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RESEARCH ARTICLE

ASSESSING FUTURE TEACHERS' READINESS IN AN AI-DRIVEN CLASSROOM

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ABSTRACT

The integration of Artificial Intelligence (AI) in education is rapidly advancing, offering personalized learning experiences and enhancing teacher effectiveness. However, there is a critical need to assess future teachers' readiness for AI-driven classrooms. This study aimed to determine the Future Teachers' Readiness in an AI-Driven Classroom (ADC). Using a descriptive-correlational research design, and purposive sampling, data were collected from Teacher Education students. The researchers utilized an adapted research instrument based on the Meta AI Literacy Scale. The analysis involved utilizing descriptive statistics such as the mean and standard deviation, along with inferential statistics such as the Spearman rho-rank order correlation. Results indicated that future teachers demonstrated a strong grasp of AI ethics but showed lower readiness in using and applying AI tools and AI problem-solving. A moderate positive correlation was found between AI literacy and AI self-management. In conclusion, the study revealed that while future teachers displayed a solid understanding of AI ethics, there was a need for further development in utilizing AI tools and problem-solving skills. Recommendations included tailored training programs focusing on practical AI applications, problem-solving strategies, and building AI self-management skills to bridge identified gaps. By addressing these areas, teacher training programs could better prepare future educators to effectively leverage AI tools, ensuring a smooth transition to AI-Driven Classrooms (ADC) and enhancing the overall learning experience for students and teachers alike.

INTRODUCTION

The use of Artificial Intelligence (AI) tools to support and enhance learning in the classroom is on the rise. Integrating AI in the classroom is no longer a way forward. It is here now. Aybala (2023) AI has provided students with enhanced learning experiences as it enables learning materials to be customized and personalized according to students' needs and abilities. The ability of AI to tailor learning materials to individual student strengths and weaknesses has the potential to significantly improve classroom instruction. AI enhances teachers' effectiveness by automating time-consuming administrative tasks such as grading assignments and tests, tracking student attendance, or documenting behavioral issues. This automation allows teachers to spend more time doing what they do best—inspiring, instructing, and providing personal mentorship to students (Fastiggi, 2023). While the AI powered tools have the potential to automate tasks, personalize learning, enhance students' engagement, and teachers' productivity, effectively integrating them into the classroom requires teachers with a new skill set. While research explores AI's impact on student learning, a crucial gap exists in assessing future teachers' preparedness for AI-driven classrooms (Mohammadi, 2024).

Assessing future teachers' readiness for AI-driven classrooms, particularly their AI literacy and self-management skills, holds significant value for the future of education. Teachers with strong AI literacy will be better equipped to leverage AI tools effectively, personalize learning experiences, and ensure responsible use that avoids perpetuating biases. AI self-management empowers teachers to adapt to evolving AI technologies, troubleshoot challenges, and maintain their expertise in this dynamic field. This translates to increased confidence, proactive problem-solving, and ultimately, a smoother learning and teaching experience for both students and teachers. Apparently, there is a need to adequately prepare future teachers to harness the potential of AI technologies and adapt their teaching methodologies accordingly. By identifying the areas where future teachers may require additional support and training, the results of this study may provide a basis for policymakers, teacher training institutions to develop comprehensive and effective teacher training programs that align with the demands of an AI-driven classroom.

Theoretical Background: The study "Assessing Future Teachers' Readiness in an AI-Driven Classroom" draws on Bandura's Self-Efficacy Theory (1977), which focuses on individuals' perceptions of their ability to control their

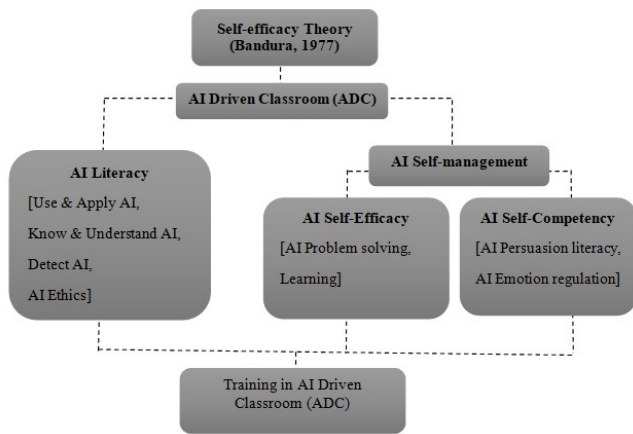


Figure 1. Theoretical-Conceptual Framework

behavior and environment. Self-efficacy reflects a person's confidence in executing actions necessary to achieve specific goals. Bandura's theory posits that self-efficacy beliefs impact various aspects of human experience, such as goal-setting, effort, and performance outcomes. It underscores the significance of self-beliefs in influencing human behavior and performance across different domains. This theory offers valuable insights into the factors driving motivation, resilience, and personal accomplishment, making it a solid theoretical basis for assessing the readiness of future teachers in an AI-driven classroom environment. There are also studies that contributed to understanding the potential influence of AI capability in an educational organization on students' self-efficacy, learning motivation, and critical thinking awareness in education (Jia & Tu, 2024).

Studies by Andrej *et al.* (2023) emphasize the need for educators to possess not only the knowledge of AI tools but also the critical assessment skills to determine if these AI-supported activities align with their specific teaching objectives and foster a desired transformation in teaching methods. Building on this, research by Abdulla & Al-Darayseh (2023) with a sufficient sample size suggests a positive correlation between teacher comfort with AI and their self-efficacy in the classroom. This highlights a key benefit of equipping teachers with the necessary skills and knowledge to leverage AI effectively. Rosemary *et al.* (2022) proposes that teacher training programs be adapted to include AI integration strategies. This would support educators in developing the confidence and skills needed to utilize these tools in a way that enhances their teaching practice. Taken together, these studies underscore the multifaceted nature of successful AI integration in the classroom. It's not just about introducing technology; it's about equipping educators with the critical thinking skills, pedagogical alignment strategies, and comfort level to leverage AI in a way that empowers them to transform their teaching practices. Teacher training programs should be redesigned to address these needs, ensuring educators are not only knowledgeable about AI tools but also possess the critical assessment and pedagogical skills necessary for maximizing the benefits of AI in the classroom.

Objectives: This study aimed to determine the Future Teachers' Readiness in an AI-Driven Classroom. Specifically, the study sought to answer the following; (a) What is the future teachers' readiness in an AI-Driven Classroom in relation to their: 1.

AI literacy; 2. AI Self- Management? (b) What aspect of an AI-Driven Classroom do future teachers assess themselves as ready and unready? (c) Is there a significant relationship between the future teachers' AI literacy and AI Self-Management? (d) Based on the findings, what training can be recommended to ensure future teachers' readiness in an AI-driven classroom?

METHODOLOGY

The study employed a descriptive-correlational research design to assess the pre-service teachers' level of artificial intelligence and self-management. Descriptive research design aimed to describe the readiness level of the AI-Driven Classroom (ADC), while correlational research design investigated the relationships between variables without manipulating them. The study was conducted within the Higher Education Institution, specifically in the College of Teacher Education located in Cebu province. The college offered Bachelor of Elementary Education (BEED) and Bachelor of Secondary Education (BSED) programs, majoring in English, Mathematics, Filipino, and Social Studies, all of which were PACUCOA level III accredited. The participants included students in the College of Teacher Education taking the BSED and BEED programs. The participants were selected through random sampling. The desired number of samples was determined with the use of Slovin's formula with a standard error of 5%. The researcher used stratified sampling techniques to determine the desired number of participants per program, field of specialization, and year level.

The study used an adapted questionnaire based on the Meta AI Literacy Scale (Carolus *et al.*, 2023). The instrument consisted of two constructs: AI literacy Skills and Self-management Skills. The AI literacy skills comprised sub-constructs such as Use and Apply AI, Know and Understand AI, Detect AI, and AI Ethics. The Self-management Skill comprised two sub-constructs such as AI Self-Efficacy (AI problem-solving and AI learning) and AI Self-Competency (AI Persuasion literacy and AI emotion regulation). The instrument underwent confirmatory factor analysis to examine the convergent validity, discriminant validity, and model fit measures. The instrument showed an acceptable model fit ($\chi^2(2035) = 3004.35$, $p < .001$, CFI = .900, TLI = .894, RMSEA = .043, 95%-CI [.039, .047], SRMR = .069). Based on the threshold values, the CFI should exceed 0.80 (Garson 2006), the TLI should be greater than 0.85 (Sharma *et al.* 2005), RMSEA should be less than 0.08 (Kenny *et al.* 2014) for a good fit and between 0.08 to 0.10 for a mediocre fit, and any value above 0.10 as poor fit (MacCallum *et al.*, 1996), and SRMR should be equal to or less than 0.08 (Hu and Betler 1999). Thus, the instrument passed the validity and reliability testing.

The researchers obtained permission from the dean of the College of Teachers Education before collecting data through a survey questionnaire. The respondents were given informed consent and were asked if they were willing to participate in the study. The researchers examined and assessed the results after collecting the information. The data was analyzed quantitatively; descriptive statistics (mean and standard deviation) were calculated to assess the future teachers' level of readiness in an AI-Driven Classroom (ADC) in relation to AI literacy and AI self-management skills.

Additionally, descriptive statistics were used to determine the aspects of an AI-Driven Classroom (ADC) in which the future teachers were ready or unready. Finally, the Spearman rho rank – order correlation was used to assess the significant relationship between the future teachers' AI literacy and AI self-management skills.

RESULTS AND DISCUSSION

Table 1 showed the future teachers' readiness in an AI-Driven Classroom (ADC) in terms of AI literacy. All sub-constructs under AI literacy showed an agreed-upon level of readiness in ADC with mean score ranges from 3.74 – 3.99. AI ethics projected the highest level with ($M = 3.99$, $SD = 0.671$), while Use and Apply AI projected the lowest level of agreement with ($M = 3.74$, $SD = 0.826$).

Table 1. The future teachers' readiness in an AI-Driven Classroom (ADC) in terms of AI Literacy

Variable	N	Mean	SD	Interpretation
Use & Apply AI	134	3.74	0.826	Agree
Know & Understand AI	134	3.97	0.585	Agree
Detect AI	134	3.87	0.728	Agree
AI Ethics	134	3.99	0.671	Agree
Overall: AI Literacy	134	3.88	0.583	Agree

Note: 1.00 – 1.79 (Strongly Disagree); 1.80 – 2.59 (Disagree); 2.60 – 3.39 (Neither Agree nor Disagree); 3.40 – 4.19 (Agree); 4.20 – 5.00 (Strongly Agree)

Table 2. The future teachers' readiness in an AI-Driven Classroom (ADC) in terms of AI Self-Management

Variable	N	Mean	SD	Interpretation
AI Self-Efficacy				
AI Problem solving	134	3.49	0.772	Agree
Learning	134	3.55	0.731	Agree
AI Self-Competency				
AI Persuasion literacy	134	4.00	0.772	Agree
AI Emotion regulation	134	3.57	0.848	Agree
Overall: AI Self Management	134	3.65	0.622	Agree

Note: 1.00 – 1.79 (Strongly Disagree); 1.80 – 2.59 (Disagree); 2.60 – 3.39 (Neither Agree nor Disagree); 3.40 – 4.19 (Agree); 4.20 – 5.00 (Strongly Agree)

Table 3. The Correlation Matrix between AI Literacy and AI Self-Management

1.AI Literacy	Spearman's rho	—		
	df	—		
	p-value	—		
2.AI Self-Management	Spearman's rho	0.595	***	—
	df	132		—
	p-value	<.001		—

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

This meant that the future teachers' readiness in ADC leaned more towards ethical considerations rather than depending on using and applying AI in their respective fields of study. Overall, the AI literacy level projected an agreement on the future teachers' readiness in an AI-Driven Classroom (ADC) with ($M = 3.88$, $SD = 0.583$). The results implied that future teachers were generally well-prepared in terms of AI literacy for an AI-Driven Classroom (ADC), with a strong emphasis on AI ethics readiness. This suggested a positive trend towards responsible AI integration in education, as educators showed the highest agreement on awareness regarding ethical considerations.

However, there was a slight gap in their readiness to actively use and apply AI tools, indicating a need for targeted training and support in practical AI implementation skills. The findings supported the previous researchers that future teacher stated a good attitude toward AI education but less ready AI-related skills, indicating that they may be less prepared in terms of AI literacy (Polak, *et al.*, 2022). Additionally, Thiene (2023) and Lim & Lee (2023) indicated that pre-service teachers demonstrated AI literacy, positive perception of AI, and enhanced grasp of AI educational technology tools. The table 2 showed the future teachers' readiness in an AI-Driven Classroom (ADC) in terms of AI Self-Management. All sub-constructs under AI Self-Management showed an agreed level on their readiness in ADC with the mean score ranging from 3.49 – 4.00. The AI persuasion literacy projected the highest level with ($M = 4.00$, $SD = 0.772$) while AI problem-solving projected the lowest level of agreement with ($M = 3.49$, $SD = 0.772$). This meant that the future teachers' readiness in ADC gave more emphasis on AI persuasion literacy rather than on AI problem-solving in their respective fields of study. The data also showed that the future teachers marked a highest agreement in AI self-competency compared to AI self-efficacy. Overall, AI self-management level projected an agreement of the future teachers' readiness in an AI-Driven Classroom (ADC) with ($M = 3.65$, $SD = 0.622$). The findings have numerous key implications.

Firstly, there appeared to be a greater emphasis on AI persuasion literacy than AI problem-solving skills, indicating a potential shift toward using AI for engaging teaching and learning processes. Furthermore, while future teachers were more confident in their AI self-competency, they may have had lower levels of self-efficacy in using AI to achieve desired results or solve complex problems. Overall, the agreement level of AI self-management readiness emphasized educators' ability to efficiently manage AI-related tasks in the classroom, setting the path for new and engaging learning experiences. The aspect of an AI-Driven Classroom (ADC) that future teachers assessed themselves as ready projected more towards ethical considerations and AI persuasion literacy. They might have been less ready on using and applying AI and AI problem-solving in their respective fields of study. The findings imply that future teachers' self-assessment of readiness in an AI-Driven Classroom (ADC) reflected a notable emphasis on ethical considerations and AI persuasion literacy, indicating a greater understanding of ethical AI integration and effective ways of interacting in educational contexts. The findings supported the previous researchers that future teacher stated a good attitude or ethics toward AI education but less ready AI-related skills, indicating that they may be less prepared in terms of AI literacy (Polak, *et al.*, 2022).

Additionally, Light & Panai, 2022) focused on ethical principles in AI integration, emphasizing the increasing recognition of ethical considerations as well as the significance of AI persuasion literacy for ethical AI deployment. However, their perceived readiness to use and apply AI, as well as AI problem-solving, appeared to be slightly lower compared to the other constructs, which were somehow considered as less ready. In general, the future teachers projected a slightly high level of agreement in AI literacy compared to AI self-management. This implies that the future teachers were much more ready in AI literacy

compared to AI self-management. Table 3 showed a moderate positive correlation between AI literacy and AI self-management ($r = 0.595$, $p < .001$, $N = 132$). The p-value of less than .001 indicated that this correlation was statistically significant. The findings of the study was related to the previous research as stated by Abdulla & Al-Darayseh (2023) a positive correlation between teacher comfort with AI and their self-efficacy in the classroom. This meant that as the AI literacy increased, the AI self-management also increased. This finding emphasized the significance of including AI literacy programs into future teacher training, allowing educators to not only understand AI concepts but also navigate AI-driven educational environments responsibly. By stressing practical AI self-management abilities, educators could use AI technologies to increase student engagement and address ethical concerns, ultimately boosting teaching practices and learning experiences in AI-Driven Classrooms (ADC). As stated by Rosemary *et al.* (2022) that teacher training programs be adapted to include AI integration strategies

CONCLUSION

This study investigated the readiness of future teachers for AI-driven classrooms by focusing on their understanding of AI (AI literacy) and their ability to manage AI tools (AI self-management). The findings offer valuable insights on aspects where they are ready and less ready.

Ready: Future teachers demonstrate a grasp of ethical considerations surrounding AI use in education. Additionally, they hold positive overall perceptions of AI's potential. These factors suggest a strong foundation for the responsible and enthusiastic integration of AI tools in future classrooms. Essentially, future teachers seem open to AI and its potential benefits, which is a key element for successful implementation.

Less Ready: Future teachers displayed lower readiness in understanding specific applications of AI and in problem-solving skills related to these tools. This highlights the need for teacher training programs to address this gap. Equipping future educators with the knowledge of how to effectively utilize AI for various learning objectives and how to troubleshoot technical challenges is crucial for successful implementation. Notably, the study also found a moderate positive correlation between AI literacy and AI self-management.

This suggests that strengthening teachers' understanding of AI (AI literacy) can provide a foundation for developing the confidence and skills to manage these tools effectively (AI self-management). This highlights an opportunity for improvement in both key areas for a more holistic approach to teacher training in AI-driven classrooms. In essence, while future teachers possess basic knowledge about AI and its ethical implications (AI literacy), they may require further support in developing the confidence and skills to manage and adapt to AI tools within the classroom (AI self-management). This translates to a need for training programs to go beyond simply teaching about AI. These programs should delve deeper into practical applications and equip future teachers with problem-solving strategies for AI-related issues.

Recommendation

In light of the given findings and conclusion, the following trainings can be conducted to bridge the identified gap:

- Practical Applications of AI in Classroom Setting: Expose future teachers to real-world scenarios of how AI can be used for various learning objectives across different subjects. This could involve hands-on workshops with existing AI tools in education.
- Problem-Solving Strategies for AI: Equip future educators with the skills to troubleshoot technical challenges related to AI tools. This might involve training on common issues and strategies for resolving them effectively within the classroom environment.
- Building AI Self-Management: Foster a growth mindset and encourage experimentation with AI. This can involve providing opportunities for future teachers to practice using AI tools, reflect on their experiences, and develop confidence in managing AI effectively in the classroom.

By addressing these areas for improvement, teacher training programs can ensure future educators are well-equipped to leverage the power of AI. This will empower them to navigate the evolving landscape of AI-driven classrooms with confidence and effectiveness, ultimately fostering a more personalized and successful learning experience for all students.

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