favor of algorithmic logic. To address these issues, the study underscored the need for comprehensive training and policy development to ensure AI is used ethically and effectively, complementing human educators rather than replacing them. The findings emphasized the importance of ethically integrating the potential of generative AI to preserve the fundamental values of education and human development.

Keywords: curriculum; generative AI; higher education; perception

1. Introduction

The application of artificial intelligence (AI) within the educational sector has garnered considerable interest in recent years, as an increasing number of educational institutions and organizations investigate the prospective advantages of AI-driven technologies[1]. The use of this technology is poised to introduce a range of advantages and drawbacks across different industries, including online education, natural language processing, and intelligent customer service[2].

ChatGPT illustrates a significant advancement in natural language processing (NLP) technology, having

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been developed by OpenAI in 2019[3]. ChatGPT is a form of generative AI that applies algorithms to produce new text that closely resembles human writing. This model employs deep learning techniques to produce responses that closely resemble human communication in reaction to natural language inquiries. ChatGPT is engineered for application in a conversational context, facilitating natural and intuitive interactions between users and the model. ChatGPT, as a sophisticated AI application, possesses the capability to respond to inquiries, generate narratives, condense documents, and create essays[4]. ChatGPT can be used as virtual tutors, the facilitation of student inquiries, and the provision of designed educational experiences. This technology can serve as a practical application of AI, enabling teachers and students to enhance their understanding of AI literacy—the capacity to interpret, utilize, and critically assess AI technologies and their societal implications[5].

Several studies presented the relevance of generative AI in education. For example, generative AI has the capability to systematically identify students' learning shortcomings and difficulties by employing machine learning algorithms and deep learning technology, which allows for the provision of adapted tutoring and exercises with the goal of enhancing students' mastery of learning content and skills[6]. Similarly, generative AI enhances the efficiency, accuracy, and fairness of assessments by automating grading and providing feedback using natural language processing and deep learning. It generates relevant evaluations based on students' learning data, helping them better understand their progress and improving learning outcomes[7]. In the future, generative AI has the potential to offer students more realistic, compelling, and personalized learning experiences by leveraging virtual reality and augmented reality technologies, thus improving student interest and engagement in the educational process[8].

However, Wu[9] raised concerns about the use of ChatGPT in education. The instantaneous information processing capabilities of ChatGPT, along with its perceptive responses, pose significant challenges to conventional methods, prompting a critical examination of the distinctions between human and machine learning. This was shaped by constructivist education perspective that students should actively participate in their learning by strengthening their abilities discovering, analyzing, and solving problems. Many times, teachers in the classroom rely on assignments and question-based approaches to help students assess material and grow personally in their viewpoint.

In line with that, ChatGPT and other tools raises concerns regarding their potential for facilitating mindless and careless practices related to plagiarism, as well as the submission of assignments, homework, and academic papers[10,11]. Qadir[12] believed that numerous automated writing tools are widely used, many of which leave detectable traces, even though these traces can sometimes be obscured through subsequent editing. At the same time, plagiarism detection software is becoming increasingly sophisticated, using techniques like identifying "tortured phrases"—a result of replacing appropriate words with awkward synonyms during paraphrasing. It is likely that ChatGPT and similar tools will also leave detectable traces, which also leads to a growing marketplace of detection tools.

Teachers had mixed feelings (concerned, challenged, or excited) about the proliferation of the use of AI in education, which made it even difficult for academic institutions to establish policies and guidelines for AI use in classrooms and to provide support for their teaching staff[13]. In their analysis, Mills, Bali and Eaton[13] observed that teachers were concerned about academic integrity, data rights, and digital privacy, while other teachers were interested and excited about how language models could have pedagogical applications. Consequently, research indicates that students should be discouraged from utilizing language models; however, it is recommended that educational efforts focus on imparting knowledge about these systems to enhance understanding of the associated risks and ethical considerations[14,15].

Over time, there has been a noticeable increase in the interest surrounding pedagogical applications. For Rasul et al.[16], "the scholarly community is actively investigating the most efficient and responsible methods to integrate ChatGPT into tertiary education." Following this direction, this exploratory paper analyzed the perceptions of college teachers about the application of generative AI in higher education, as well as discuss its impact to students' classroom engagement. Even among teachers who generally view the technology favorably, research on their perception indicates notable concerns and ambiguity regarding the re-evaluation of assessment methods[17,18]. Hence, this paper holds academic significance as it contributes to the growing discourse on the integration of generative AI in higher education.

2. Literature review

Generative AI represents a category of artificial intelligence, characterized by its remarkable capabilities, which have gained significant attention through platforms like ChatGPT[19]. Given varying types of generative AI available in the market, this paper was solely focused on the use of ChatGPT in education. ChatGPT, created by OpenAI, achieved a remarkable milestone by acquiring one million users within just five days and reached a total of 100 million users two months post its public release in November 2022, establishing a record for the fastest-growing consumer application[20]. DALL-E is a form Generative AI created by OpenAI, functioning in a manner like ChatGPT, but producing digital images as its outputs[21]. ChatGPT and DALL-E emerged from deep learning, a category within machine learning that emulates the cognitive processes of the human brain in its ability to learn from and interpret information, data, and prompts[22].

Montenegro-Rueda et al.[23] performed a systematic review examining the effects of ChatGPT implementation within the educational sector. They reviewed that the literature on ChatGPT in education highlights three key areas of research. First, it examines the role of teachers in AI-driven settings, where ChatGPT aids in curriculum design and teaching innovation. Second, it focuses on impact of AI in classrooms, improving student performance and fostering personalized learning, while addressing ethical concerns like data privacy. Lastly, it explores the broader effects of AI on education, emphasizing its potential to optimize resource management and enhance educational quality.

Ally[24] posited that the rapid growth of education into the digital era, characterized by a focus on emerging technologies and the Internet of Things (IoT), necessitates major shifts in educators' teaching methods and their awareness of their roles within the learning framework. As a result, the integration of AI in educational settings has prompted apprehensions among educators, parents, and policymakers. Concerns have been raised regarding the potential consequences of adopting AI, particularly the risk of diminishing the value of human expertise and the erosion of social engagement within the learning process[25,26].

Research on educators' attitudes toward the use of AIED has started to surface since 2020; however, the volume of studies conducted in this domain remains relatively low[27]. Wang et al.[28] used a modified Technology Acceptance Model (TAM) to study Chinese faculty members' attitudes toward AI in higher education, adding two new factors: anxiety and self-efficacy. Their findings showed that these factors, along with perceived usefulness, perceived ease of use, and attitudes toward use, explained 70.4% of changes in behavioral intention to use AI. Attitudes toward use had the strongest influence on behavioral intention. The study recommended professional development to improve educators' attitudes and encourage AI adoption.

Iqbal, N., Ahmed, H., & Azhar[29] explored the attitude of 20 teachers from a private university in Pakistan towards of using ChatGPT using TAM. The data collected from the interviews suggest that university faculty exhibit a generally cautious attitude towards the utilization of ChatGPT. The faculty

members exhibited a negative perception and attitude regarding the use of ChatGPT, including cheating and plagiarism, were highlighted as significant issues. Conversely, the potential benefits, such as the facilitation of lesson planning and assessment, were also acknowledged. Consequently, the university faculty require additional information and education regarding ChatGPT to facilitate informed decision-making concerning its application.

Arguello et al.[30] conducted a study investigating how teachers perceive and adopt tools like ChatGPT in education, using a quantitative approach and a survey with Likert scales and closed questions. The results showed that resistance to change and the need for ethical policies regarding chatbot use should be prioritized by nations and higher education institutions to improve digital literacy. The study emphasized that such measures are essential for effective tool adoption by both teachers and students. These findings provide valuable insights for future educational policies and teacher training programs, encouraging a more adaptive integration of technology in education.

Priyohartono[31] examined the benefits and perceptions of teachers using ChatGPT in teaching, focusing on instructors from the Language Education Study Program at Universitas Islamic of Kadiri. Data collected through interviews and questionnaires revealed that teachers are satisfied with ChatGPT's accurate responses, ease of use, and its ability to improve both teaching efficiency and learning activities. They particularly valued its personalized tasks, such as reducing grammatical errors and assisting with material searches, which positively impacted student outcomes. The study highlights the importance of balancing the advantages and challenges of integrating ChatGPT in higher education.

Recent studies investigating the opportunities and challenges presented by generative AI within the educational landscape offer essential perspectives. Given the conflicting findings from recent studies, Tlili et al.[32] emphasize the importance of developing a new pedagogical framework that can successfully integrate AI-driven innovations. The significance of developing ethical and personable chatbots is highlighted, alongside the necessity of improving digital skills to maximize the potential advantages of AI. Similarly, Bozkurt et al.[33] contend that the present context offers a significant opportunity to reevaluate the functions of human educators and artificial intelligence within the educational landscape, given that AI can attain educational responsibilities that were previously managed exclusively by human educators. Hence, this paper was expected to give depth to the discourse about the use of generative AI in education, based on the perspectives of college teachers. This paper discussed about the context of AI use in education, its application, impact on students and teachers, and its relevance to the curriculum.

3. Methods

3.1. Research design

This qualitative paper explored the use of generative AI in higher education, highlighting its relevance and effectiveness in teaching. Exploratory studies aim to address a specific question or gain knowledge about a particular phenomenon[34-36], such as the emergence of AI in higher education. Swedberg[37] articulated that the aim of exploratory research is to establish a foundational, general comprehension or outline of a subject, with the understanding that additional efforts will be undertaken to further narrow it into a more focused, accurate, or detailed examination. Chavez et al.[38] assert that a qualitative exploratory design enables researchers to look into topics that have not been thoroughly examined in the existing literature, while also facilitating active participation from study participants in the creation of new knowledge While some may regard exploratory studies as lacking in scientific rigor, normative perspectives suggest that these studies hold significant value by enabling researchers to understand the problem and collect preliminary data

efficiently[37]. In that sense, exploratory studies frequently serve as initial investigations that establish a basis for later definitive research[39]. Hence, exploratory studies like this paper have the potential to present new avenues of inquiry and produce initial findings that may inform subsequent research endeavors.

3.2. Participants and sampling

Exploratory research generally does not necessitate extensive sample sizes[40] because it does not aim to quantify a phenomenon but describe it[41]. In qualitative studies, Emmel[42] emphasizes that the significance lies not in the quantity of cases, but rather in the way they are utilized. Hence, this study opted to conduct interviews with only 15 teachers to give depth to the narrative findings. Higher education teachers from Visayas, Philippines were purposively sampled to be interviewed regarding their perceptions about and experiences in using AI in classrooms, and how this impacts the curriculum. Participants should be using generative AI and should teach in college for at least 10 years given the timeframe of AI. Purposive sampling is a technique employed to systematically choose cases that provide substantial information, facilitating extensive investigations[43,44]. The *flexibility* inherent in purposive sampling allows for a concentrated examination of specific subgroups or individuals who hold relevant ideas, expertise, experiences, or characteristics essential for learning the research phenomenon[45]. Purposive sampling is particularly useful in exploratory studies because it amplifies the depth and breadth of the information acquired, which is critical for developing innovative concepts and contextualizing emergent trends. Purposive sampling is flexible to the dynamics of exploratory research, allowing researchers to adjust their sample criteria in response to new ideas throughout the investigation[46].

3.3. Research instrument

Exploratory studies typically do not place a high priority on the use of structured questionnaires[40]. Exploratory studies are generally flexible and dynamic[35], thus making semi-structured questionnaire effective in gathering narratives. Semi-structured interviews are frequently preferred over standardized interviews because they allow the interviewer to probe into the ideas and viewpoints of the interviewees more thoroughly[47]. This enables the investigation of their beliefs and ideas, while also allowing the interviewer to push further into their responses to acquire additional information and clarification[48]. However, even when semi-structured interviews include the principal subject to be analyzed, it is not recommended to strictly adhere to them[49]. Kallio et al.[48] investigated 2,703 titles, abstracts, and full texts of methodological works for semi-structured interview guides from 2004 to 2015. The design of the research guide questions was patterned based on their findings. They suggested that in developing interview guides, researchers should identify conditions, apply prior knowledge, create a preliminary interview guide, conduct pilot testing, and finalize. **Table 1** presents the final interview guide used for interviews.

Table 1. Interview guide questions.

Research Questions	Questions
How do college teachers perceive the impact of Generative AI on their teaching methods and student engagement?	1. In what ways has Generative AI influenced your teaching methods or instructional strategies? 2. How do you believe Generative AI has affected student engagement and participation in your courses? 3. Can you provide examples of specific instances where Generative AI has enhanced your teaching effectiveness? 4. How do you perceive students' attitudes towards using Generative AI in their learning process? 5. What changes have you noticed in student learning outcomes since incorporating Generative AI into your teaching practices?
What are the perceived benefits and challenges of integrating Generative AI into higher education teaching practices among college educators?	1. What do you see as the primary benefits of using Generative AI in your teaching practices? 2. Can you identify any challenges or obstacles you have faced while integrating Generative AI into your curriculum?

Research Questions	Questions
	3. How do you think the use of Generative AI compares to traditional teaching methods in terms of effectiveness? 4. What support or resources do you believe are necessary to overcome the challenges associated with using Generative AI in education? 5. How do you envision the future role of Generative AI in higher education, based on your experiences and observations?

Table 1. (*Continued*)

3.4. Data gathering procedure

This paper gathered narrative data from participants through one-on-one interviews. Qualitative studies often gather perspectives of participants, which are subsequently transcribed and analyzed to reveal a narrative or concept that articulates the importance of the event under investigation[50-52]. Interviews serve as a prevalent method in phenomenological research to explore the lived experiences of individual participants[53]. Narratives have functioned as a method for individuals to extract meaning from their experiences since the emergence of written documentation, providing a structure for identifying their perceptions[54]. Qualitative interviews could be informal conversations, facilitating an environment where participants can openly share their perceptions and experiences[55]. Early methods of qualitative interviews involve maintaining the continuity of narrative, ensuring a positive interaction, and mitigating the influence of interviewer bias[56]. Creswell and Creswell[57] generalized that qualitative interviews usually follow a process: formulation of research questions, selection of study subjects, preliminary section (aims, confidentiality considerations, and utilization of data during interview), formulating thematic enquiries within the interview framework, implementing follow-up probes or enquiries, interview conclusions. These procedures were adapted in this study to suit the specific needs of the research context. However, given the difficulties in connecting with participants who spoke different languages or dialects, additional steps were required to assure data clarity and correctness. This included using translators or interpreters as needed, simplifying or adjusting question phrasing to accommodate linguistic differences, and using culturally appropriate communication strategies to reduce misunderstandings and ensure that participants' responses were accurately captured and understood within the context of the study.

3.5. Data analysis

Thematic analysis, a qualitative method used for systematically identifying, organizing, and interpreting patterns of meaning within data[58,59], was applied in this study to analyze the narratives of college teachers regarding the relevance of receptive vocabulary in arithmetic fluency and problem-solving skills. This *flexible* method, as described by Braun and Clarke[58], is especially useful for exploratory studies, as it allows for the identification of shared meanings and experiences within a dataset[38]. The coding process typically involves three levels—starting with descriptive coding and progressing towards a more interpretative analysis[60,61]. Reflexive thematic analysis was conducted, focusing on generating themes that represent deeper, underlying meanings rather than surface-level patterns[62]. This approach requires researchers to remain reflexive, acknowledging how their own perspectives might shape the interpretation of the data[63]. Because of potential subjectiveness and bias, an inductive approach was employed, wherein the codes and themes emerged directly from the data itself, ensuring that the analysis remained closely aligned with the participants' responses. The study followed the six phases of reflexive thematic analysis (**Figure 1**) outlined by Braun and Clarke[64], which emphasizes flexibility while maintaining methodological rigor. Through this inductive, data-driven approach, the themes developed in this study provide a cohesive understanding of the teachers' experiences and perspectives, without being constrained by prior theoretical frameworks or the researchers' assumptions.

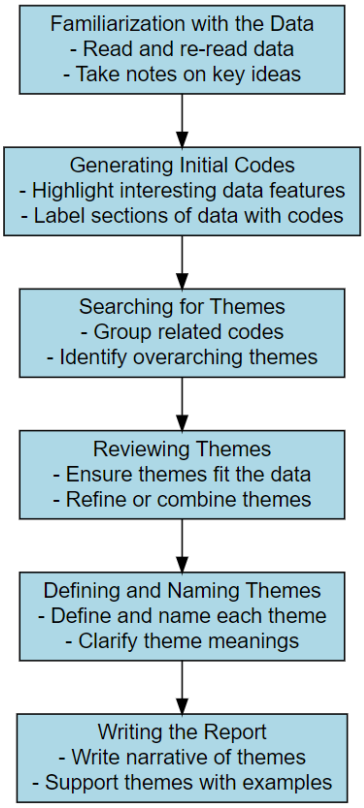

Figure 1. Reflexive thematic analysis.

4. Results

Question 1: How do college teachers perceive the impact of Generative AI on their teaching methods and student engagement?

The evolution of educational landscapes, driven by technological advancements, has positioned the integration of Generative AI within teaching practices as a significant transformative force in higher education. College educators are progressively investigating the potential of AI tools to improve their teaching methods, promote student involvement, and meet the learning needs of their students.

Theme 1: Adaptive teaching

Adaptive Teaching describes the transformative impact of Generative AI on educators' instructional strategies, emphasizing the shift toward personalized and engaging learning experiences. The narratives reveal a profound appreciation among teachers for resources that cater to individual student needs and interests, highlighting the significance of *tailored resources* in enhancing educational relevance.

> "They appreciate having resources tailored to their individual needs and interests."

> "Integrating Generative AI has fundamentally altered my teaching methods by facilitating more personalized and adaptive learning experiences."

Educators report that the integration of Generative AI has fundamentally altered their teaching methods, facilitating a more personalized approach to instruction. This transition enables teachers to *explore diverse learning instructions*, effectively addressing the varying demands of their students. The flexibility provided

by AI allows for the adjustment of lesson plans based on *student feedback and performance,* ensuring that the content remains pertinent and effective.

> "I was able to explore learning instructions to meet the demand of diverse learners."
>
> "AI allows me to adjust existing lesson plans or resources to produce content based on student feedback and performance, ensuring that lessons remain relevant."
>
> "Educators can create a more personalized learning environment that not only meets the diverse needs of students but also empowers them to take control of their own educational journeys."
>
> "We can create a more personalized and supportive learning environment that meets the diverse needs of all students."

The shift from traditional lecture-based formats to *AI-generated interactive lessons and simulations* signifies a major transformation in teaching methods. This evolution reflected engaging classroom environment, actively involving students in their own learning processes. Teachers recognize that Generative AI compels them to *balance traditional methods with innovative practices*, prompting a reevaluation of curriculum relevance in an increasingly tech-driven educational landscape.

> "I've shifted from traditional lectures to using AI-generated interactive lessons and simulations that actively engage students in the learning process."
>
> "Generative AI challenges me to find a balance between traditional teaching methods and innovative practices, pushing me to rethink what curriculum relevance means in a tech-driven world."

It encourages them to *innovate and experiment* with new teaching methods, creating dynamic curricula that resonate with students on multiple levels. The introduction of AI tools not only enhances engagement but also promotes accessibility in learning, as evidenced by student feedback indicating that these tools allow them to learn at their own pace.

> "Generative AI empowers me to innovate and experiment with new teaching methods, allowing me to create a more dynamic and relevant curriculum that resonates with students."
>
> "AI tools in teaching, making learning more engaging and accessible for all students"
>
> *"Students have commented on how the AI tools help them learn at their own pace."*

Theme 2: Productiveness

Productiveness is the efficiency and effectiveness of strategies that educators experience through the integration of Generative AI into their teaching practices. The insights indicate a strong correlation between the use of AI tools and a streamlined approach to lesson preparation, emphasizing that the accessibility of AI resources—*just one click away*—has transformed the way teachers approach their instructional responsibilities.

AI has not only simplified the process of preparing lessons but also contributed to their overall productivity. This shift reflects a broader trend where technology facilitates a *more efficient workflow,* allowing teachers to allocate their time and energy toward more meaningful interactions with students and the development of engaging content.

> "It is helping me in doing may lesson preparation easier because these AI generative is just one click away, I can see that I 'am becoming more productive than before since AI is within the reach."

> "I realized that using AI it made my work easier and innovative."

Theme 3: Content Assessment

Educators emphasize the importance of designing assignments and activities that compel students to *analyze, synthesize, and evaluate* AI-generated content. This approach encourages students not merely to accept information at face value but to engage deeply with the material, which can develop higher-order thinking skills essential for their academic growth.

The implementation of *self-assessment tools* allows students to reflect on their learning experiences actively. By rating their understanding and engagement levels, students participate in a form of metacognition that enhances their awareness of their learning processes. This reflective practice not only aids in measuring the impact of AI tools but also empowers students to take ownership of their educational journeys.

> "I still encourage critical thinking by designing assignments and activities for my students that require them to analyze, synthesize, and evaluate AI-generated content rather than simply accepting it."

> "I ask students to reflect on their learning using self-assessment tools, where they rate their understanding and engagement levels. This reflective practice helps me measure the impact of AI tools."

Theme 4: Creative Thinking

Educators observe that the integration of AI tools has ignited a new level of imaginative engagement among students, leading them to generate *unique project ideas* and approach topics with fresh perspectives. This shift signifies a departure from conventional learning paradigms, where creativity may have been stifled by rigid structures or limited resources.

Generative AI serves as a catalyst for innovation, enabling students to think outside the box and venture into areas of inquiry they might not have considered previously. The use of AI encourages a *dynamic exploration* of ideas, allowing students to experiment with different concepts and formats in their projects. This newfound freedom enhances their ability to synthesize information creatively and produce work that reflects their individual voices and interests.

> "Generative AI has sparked creativity in my students."

> "They're coming up with unique project ideas and exploring topics in ways I hadn't seen before."

Theme 5: Participation

Educators observe that students are not only more attentive but also exhibit a greater willingness to *participate* actively in lessons. This heightened level of engagement suggests that the introduction of AI has fundamentally transformed the learning experience, making it more interactive and appealing.

AI tools appear to enhance the *interactive elements* of lessons, designing an environment where students feel more connected to the content and their peers. This shift towards interactive learning encourages students to engage more deeply with the material, facilitating discussions and collaborative activities that

promote a sense of community within the classroom. As students become more involved, their enthusiasm for learning grows, indicating that the use of technology can positively influence motivation and interest in the subject matter.

> "Students are more engaged and enthusiastic about lessons since we started using AI tools."

> "They enjoy the interactive elements and are more willing to participate."

Question 2: What are the perceived benefits and challenges of integrating Generative AI into higher education teaching practices among college educators?

Integrating Generative AI into higher education teaching practices has emerged as a transformative development that brings both benefits and challenges for college teachers. They have highlighted the innovative potential of AI tools to enhance experiential learning, facilitate continuous assessment, and provide instant feedback, which ultimately supports diverse learning needs. However, this technological shift raises important questions about the identity of educators, with some expressing fears that reliance on AI for content generation may undermine their roles and expertise. Furthermore, concerns about students' reliance on AI tools, particularly regarding their critical thinking and problem-solving abilities, underscore the complexities involved in effectively implementing these technologies in the classroom.

Theme 1: Classroom Assessment

Teachers believed that integrating AI tools into classroom assessment allows for more *innovative* and *experiential learning opportunities* for students. They recognized the importance of grouping students by skill levels, *grouping by skill level*, which enables them to observe interactions with AI-generated content and assess whether these tools effectively cater to diverse learning needs. Rather than relying solely on traditional periodic tests, teachers embraced *continuous assessment* methods facilitated by AI, providing *feedback* that helps students track their progress in real time. This approach not only enhances understanding but also fosters a more responsive learning environment.

> "I was able to collaborate ideas to innovate new experiential learning for students."

> "I group students by skill levels and observe how they interact with AI-generated content. This allows me to see if the tools effectively support varying levels of understanding and expertise."

> "Instead of solely relying on periodic tests, I incorporate AI tools for continuous assessment and instant feedback, helping students understand their progress in real time."

> "Educators must develop accessible online courses and tutorials that cover the basics of AI tools, advanced features, and best practices for implementation in various subject areas."

Teachers emphasized the need for *accessible online courses* and *tutorials* to equip teachers with the necessary knowledge to implement AI tools effectively across various subject areas. They acknowledged the importance of *source verification*, ensuring that the content used is accurate and reliable. By setting *clear expectations* regarding the appropriate use of AI tools, teachers aimed to guide students in balancing their reliance on technology with their own knowledge and skills, ultimately promoting a more informed and responsible learning process.

> "I make sure to always conduct source verification, cross-checking facts with reputable academic or educational sources to ensure accuracy."
>
> "I make sure to set clear expectation to my students by communicating with them when it's appropriate to use AI tools and when to rely on their own knowledge and skills."

Theme 2: Identity Concerns

Teachers believed that over-reliance on AI for content generation could undermine their roles as educators, like *dilution of educator role*. They expressed *feelings of inadequacy*, sensing that dependence on AI diminished their identity and expertise, as it shifted the focus away from the knowledge they acquired during their own education. This reliance sparked *guilt* among teachers, who felt a societal expectation to embody their professional knowledge and skills. Consequently, they worried that utilizing AI might suggest a lack of competence in their subject areas, leading to concerns about their credibility and the perception of their teaching abilities. These identity concerns highlight the tension educators experience as they navigate the integration of AI tools while striving to maintain their professional integrity and identity.

> "I worry that relying too heavily on AI for content generation may dilute my role as an educator."
>
> "I feel less of an educator because I depended on AI and not on the learning or knowledge that I gained during my schooling."
>
> "I always feel guilty because as a teacher the world is looking up to you and to your teaching, so if you use AI as if you haven't learned anything in your field."

Theme 3: Reliance

Teachers believed that students were apprehensive about becoming overly dependent on AI tools for answers, which could hinder their development of critical thinking and problem-solving skills. They observed that many students voiced worries about the *reliability* and *accuracy* of AI-generated content, reflecting a desire to ensure that their learning remained grounded in robust, factual information.

> "Some students are worried about becoming too reliant on AI tools for answers, expressing a desire to maintain their own critical thinking and problem-solving skills."

This reliance on AI tools not only raised concerns about the potential erosion of essential cognitive skills but also highlighted the importance of integrating technology use with traditional learning methods to develop independent thought and critical engagement in the educational process.

> "Many students express concerns about the accuracy of AI-generated content."

5. Discussion

The increasing integration of AI within organizations and among individuals is currently having a substantial effect and is likely to further influence a range of tasks through complete automation or optimization[65]. In education, use of these technologies presents significant potential for improving learning efficiency, delivering adapted educational assistance, and streamlining administrative processes[66,67]. However, its extensive use also poses challenges like ethical dilemmas, social variables, concerns regarding privacy, and challenges related to language proficiency [68,66]. **Table 2** summarizes the thematic findings for

adaptive teaching, productiveness, content assessment, creative thinking, participation, classroom assignment, identity concerns, and reliance.

Table 2. Summary of thematic findings.

Themes	Key Points
Adaptive Teaching	Teachers emphasize personalized learning enabled by AI, which designs resources to students' needs and transforms teaching methods through interactive lessons and simulations. AI promotes dynamic curricula and accessibility for diverse learners.
Productiveness	AI simplifies lesson preparation and increases productivity, allowing educators to focus more on meaningful interactions and innovative content creation.
Content Assessment	Teachers design assignments and self-assessment tools encouraging critical thinking and metacognition, helping students reflect on their learning and engage deeply with AI-generated content.
Creative Thinking	AI sparks creativity in students, encouraging them to generate unique ideas and approach topics with fresh perspectives, fostering innovative and imaginative engagement.
Participation	AI-enhanced lessons boost student engagement and willingness to participate, creating interactive learning environments that promote motivation and collaboration.
Classroom Assessment	AI facilitates innovative and continuous assessment methods, providing real-time feedback and catering to diverse student skill levels. Teachers emphasize source verification and clear usage guidelines to ensure balanced technology use.
Identity Concerns	Teachers express concerns that over-reliance on AI may undermine their roles and expertise, leading to feelings of inadequacy and guilt over perceived diminished credibility as educators.
Reliance	Students and teachers highlight the risk of over-reliance on AI, which may hinder critical thinking and problem-solving skills. Concerns about the reliability and accuracy of AI-generated content are also emphasized.

In educational contexts, the introduction of chatbots is on the rise, serving to provide designed assistance and support to learners. These chatbots possess the capability to respond to enquiries, deliver guidance, and serve as a significant resource for students[68,66]. Their presence contributes to the establishment of an interactive and engaging educational atmosphere, promoting autonomous learning and enhancing student involvement[69]. For example, through AI-driven platforms, the system monitors the student's progress and identifies patterns in their mistakes. Based on this data, the AI tool suggests designed exercises and resources specifically focused on the areas where the student is struggling[70,71]. This paper identified a similar use of AI among teachers to innovate their teaching methods. One teacher said that she *"…shifted from traditional lectures to using AI-generated interactive lessons and simulations that actively engage students in the learning process."* In her setup, she uses generative AI to design lessons in a way that helps her students better understand complex topics in mathematics. For example, when teaching algebra, she uses AI tools to create interactive simulations that visually demonstrate how equations are balanced. Instead of relying solely on verbal explanations or written examples, her students can manipulate variables in real-time, allowing them to see the immediate effects of their actions. Some teachers label this as *innovative* as students are *"…[enjoying] the interactive elements and are more willing to participate"* while teachers *"…[are] becoming more productive than before."* This also coincides with the study of Kaplan-Rakowski et al.[27] who argued that chatbots have the capability to engage students through interactive conversations and deliver immediate answers to enquiries, thus minimizing delays in learners' progress that may arise from awaiting teachers' responses.

Another significant narrative to consider was how generative AI sparks creativity of its users. It is essential to transform classrooms into environments that promote curiosity and critical thinking, rather than merely delivering knowledge, particularly considering the advancements brought about by generative AI[72-74]. For example, during the process of engaging with simulations, students frequently encounter the necessity to make a series of decisions, evaluate hypotheses, and modify their strategies in response to the feedback received[75]. This process promotes analytical reasoning by prompting students to evaluate the efficacy of

their choices, construct lessons from errors, and enhance their approaches[76]. A similar trend was observed in HEIs regarding the use of generative AI. College teachers observed that with AI, students are *"…coming up with unique project ideas and exploring topics in ways I hadn't seen before."* Teachers observed a shift in how students present their work, with many opting for outline-based reporting rather than simply reproducing entire texts. This indicates a more structured and critical approach to learning, where students use AI to guide their thinking but still retain autonomy in how they organize and present their ideas. For teachers, this represents a creative development, as students are not just passively consuming information but are actively exploring new ways of expressing their understanding, demonstrating critical thinking, and engaging with content in a more profound manner.

These aspects made generative AI relevant in the education sector as it integrates the learning systems for students. Kuleto et al.[77] focused on surveying K–12 educators in Serbia to assess their understanding of AI, their proactive attempts to integrate AI as an instructional resource, and their views on AI in connection with their anticipations. There was a positive correlation between the opportunities provided to teachers for experiencing AI in education and their subsequent opinions regarding it, which affect their intentions to incorporate AI into their teaching practices. This paper believed that with extensive AI use in education, teachers were "able to collaborate ideas to innovate new experiential learning for students," which further shaped their perceptions about the potential use of generative AI in classroom settings. Experiences with AI use can significantly influence an individual's likelihood of adopting it for the long term. Positive interactions, such as gaining efficiency in tasks, receiving helpful feedback, or improving creative output, can encourage a person to integrate AI into their regular workflow[78]. This opens an opportunity for enhancing professional development for educators, which facilitate active engagement with AI, could result in a greater propensity for them to integrate AI into their routine practices[79], such as *developing online courses*, *source verification skills*, *cross-checking methods*, and *setting classroom policies and expectations.*

However, several concerns have emerged regarding the use of generative AI in classrooms, particularly from industry professionals. Many industries are worried about how the integration of AI might affect the future workforce. For example, in the academe, the reliance exclusively on AI-generated information may undermine traditional research methodologies, consequently posing a risk to the overall quality of research outcomes[80]. De Cremer and Narayanan[81] argued that danger is the rise of a "rationalistic mindset" that overvalues the efficiency and logic of AI while devaluing human thinking, which is often seen as inefficient or irrational. This could lead to a societal shift where human intelligence is regarded as inferior or even worthless compared to AI, reinforcing the idea that AI is superior in solving problems, making decisions, and managing processes. The long-term risk is that the unique qualities of human creativity, intuition, and emotional understanding may be undermined or dismissed in favor of purely algorithmic logic. Similar perceptions the teachers hold when reflecting on the challenges they encountered in using generative AI in teaching. Some worried that *"…relying too heavily on AI for content generation may dilute my role as an educator."* Others were guilty of using generative AI that *"…you haven't learned anything in your field."* In that sense, it is essential for managers to not only focus on technical improvements aimed at developing the interpretability, robustness, and fairness of their AI systems but also to receive training that heightens their understanding of the ethical challenges associated with these technologies[81].

There were two major lessons that can be learned from this study: AI has a potential, and AI requires training for teachers. While generative AI holds immense potential for enhancing educational processes by encouraging creativity, improving efficiency, and offering personalized learning experiences, it must be integrated thoughtfully. Teachers and educators should remain actively involved in shaping and guiding the learning process to ensure that the use of AI complements human critical thinking, creativity, and emotional

understanding, rather than replacing these essential aspects of education. Second, concerns raised by teachers regarding the overreliance on AI must be addressed through comprehensive training and policy development. Educators should be equipped with the necessary skills to ethically and effectively integrate AI into their teaching practices, while also preserving their unique role as facilitators of learning. Simultaneously, broader discussions on the implications of AI for workforce development and research quality are needed to prevent the devaluation of human intelligence and creativity in favor of algorithmic processes. These lessons reflected the importance of establishing a new framework to AI adoption in education, ensuring that it enhances rather than undermines the core values of learning and human development.

6. Limitations

There were several limitations that are necessary to be addressed in future studies to be conducted. The relatively small sample size (n=15) and the focus on participants from a single higher education institution in the Philippines restrict the generalizability of the findings. A larger and more diverse participant pool would provide broader insights into the perceptions and applications of generative AI across different contexts. Further, while the qualitative approach was suitable for exploring nuanced perspectives, the absence of quantitative data limits the ability to measure the prevalence of biases or assess the statistical effectiveness of identified interventions. The cross-sectional nature of the study also precludes an understanding of how perceptions and practices evolve over time. A longitudinal study would better capture the dynamic nature of educational practices and the integration of generative AI in teaching.

To address these limitations and enhance the integration of generative AI in education, specific recommendations are proposed. School administrators should consider investing in professional development programs that equip teachers with the technical and ethical competencies needed to effectively use generative AI tools. These programs should emphasize hands-on training, policy development, and the ethical implications of AI use to ensure its responsible integration. Administrators should also encourage the implementation of longitudinal studies within their institutions to track the evolving impact of AI on teaching practices and student learning outcomes.

Teachers are encouraged to adopt a balanced approach to using AI in their classrooms, integrating these tools as supplements rather than replacements for traditional teaching methodologies. They should actively engage in collaborative learning networks to share innovative practices and address common challenges associated with AI use. Teachers can incorporate mixed methods into their research on generative AI to capture both the qualitative and quantitative impacts of its application in diverse learning environments.

Stakeholders, including policymakers and educational technology providers, must support initiatives that promote the ethical and equitable use of generative AI in education. They should provide funding for scalable, inclusive pilot programs that explore AI integration in various educational settings. These stakeholders should also engage in dialogues with industry professionals to ensure that the development and deployment of AI tools align with the broader goals of education, including fostering critical thinking, creativity, and emotional intelligence.

7. Conclusion

This study highlighted the significant potential of generative AI in education, demonstrating its ability to enhance creativity, engagement, and efficiency in teaching and learning processes. Teachers who incorporated AI tools in their classrooms observed improved student involvement, increased creativity in assignments, and more structured approaches to problem-solving. Generative AI, such as chatbots and simulations, enabled personalized learning experiences that developed critical thinking and autonomy.

However, the findings also raised concerns related to the overreliance on AI, which may compromise the educator's role and diminish the value of traditional research and human creativity. Educators expressed apprehension about how AI may lead to passive learning or dependency, emphasizing the need for a new paradigm where AI supports, rather than replaces, human instruction and creativity.

The integration of generative AI in education has important implications for teaching methods and professional development. First, AI can be a powerful tool to engage students in more interactive and innovative learning experiences, promoting critical thinking and problem-solving. However, it is critical for teachers to remain at the forefront of guiding the learning process to maintain the value of human-centered education. Second, teachers need to develop the skills and understanding required to ethically and effectively integrate AI into their practices, ensuring that AI enhances, rather than undermines, their role. Following these, educational institutions must address the broader societal and ethical concerns related to AI use, including workforce development, research integrity, and the preservation of human creativity and intuition.

Several limitations emerged from this study. The study primarily focused on the positive aspects of AI integration, such as increased creativity and efficiency, but less attention was given to the broader, long-term effects of AI reliance in education. The findings were based on specific case studies and narratives from individual teachers, which may not represent the full spectrum of experiences across different educational contexts. The potential negative implications of AI in undermining traditional research methodologies and human intelligence require further exploration. This paper did not extensively explore the differences in AI integration across various subjects or education levels, leaving room for future research on how AI impacts different domains of learning. Given these findings, there is a need to conduct quantitative analysis to better understand how AI use in classrooms impacts teacher productivity and enhances student engagement. It is also important to examine critical factors such as teachers' self-efficacy, professional identity, and sense of purpose, which may influence the successful integration of AI into educational practices.

Conflict of interest

The author declares no conflict of interest.

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