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Research Article

Exploring the Integration of ChatGPT in Pre-Service Teacher Education: Benefits, Challenges and Pedagogical Implications

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ABSTRACT

This study examines the integration of ChatGPT in pre-service teacher education in the Philippines, focusing on its benefits, challenges, and potential impact on teaching practices. Using a qualitative research design, data were collected from 45 pre-service educators at Bulacan State University through an open-ended online survey. Thematic analysis revealed key challenges, including unfamiliarity with AI, concerns about accuracy and credibility, and risks of over-reliance on AI-generated content. Despite these concerns, participants recognized ChatGPT's ability to enhance lesson planning, foster creativity, and support differentiated instruction. The findings highlight the need for structured AI training in teacher education programs, ethical guidelines for responsible AI use, and institutional support for effective AI integration. The study concludes that ChatGPT can serve as a valuable supplementary tool in teacher preparation, provided that educators receive adequate training and institutional backing. Future research should explore interactive methodologies, such as focus groups or classroom-based AI interventions, to gain deeper insights into its pedagogical applications.

Keywords: *ChatGPT in Education, Artificial Intelligence in Teaching, Pre-Service Educators, Challenges in AI Integration, Ethical AI Use in Education*

Introduction

The rapid advancements in artificial intelligence (AI) have revolutionized various fields, including education. Among the AI tools gaining widespread attention is ChatGPT, an OpenAI language model with the potential to transform teaching and learning. AI assists educators in lesson planning, content creation, and the development of creative classroom activities, easing workloads while enhancing instructional practices. However, the practical application of AI tools remains a challenge, particularly among pre-service educators who are still developing their pedagogical approaches.

Pre-service educators are often hesitant to integrate AI into their teaching practices due to

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their early-stage professional development. While some recognize ChatGPT's potential to improve efficiency and foster creativity, others express concerns regarding its accuracy, reliability, and the risk of over-reliance. Additionally, the absence of structured institutional support and professional development programs creates uncertainty about its effective use. This resistance is often rooted in a lack of familiarity with AI, skepticism regarding its pedagogical value, and fears that it may diminish the humanistic aspects of teaching.

The integration of AI tools in education has been extensively studied worldwide, highlighting both opportunities and challenges. A systematic review by Mhlanga (2023) discussed the significance of ChatGPT in education, noting its potential to assist in various educational tasks while also raising ethical considerations. Similarly, Sallam (2023) explored ethical issues related to ChatGPT, cautioning against excessive reliance on AI, which may hinder educators' creativity and critical thinking, ultimately affecting the richness of teaching practices.

The World Economic Forum has emphasized the broader implications of AI in education, advocating for comprehensive teacher training programs to ensure responsible AI use. Their recommendations highlight the need for ethical guidelines to prevent AI from replacing traditional teaching roles and instead focus on enhancing learning outcomes. These studies demonstrate the global concern over AI's potential to either support or undermine traditional pedagogical methods.

In the Philippines, AI integration in education remains in its early stages, with research efforts increasing to examine its effects. A study by Soliman (2024) investigated the adoption, perceptions, and ethical implications of AI tools among rural Philippine college students, highlighting both opportunities and challenges in AI integration.

Government initiatives are gradually incorporating AI education into the curriculum. The Department of Education (DepEd) has launched an AI Center for Education to enhance AI literacy among educators and students. However, progress has been slow, leaving many educators feeling unprepared to integrate AI effectively into their teaching strategies. This gap between technological advancements and teacher preparedness underscores the urgent need for structured training and institutional support to maximize AI's benefits in the classroom.

Despite the growing body of literature on AI integration in education, there remains a significant gap in research focusing on pre-service educators' experiences with ChatGPT, particularly within the Philippine context. While most studies examine AI's general benefits and challenges, they often overlook the specific perspectives of pre-service educators who are still refining their teaching methodologies. Furthermore, there is limited research on the unique concerns, needs, and ethical implications of AI integration among Filipino pre-service teachers. Addressing this gap is crucial for developing targeted training programs and guidelines to ensure the responsible and effective use of AI in teacher education.

Research Questions

1. What are the challenges that pre-service educators face in using ChatGPT for teaching?
2. What are the main concerns about the accuracy, credibility, and technical limitations of ChatGPT in the classroom?
3. How do pre-service educators perceive the benefits of using ChatGPT in their teaching practice?
4. What strategies or recommendations can be made to support the effective integration of ChatGPT into pre-service educator training?

Theoretical Framework

The study is anchored in several established theories that explain technology adoption and integration in education:

1. Technology Acceptance Model (TAM)

Developed by Davis (1989), the Technology Acceptance Model (TAM) explains how users adopt and accept new technologies based on perceived usefulness and perceived ease of use. In the context of this study, TAM helps to analyze pre-service educators' attitudes toward

ChatGPT and the factors influencing its adoption in teaching (Scherer, Siddiq, & Tondeur, 2020).

2. *Technological Pedagogical Content Knowledge (TPACK)*

Mishra and Koehler (2006) introduced the TPACK framework, which highlights the intersection of technology, pedagogy, and content knowledge. This framework is particularly relevant in teacher education, as it emphasizes the need for pre-service educators to develop digital competency and integrate AI tools like ChatGPT effectively into their instructional practices (Koehler & Mishra, 2009).

3. *Diffusion of Innovation Theory*

Proposed by Rogers (1962), the Diffusion of Innovation Theory describes how new technologies are adopted over time. It provides a lens to examine the varying levels of AI adoption among pre-service educators, identifying early adopters, resistors, and factors influencing AI integration in classrooms (Rogers, 2003).

Review of Related Literature (RRL)

This section presents relevant literature on AI integration in education, focusing on global and local contexts.

1. *Global Perspectives on AI in Education*

AI is increasingly being used in education worldwide. Zawacki-Richter et al. (2019) conducted a systematic review on AI applications in higher education, highlighting their potential to enhance student engagement, personalized learning, and administrative efficiency. However, concerns remain regarding ethical implications, over-reliance, and content accuracy.

2. *Pre-Service Teachers' Perceptions and Challenges*

Pre-service teachers' acceptance of AI tools is influenced by various factors, including their familiarity with technology and institutional support. Scherer, Siddiq, and Tondeur (2020) used the TAM model to analyze technology adoption among teachers, finding that perceived ease of use and institutional training programs significantly impact AI adoption.

3. *Ethical Considerations in AI Usage*

Ethical concerns surrounding AI in education include plagiarism, bias in AI-generated content, and the potential for diminished critical thinking skills among students. Holmes, Bialik, and Fadel (2019) emphasized the importance of responsible AI integration in teaching to prevent misuse and uphold academic integrity.

4. *AI Integration in the Philippine Education System*

AI adoption in the Philippines is progressing through initiatives such as the Department of Education's AI Center for Education and collaborations with Microsoft to enhance AI literacy among educators; however, challenges remain, including inadequate digital infrastructure, limited teacher training, and insufficient policy frameworks (Department of Education [DepEd], 2025; Microsoft Asia News Center, 2025; Gonzales, Mozo, & Maniquis, 2024).

Methodology

Research Design

This study employed a qualitative research design to explore the integration of ChatGPT into pre-service educators' teaching practices. Qualitative research is particularly suitable for investigating complex phenomena that require an in-depth understanding of participants' experiences, beliefs, and attitudes (Creswell & Poth, 2018). Since this research is exploratory, it primarily seeks to capture participants' perceptions, as well as the challenges and benefits of using ChatGPT in teaching. The chosen design provides a rich, contextual understanding of how pre-service teachers interact with emerging technology in educational settings.

A qualitative approach was explicitly selected over a quantitative or mixed-method approach due to its capacity to generate detailed, nuanced insights rather than numerical data. The open-ended nature of qualitative research allows for the emergence of unexpected themes and perspectives, which is crucial when studying evolving educational technologies such as ChatGPT.

Participants

This study involved 45 pre-service educators from the Bachelor of Secondary Education (BSED) Social Studies program at Bulacan State University College of Education. Participants were selected through purposive sampling, ensuring that their backgrounds and experiences

were directly relevant to the research topic (Etikan, Musa, & Alkassim, 2016). These participants were in the early stages of their teaching careers, with varying levels of exposure to ChatGPT, making them ideal candidates for examining the tool's integration into their instructional practices.

The sample size of 45 was chosen to achieve data saturation while maintaining diversity and manageability for in-depth analysis. Saturation occurs when no new themes emerge from the data, ensuring that the research captures a comprehensive range of perspectives. A smaller sample could have limited thematic variability, while a larger sample might have introduced excessive data complexity, making it challenging to conduct a thorough qualitative analysis.

Data Collection and Analysis

Data was collected using an online survey administered through Google Forms, consisting of open-ended questions designed to elicit detailed responses about participants' experiences using ChatGPT in teaching. The survey format was chosen for its convenience, accessibility, and efficiency. Participants could complete the survey at their own pace, ensuring greater participation while maintaining anonymity, which encouraged honest responses. This method also allowed for the collection of qualitative data from a relatively large sample within a reasonable timeframe. Although interviews or focus groups could have provided deeper insights, the online survey format was deemed optimal for balancing accessibility and response quality. Future research may incorporate interactive methods such as interviews or focus groups to explore emerging themes more deeply.

The survey questions covered essential aspects of ChatGPT integration, including perceived benefits, challenges, ethical concerns, and participants' familiarity with AI in education. The structure ensured a comprehensive exploration while allowing flexibility in responses.

The collected data was analyzed using thematic analysis, following the approach outlined by Braun and Clarke (2006). This method involves identifying, analyzing, and reporting patterns (themes) within the dataset, providing a structured means of exploring participant experiences. The analysis process included familiarizing with the data, coding key phrases, identifying recurring themes, reviewing and refining themes for consistency, and interpreting findings to draw meaningful conclusions about ChatGPT's role in pre-service teacher education. Thematic analysis was particularly suitable for this study due to its flexibility and ability to uncover nuanced insights into the challenges, benefits, and recommendations associated with ChatGPT integration in teaching. By employing this rigorous approach, the study ensures credibility and reliability in its findings, offering valuable insights into the evolving role of AI in teacher education.

Ethical Considerations

During this study, all ethical considerations came first. Consent forms were presented to participants clearly stating the purposes of the research, their status in relation to the nature of participation, and their rights while participating in a study. All participants were educated on their volition in contributing to the research and on how they may quit the research whenever they wanted. The respondents were also ensured to have responses to the survey conducted anonymously for full confidentiality, as well as stored data placed into secure environments through institutional ethical policies.

Results and Discussion

1. Challenges Encountered by Pre-Service Educators in Utilizing ChatGPT

This study identified several challenges in the use of ChatGPT by pre-service educators, aligning with the theoretical frameworks and literature discussed earlier. These challenges highlight gaps in AI literacy, concerns over accuracy, technical limitations, and the ethical implications of over-reliance on AI tools.

1.1 Limited Use in Teaching

Approximately 40% of respondents reported not using ChatGPT in their teaching activities. The primary reasons included a lack of knowledge about AI tools, inadequate institutional support, and skepticism regarding the tool's effectiveness for lesson planning. Many

pre-service educators preferred traditional planning methods, citing concerns over the reliability of AI-generated content.

Example Responses:

"Not yet tried implementing ChatGPT in teaching practices."

"Not frequently using ChatGPT in my lecture planning."

These findings are consistent with the Technology Acceptance Model (TAM), which suggests that perceived usefulness and ease of use significantly influence technology adoption (Scherer, Siddiq, & Tondeur, 2020). The lack of structured training and support further reinforces the need for AI literacy programs in teacher education, as emphasized in studies by Mhlanga (2023) and Sallam (2023).

1.2 Accuracy and Credibility Concerns

Half of the respondents expressed concerns regarding the accuracy of ChatGPT-generated content, particularly its tendency to produce outdated or generalized information without proper citations. This skepticism aligns with existing literature highlighting AI's limitations in ensuring factual accuracy and contextual relevance (Zawacki-Richter et al., 2019).

Example Responses:

"Most of the information is not up to date, so instead of relying on AI, I prefer to browse articles and journals."

"*Sometimes the information lacks credibility because there are no sources cited."*

This finding underscores the TPACK framework, which emphasizes the need for educators to develop digital literacy and critical evaluation skills when integrating AI into teaching. While AI can assist in summarizing knowledge, pre-service educators must be trained to verify its accuracy using reliable sources.

1.3 Technical and Practical Challenges

Approximately 30% of respondents cited technical limitations, such as difficulties processing large amounts of information, errors in responses to complex queries, and the inability to interpret visual data (e.g., charts and diagrams). Given that subjects like Social Studies often rely on visual aids, these limitations pose significant challenges to effective AI integration.

Example Responses:

"Sometimes ChatGPT causes an error when too much information is input."

"It lacks the ability to interpret visual data, which is essential for some lessons."

These challenges highlight the importance of AI literacy training, as recommended by Zawacki-Richter et al. (2019). Institutional support is crucial to equipping educators with the skills to work around AI's technical limitations.

1.4 Over-Reliance on AI

About 25% of respondents expressed concerns that excessive dependence on ChatGPT could lead to reduced creativity in lesson planning and critical thinking skills among educators.

Example Responses

"ChatGPT generalizes my work, and I prefer making my own content."

"Teachers might rely too much on AI to the extent that they fail to develop creative lesson plans."

This aligns with Holmes, Bialik, and Fadel's (2019) study on the risks of AI reliance in education. The Diffusion of Innovation Theory (Rogers, 2003) suggests that while early adopters of AI may embrace its advantages, cautious users may resist due to concerns about diminishing teacher agency. To mitigate these risks, institutions should implement guidelines that promote balanced AI use.

2. Recommendations for Effective ChatGPT Integration

2.1 AI Literacy and Capacity-Building Workshops

Respondents strongly recommended structured training programs to develop a critical

understanding of ChatGPT. These workshops should focus on evaluating AI-generated content, identifying strengths and weaknesses, and integrating AI responsibly into lesson planning.

Example Responses:

"We need more training on ChatGPT if it is to be part of teaching strategies."

"There ought to be courses and training on how to verify information given by AI."

Aligning with the TPACK framework, this recommendation highlights the need for teacher education programs to incorporate AI-related modules that enhance both technological and pedagogical competencies.

2.2 AI as an Auxiliary Teaching Tool

About 45% of respondents emphasized that ChatGPT should complement, rather than replace, traditional teaching methods. AI can be useful for brainstorming ideas, developing assessments, and generating teaching materials but should not substitute the teacher's instructional role.

Example Responses:

"I use ChatGPT to develop motivational activities and quizzes but not to create an entire lesson plan."

"It is helpful for idea generation, but the final lesson plan should be done by a teacher."

This aligns with Rogers' Diffusion of Innovation Theory, which suggests that AI adoption should be gradual and strategically aligned with existing pedagogical frameworks to ensure meaningful integration (Rogers, 2003).

3. Advantages of ChatGPT in Teaching

Despite challenges, most respondents acknowledged the advantages of ChatGPT in enhancing teaching efficiency and fostering creativity.

3.1 Efficiency and Time-Saving

Many educators reported that ChatGPT significantly reduces lesson planning time by generating drafts of lesson plans, activity ideas, and assessment questions that can be refined as needed.

Example Responses:

"ChatGPT helps teachers finish their workload quickly, giving more time for lesson delivery."

"It helps in brainstorming ideas and planning activities, saving a lot of preparation time."

This finding aligns with the Technology Acceptance Model (TAM), reinforcing the idea that perceived usefulness plays a key role in technology adoption (Scherer et al., 2020).

3.2 Creative Support and Idea Generation

Pre-service educators praised ChatGPT's ability to provide creative instructional strategies, particularly for engaging students with difficult topics.

Example Responses:

"When I don't know how to come up with an engaging activity, it gives me creative solutions."

"It gives me ideas on how to present difficult topics in a more engaging way."

This advantage aligns with the TPACK framework, which highlights AI's potential to enhance pedagogical innovation when used effectively (Koehler & Mishra, 2009).

4. Ethical Considerations in AI Integration

While the integration of ChatGPT in pre-service teacher education offers numerous advantages, it also raises ethical concerns that must be carefully examined. One of the primary issues is bias in AI-generated content, as AI models are trained on large datasets that may contain implicit biases. These biases can affect educational materials, potentially leading to misinformation or reinforcing stereotypes (Bender et al., 2021).

Another significant concern is academic integrity, particularly in relation to plagiarism and misinformation. AI-generated text can sometimes closely resemble human writing, making it difficult to distinguish original work from AI-assisted content. This poses challenges

for assessing students' actual understanding and critical thinking skills (Cotton et al., 2023).

To address these concerns, institutions should establish clear guidelines on AI usage in education, ensuring that AI tools are used ethically and responsibly. UNESCO's Recommendation on the Ethics of Artificial Intelligence (2023) underscores the importance of transparency, accountability, and human oversight in AI applications. These principles can guide educators in critically assessing AI-generated content while promoting AI literacy among students.

Summary of Key Themes

Theme	Sub-theme	Description
Challenges	Limited Adoption	Lack of familiarity with AI tools and skepticism about their effectiveness hinder the use of ChatGPT in teaching.
	Credibility Concerns	AI-generated content is often outdated, lacks citations, or contains misinformation, raising concerns about accuracy.
	Technical Limitations	Difficulties in processing large data, interpreting visuals, and handling complex queries limit the practical use of ChatGPT.
	Over-Reliance	Excessive dependence on AI may reduce creativity and critical thinking skills in lesson planning.
Benefits	Efficiency	ChatGPT streamlines lesson planning and idea generation, saving time for educators.
	Creative Support	AI provides innovative instructional strategies and helps engage students with challenging topics.
Recommendations	AI Literacy Training	Structured workshops and courses are needed to enhance understanding and responsible use of ChatGPT.
	Complementary Use	AI should be used as a supplementary tool, not a replacement for traditional teaching methods.
	Ethical Guidelines	Clear policies and standards are necessary to address bias, plagiarism, and misinformation in AI-generated content.

Practical Implications and Policy Recommendations

The integration of ChatGPT and other AI-powered tools into pre-service teacher education presents both opportunities and challenges. While AI can enhance instructional strategies and foster innovation in the classroom, its responsible and effective use requires institutional support, structured training, and clear ethical guidelines. This section provides specific recommendations to ensure that pre-service educators are well-equipped to integrate AI into their teaching practices while maintaining pedagogical integrity.

1. Institutional Professional Development in AI Literacy for Pre-Service Teachers

Higher education institutions, particularly colleges of education, must embed AI literacy training into teacher education programs. AI literacy extends beyond technical proficiency—it encompasses the ability to critically evaluate AI-generated content, understand its ethical implications, and apply it effectively in instructional contexts. Professional development initiatives should cover:

1.1 Evaluating AI-Generated Content for Bias and Reliability – AI models like ChatGPT generate responses based on large-scale

datasets, which may contain biases (Bender et al., 2021). Pre-service teachers must be trained to critically assess AI-generated materials for factual accuracy, relevance, and alignment with pedagogical standards (UNESCO, 2023).

1.2 Guidelines on Ethical AI Use in Teaching – Institutions should establish clear ethical guidelines for using AI in lesson planning, assessments, and student interactions (OECD, 2021). This includes ensuring academic integrity, preventing plagiarism, and fostering original student work.

1.3 Practical AI Integration Workshops – Structured training programs should include hands-on workshops and teaching simulations where pre-service educators experiment with AI-enhanced lesson plans and assessments. These activities will help teachers understand when and how AI should be integrated into teaching (Luckin et al., 2022).

2. Inclusion of ChatGPT in the Teacher Education Curriculum

Given AI's growing role in education, teacher preparation programs must integrate AI-specific coursework into their curricula. The following strategies can ensure that pre-service teachers develop AI competency:

2.1 AI-Focused Coursework in Education Programs – Universities should offer dedicated courses on AI applications in education, covering topics such as AI-enhanced instruction, differentiation strategies, and AI ethics (Selwyn, 2022). These courses will help pre-service teachers develop informed perspectives on AI's role in teaching.

2.2 Project-Based Learning on AI Critique and Usage – Teacher candidates should be required to analyze AI-generated content, identify biases, and assess its pedagogical validity. For example, coursework could include comparing AI-generated lesson plans with human-designed ones and discussing their strengths and limitations (Mollick, 2023).

2.3 AI-Assisted Teaching Simulations – Universities can implement AI-driven teaching simulations, where pre-service teachers practice classroom management, differentiated instruction, and formative assessment strategies using AI-generated case scenarios (Kumar & Rose, 2023). These simulations help educators refine their instructional techniques before entering real classrooms.

3. Government Support and Policy Development

The Department of Education (DepEd) and other regulatory bodies must play an active role in guiding AI integration in teacher education. Policy initiatives should focus on:

3.1 Establishing National AI Literacy Standards – Governments should develop AI literacy frameworks for educators, ensuring that AI use in education is ethical, pedagogically sound, and aligned with national learning standards (UNESCO, 2023). These standards should outline best practices for AI-assisted instruction, assessment reliability, and student data protection.

3.2 Funding AI Training Programs for Pre-Service and In-Service Teachers – Many educators, particularly those in underprivileged areas, lack access to AI training. Government-funded AI workshops and certification programs can ensure equitable AI literacy development across teacher populations (OECD, 2021).

3.3 Encouraging AI-Enhanced Assessments with Human Oversight – AI can assist teachers in grading, formative assessment, and feedback generation, but human oversight is essential to ensure fairness and contextual accuracy. National policies should mandate teacher involvement in AI-assisted evaluation processes** to prevent over-reliance on automated grading (Mollick, 2023).

3.4 Public-Private Partnerships for AI Training – Collaborations between government agencies, universities, and tech companies can support AI education initiatives. For example, partnerships with EdTech firms can provide customized AI training programs or educators, ensuring that they receive context-specific AI education relevant to their teaching needs (Kumar & Rose, 2023).

Conclusion

The integration of AI tools like ChatGPT into pre-service teacher education requires comprehensive institutional and governmental support to ensure its effective and responsible use. Establishing structured AI literacy programs, embedding AI-focused coursework in teacher training curricula, and formulating national policies on ethical AI use are essential steps toward maximizing its benefits while addressing potential risks. By equipping future educators with AI competencies and ethical awareness, they can harness AI as a supplementary pedagogical tool that enhances lesson planning, creativity, and differentiated instruction. Ultimately, fostering AI-literate and critically informed educators will contribute to innovative teaching practices and improved student learning outcomes in the evolving landscape of 21st-century education.

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