Assessing Attitudes toward Artificial Intelligence among Future Science Educators: A Comprehensive Study of Cognitive, Emotional, and Behavioral Dimensions

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ABSTRACT

Artificial Intelligence (AI) plays an increasingly vital role in education, yet future educators' readiness and perceptions of AI remain key considerations for its effective integration. This study investigated the attitudes of Future Science Educators toward AI, specifically focusing on the behavioral, cognitive, and emotional/affective dimensions. Additionally, the study aimed to determine the predictors of these attitudes, including demographic variables such as sex, age, and frequency of AI use. Using a descriptive-correlational research design, data were collected from 82 voluntary members of the Future Science Educators Organization (FSEO) at Nueva Vizcaya State University, Bayombong Campus, through a survey questionnaire. The results showed that the respondents generally exhibited positive attitudes toward AI in all the dimensions, with the cognitive dimension showing the "Agree" interpretation. The emotional and behavioral dimensions also elicited "Agree" interpretations but reflected slight hesitations concerning the practical application of AI in personal contexts. No significant differences in attitudes toward AI emerged when grouped by sex or age, and a very weak, non-significant correlation emerged between the frequency of AI use and attitudes. Regression analysis further confirmed that sex, age, and frequency of AI use were not significant factors of attitudes, explaining only 0.3% of the variance. Implications for policy and practice are discussed by the researcher to guide the effective integration of AI into future science education.

Key Words: Artificial Intelligence, Attitudes Toward AI, Future Science Educators, Attitudes

INTRODUCTION

The term Artificial Intelligence (AI) was first coined by John McCarthy in 1956 during the Dartmouth Summer Research Project on Artificial Intelligence, an event widely recognized as the formal beginning of AI as a scientific field (Adrain, 2019; Mintz & Brodie, 2019; Gunter, 2021). However, foundational ideas regarding the possibility of machines simulating human intelligence were introduced earlier by Alan Turing, who proposed the Turing Test as a method for distinguishing human intelligence from machine behavior (Mintz & Brodie, 2019). Early conceptual contributions to the development of intelligent systems can also be traced to Vannevar Bush, whose seminal essay "As We May Think" articulated a vision of human–machine interaction and information processing that later influenced AI research (Gunter, 2021). Over time, AI has evolved to encompass major subfields such as machine learning, neural networks, and deep learning, which underpin many contemporary AI systems and applications (Sachdeva, 2023). In the present era, AI has become integrated into various aspects of daily life, including virtual personal assistants, automated transportation systems, and digital gaming environments, demonstrating its expanding influence across multiple domains (Mintz & Brodie, 2019).

Building on its historical development and expanding capabilities, Artificial Intelligence (AI) has become a central component of contemporary educational systems. Recent scholarship identifies AI as a transformative force in education, reshaping traditional teaching paradigms and learning experiences through the use of adaptive and intelligent technologies (Young, 2024). The integration of AI in education includes applications such as personalized learning environments, intelligent tutoring systems, and data-driven analytics, which enable instruction to be tailored to learners' individual needs and learning trajectories. These AI-enabled tools enhance

multiple dimensions of education, including teaching effectiveness, student learning, assessment practices, and institutional operations by improving efficiency, responsiveness, and evidence-based decision-making (Chhatwal et al., 2023). As AI continues to evolve and gain wider adoption, its growing presence in educational contexts underscores the importance of examining how educators understand, perceive, and engage with these emerging technologies.

Recent studies have explored educators' attitudes toward Artificial Intelligence (AI) in education, addressing a gap in prior research that primarily focused on students' perspectives. Complementing this shift, student-centered research has shown high levels of awareness, positive perceptions, and extensive use of AI tools in academic work, with variations across gender and programme type (Joseph et al., 2024). Teachers generally hold favorable attitudes toward AI and acknowledge its potential impact on education; however, their current knowledge remains limited due to a lack of formal training opportunities (Davis, 2024; Almaraz-López et al., 2023). Many educators acquire AI knowledge independently, underscoring the need for structured and organized training programs to bridge this gap (Konecki et al., 2024). In countries like Bangladesh, for instance, university teachers have limited understanding of AI yet view it as a valuable educational opportunity (Shirin, 2022).

Teachers also express a need to build greater confidence in their AI skills and emphasize the urgency of training on AI-related issues (Fissore et al., 2024). A study by Ayanwale and Sanusi (2023) further highlights that while STEM and non-STEM teachers demonstrate similar readiness to teach AI, significant differences exist in their levels of anxiety, attitudes, and behavioral intentions. Consequently, there is a growing call for practice-oriented curricula in AI teacher training programs, as many theory-centric courses fail to provide the practical skills necessary for real-world classroom applications (Davis, 2024). These findings underscore the importance of expanding and enhancing AI education, enabling them to confidently and responsibly integrate AI into their professional practice (Almaraz-López et al., 2023).

While these studies provide valuable insights, existing literature primarily analyzes AI’s role and the attitude of educational stakeholders from an international standpoint, and it may not fully address the specific contexts and needs of prospective educators in the Philippines. To date, only limited local studies have explored perceptions of AI in educational settings. However, these studies do not specifically target future science educators, nor do they investigate the potential correlation between AI usage frequency and attitudes toward AI. This notable gap highlights the necessity for localized research that examines future science educators’ perspectives on AI, considering demographic factors such as gender and age, as well as the frequency of AI application usage. Such research is valuable to ensure that future educators are equipped to navigate and implement AI-driven innovations in their teaching practices effectively.

In summary, as AI continues to redefine the educational landscape, understanding the attitudes of those who will serve as educators in the future is important. By investigating the attitudes of future science educators towards AI, this research not only contributes to academic scholarship but also has the potential to impact educational practices and policies on a broader scope. The results will not only benefit educators themselves but also ultimately enrich the learning experiences of students in science and other disciplines.

Statement of the Problem

This study aimed to explore the attitudes of future science educators toward Artificial Intelligence, focusing on cognitive, emotional, and behavioral dimensions.

Specifically, this study sought answers to the following questions:

1. What is the level of attitudes of Future Science Educators toward Artificial Intelligence in terms of
   - Behavioral Aspect
   - Cognitive Aspect
   - Emotional/Affective Aspect

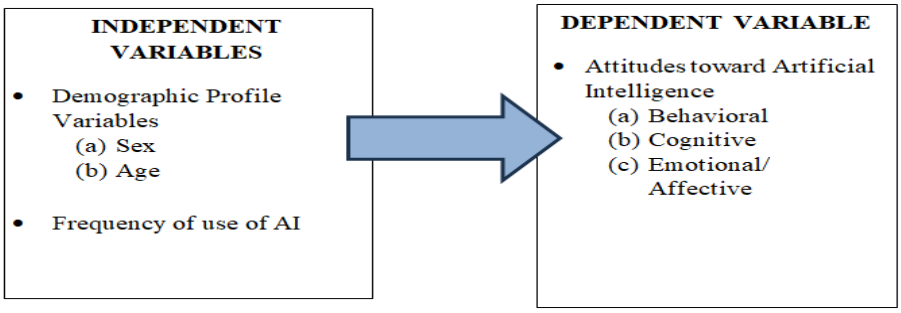
2. Is there a significant difference in attitudes toward Artificial Intelligence when grouped by the following profile variables:

   - Sex
   - Age

3. Is there a significant correlation between the frequency of use of AI applications and the attitudes toward Artificial Intelligence among the members?

4. Which among the variables significantly influences attitudes toward Artificial Intelligence?

Conceptual/Theoretical Framework



This study is anchored on the examination of attitudes toward Artificial Intelligence (AI) among Future Science Educators, with particular emphasis on the cognitive, emotional/affective, and behavioral dimensions of attitude. The conceptual framework proposes that attitudes toward AI are shaped by selected independent variables, namely demographic characteristics (sex and age) and the frequency of AI use in educational contexts. These variables are posited to influence how future science educators evaluate AI, which may, in turn, affect their openness to accepting and integrating AI into academic and future professional practices. The framework reflects the assumption that individual background factors and exposure to AI contribute to the formation of evaluative orientations toward emerging technologies. The dependent variable of the study, attitudes toward Artificial Intelligence, is operationalized as a multidimensional construct consisting of cognitive, emotional/affective, and behavioral components. The cognitive dimension refers to beliefs, understanding, and perceptions regarding AI and its relevance to education. The emotional/affective dimension encompasses feelings, trust, and comfort toward AI, while the behavioral dimension reflects evaluative tendencies and willingness to engage with and use AI-related tools. Together, these dimensions provide a comprehensive representation of attitudes toward AI, capturing both rational evaluations and affective responses without extending into behavioral intention or actual usage.

The theoretical foundation of this study is grounded in the Theory of Planned Behavior (TPB) proposed by Ajzen. TPB posits that human behavior is influenced by attitude toward the behavior, subjective norms, and perceived behavioral control. In this study, the framework draws specifically on the attitudinal component of TPB, conceptualizing attitudes toward AI as an overall evaluative orientation toward engaging with AI. While TPB also includes normative and control-related components, these are not examined in the present study, as the primary objective is to assess evaluative attitudes rather than predict intention or behavior. By situating the framework within TPB, the study provides a theoretically sound basis for understanding how future science educators form attitudes toward AI and how these attitudes relate to selected demographic factors and exposure to AI.

METHOD

Research Design

This study used a quantitative approach, particularly:

Descriptive, as it described the level of attitudes of future science educators toward Artificial Intelligence (AI) across cognitive, emotional, and behavioral dimensions.

Comparative, as it explored the significant difference in attitudes toward AI when future science educators were grouped by profile variables such as sex and age.

Correlational, as it examined the relationship between the frequency of AI application usage (ordinal data) and the attitudes toward AI among future science educators.

Research Locale

The study was conducted at Nueva Vizcaya State University (NVSU), Bayombong Campus, located in Bayombong, Nueva Vizcaya, Region II, Philippines. It was formed in 1926 by merging the Nueva Vizcaya State Institute of Technology (NVSIT) and the Nueva Vizcaya State Polytechnic College (NVSPC). Recognized as a SUC Level IV and ISO-certified institution, it is known for its commitment to academic excellence, research, and innovation. The university was chosen as the research environment due to its reputation for producing competent future science educators and its emphasis on technological advancements. The Future Science Educators Organization (FSEO) at NVSU provided a focused group of respondents, aligning with the study's aim to explore attitudes toward AI in education.

Respondents of the Study

The respondents of the study were the members of the Future Science Educators Organization (FSEO) at Nueva Vizcaya State University (NVSU), Bayombong Campus. With a total of 103 members, the study used a 95% confidence level and a 5% margin of error.

Table 1 Demographic Profile of Respondents

Profile	**Categories**	**Frequency**	**Percentage**
Sex	Male	40	48.8
	Female	42	51.2
Age	16-18	17	20.7
	19-21	18	22.0
	22-24	17	20.7
	25-27	15	18.3
	28 and above	15	18.3

Table 1 below shows the demographic profile of the respondents of the study. The demographic profile of the respondents shows that there are more females than males, with females making up 51.2% of the participants compared to males at 48.8%. This indicates a slightly higher representation of females in the study.

Regarding age groups, the group of 19-21 years old makes up the largest proportion of respondents which is 22% of the total participants. The next two age groups, 16-18 and 22-24 are close in terms of proportion with each group making up to 20.7% of the total respondents. The two groups of 25-27 and 28 and above have a smaller proportion as each make up 18.3% of the total respondents. Overall, the results indicate that there are more young respondents than in the older age groups.

Research Instruments

The research utilized the SATAI scale with 26 items, developed initially by Suh and Ahn (2022), to measure the cognitive, emotional, and behavioral dimensions of attitudes toward artificial intelligence. The version of the scale used in this study comprises 25 items, as reported by Katsantonis and Katsantonis (2024), where the item *"I am afraid of AI in education"* was excluded. It was excluded from analysis because it failed to load on any factor in their adaptation. The new scale was validated for use in education with excellent reliability as demonstrated by the Cronbach's alpha values shown for each factor:

- Behavioral aspect: 0.816
- Cognitive aspect: 0.895
- Emotional aspect: 0.828

These values suggests that instrument demonstrates both validity and reliability, adhering to the established Cronbach's alpha threshold of 0.70 and above.

Data Gathering Procedure

To collect the necessary data for the study, the researcher first obtained permission from the advisers of the Future Science Educators Organization (FSEO) to administer the questionnaire. Once approval was granted, the researcher drafted a formal letter addressed to the respondents, outlining the purpose of the study and requesting their voluntary participation. The questionnaire was then distributed with the help of the FSEO advisers and officers. To ensure inclusivity, the researcher provided the questionnaire in two formats: online via Google Forms for respondents with internet access, and printed copies for those without. This approach allowed all potential respondents the opportunity to participate. After completing the questionnaires, the researcher collected both online and printed responses. The data from both formats were then consolidated, which was prepared for analysis.

Statistical Treatment of Data

The researcher employed both descriptive and inferential statistical methods to assess the attitudes of future science educators toward Artificial Intelligence (AI), focusing on the cognitive, emotional, and behavioral components.

Descriptive Statistics

For data organization and basic analysis, MS Excel was employed to compute frequencies, percentages, and mean scores. Descriptive statistics were used to determine the level of attitudes of the respondents toward AI. To interpret responses, a four-point Likert scale was used, as shown in Table 2 below:

Table 2 Interpretation of Future Science Educators' Attitudes toward AI Based on Likert Scale Scores

Score Range	Interpretation	Meaning/Level of Attitude toward AI
1.00 - 1.49	Strongly Disagree	Very Negative Attitude
1.50 - 2.49	Disagree	Negative Attitude
2.50 - 3.49	Agree	Positive Attitude
3.50 - 4.00	Strongly Agree	Very Positive Attitude

Inferential Statistics

On the other hand, the researcher used SPSS 16 for inferential statistics like t-test, Analysis of Variance [ANOVA], Pearson-R Moment of Correlation, and linear regression analysis. The Independent t-test was used to determine if there is a significant difference in attitudes toward AI when grouped by sex. The One-Way Analysis of Variance (ANOVA) was used to test for significant differences in attitudes when grouped by age. The Pearson's R Correlation Coefficient was used to examine the relationship between the frequency of use of AI applications and the attitudes toward AI. Lastly, the Linear Regression Analysis was utilized to identify which among the variables (sex, age, frequency of AI use) significantly influences respondents' attitudes toward AI.

RESULTS AND DISCUSSIONS

The main objective of the study is to assess the attitudes of Future Science Educators toward Artificial Intelligence and identify the factors affecting those attitudes. This study offers a comprehensive exploration into their cognitive, emotional, and behavioral/affective attitudes of AI. The following tables below show the results and discussions of the study.

Table 3 Frequency Count and Percent Distribution of Attitudes Toward AI Among Future Science Educators

Level of Attitudes toward AI	*Frequency*	*Percentage*
Strongly Disagree	0	0
Disagree	10	12.2
Agree	69	84.1
Strongly Agree	3	3.7
Total	82	100.0

Mean: 2.90 (Agree) *Standard Deviation: 0.36*

According to the findings, the attitude of Future Science Educators toward AI is in the Positive Attitude category with a mean score of 2.90. This indicates that 84.1% have a positive attitude; only 3.7% strongly agreed, while 12.2% disagreed. No respondent answered with Strongly Disagree indicating that none of the respondents held a Very Negative attitude towards AI. The standard deviation of 0.36 shows that there is a consistent agreement among the respondents. However, the absence of "Very Positive Attitudes" (Strongly Agree) indicates that while participants recognize AI's importance, their perceptions remain cautious and reflective of moderate acceptance rather than full enthusiasm. The findings are in line with studies that point out educators have generally positive attitudes toward AI and its potential in educational contexts. Annuš (2024) supports this by showing that educators across various disciplines are open to AI technologies, underscoring the importance of teacher knowledge in effectively integrating these tools. Konecki et al. (2024) further reveals that while some educators' express concerns about AI, the overall sentiment is positive, indicating a readiness for organized training to better understand AI's role in education.

Table 4 Future Science Educators Attitudes toward AI in terms of Behavioral Dimension

Statement	*Mean*	*SD*	*Descriptive Interpretation*
1. I like using apps related to AI.	2.83	0.58	Agree
2. It is fun to learn about AI.	3.06	0.45	Agree
3. I want to continue learning about AI.	3.15	0.52	Agree

4. I'm interested in AI-related TV programs or online videos.	2.83	0.72	Agree
5. I want to make something that makes human life more convenient through AI.	2.98	0.59	Agree
6. I am interested in the development of AI.	2.99	0.58	Agree
7. It is interesting to use AI.	3.15	0.42	Agree
8. I think there should be more class time devoted to AI in university.	2.65	0.64	Agree
Overall Mean	2.96		Agree

The results in Table 4 show that Future Science Educators have a generally positive behavioral attitude toward AI, with an overall mean score of 2.96, interpreted as "Agree." The statements "I want to continue learning about AI" and "It is interesting to use AI" had the highest agreement, with a mean score of 3.15, showing strong interest and enthusiasm for engaging with AI tools and applications. The lowest agreement was seen in the statement "I think there should be more class time devoted to AI in university," with a mean score of 2.65, suggesting that although participants are willing to learn and use AI, there are limited opportunities for formal engagement.

This finding aligns with studies by Aghaziarati et al. (2023) and Konecki et al. (2024), which indicate that educators generally exhibit positive attitudes toward AI's behavioral dimensions, particularly recognizing its potential to enhance learning outcomes and operational efficiency. These results imply that although educators are interested in learning about and exploring AI, educational institutions need to offer more scaffolded opportunities, including curriculum embedding of AI and practical experience, to translate this enthusiasm into meaningful and sustained behavioral engagement.

Table 5 Future Science Educators Attitudes toward AI in terms of Cognitive Dimension

Statement	*Mean*	*SD*	*Descriptive Interpretation*
1. I think that it is important to integrate AI in my university studies.	3.12	0.51	Agree
2. AI classes are important.	2.90	0.46	Agree
3. I think that lessons about AI should be taught in university.	3.00	0.52	Agree
4. I think every university student should learn about AI in university.	3.02	0.47	Agree
5. AI is very important for developing society.	2.94	0.55	Agree
6. AI produces more good than bad.	2.61	0.66	Agree
7. It is worth to know AI very well.	3.15	0.48	Agree
Overall Mean	2.96		Agree

The results in Table 5 indicate that Future Science Educators generally hold a positive cognitive attitude toward AI with an overall mean score of 2.96, interpreted as "Agree." The statement that received the highest agreement is "It is worth to know AI very well," with a mean score of 3.15, indicating that the participants recognize the importance of gaining knowledge about AI. The lowest agreement was noted in the statement "AI produces more

good than bad," with a mean score of 2.61, indicating that participants see a value in AI but are nevertheless cautious about its overall impact.

This result aligns with Uygun (2024), who highlighted that while educators exhibit positive cognitive attitudes toward AI in education, concerns persist regarding ethical and privacy issues. These findings imply that while educators acknowledge the value of AI and its integration into educational practices, addressing ethical concerns and offering structured training programs are necessary to further deepen their cognitive engagement and prepare them with the necessary skills to use AI effectively in education.

Table 6 Future Science Educators Attitudes toward AI in terms of Emotional/Affective Dimension

Statement	*Mean*	*SD*	*Descriptive Interpretation*
1. I think AI makes people's lives more convenient.	2.98	0.47	Agree
2. AI is related to my daily life.	2.70	0.54	Agree
3. I will use AI to solve problems in daily life.	2.46	0.71	Agree
4. AI helps me solve problems in real life.	2.51	0.67	Agree
5. I will need AI in my life in the future.	2.96	0.46	Agree
6. AI is necessary for everyone.	2.70	0.60	Agree
7. I think that most jobs in the future will require knowledge related to AI.	2.98	0.61	Agree
8. I can use well the apps based on AI.	2.89	0.67	Agree
9. I will use AI in the future in my professional life.	2.94	0.60	Agree
10. It would be very helpful for me to have available AI apps in my professional life.	2.99	0.48	Agree
Overall Mean	2.81		Agree

The results in Table 6 show that Future Science Educators have a positive emotional attitude toward AI with an overall mean score of 2.81, interpreted as "Agree." The highest agreement was seen in the statement "It would be very helpful for me to have available AI apps in my professional life," with a mean score of 2.99, and "I think AI makes people's lives more convenient," with a mean score of 2.98. This finding indicates that respondents understand that AI enhances convenience and also better professional tools. On the other hand, the statement "I will use AI to solve problems in daily life," with a mean score of 2.46, indicated a feeling of being hesitant or unsure about what AI may be able to do for themselves in solving day-to-day problems.

These results align with Ghimire et al. (2024), who found that educators exhibit generally positive attitudes toward AI on the emotional dimension, regardless of their teaching style. This consistency in positive emotional attitudes reflects a widespread recognition of AI's potential benefits, even if personal use remains limited. Findings indicate that though educators admit AI is convenient and has professional value, there is still a need to gain confidence in its practical application to daily life.

Table 7 Differences in the Future Science Educators Attitudes toward AI when grouped According to Sex

Variable	*Sex*	*N*	*Mean*	*SD*	*t(80)=-0.357, p=0.722*
Attitudes towards AI	Male	40	2.88	0.38	
	Female	42	2.91	0.32	

The mean score of the female respondents (m = 2.91, SD = 0.32) is slightly higher than that of the male respondents (m = 2.88, SD = 0.38). However, the t-test for independent samples showed no significant difference between the two groups, t(80) = -0.357, p = 0.722. This means that there is no significant difference in the attitudes of Future Science Educators toward AI when grouped by sex. Both male and female respondents share similar positive attitudes toward AI, indicating that sex does not influence their perceptions.

These findings align with Fakhar (2024), who highlighted that teachers' perceptions of AI in education are shaped more by proficiency and academic level than demographic factors like gender. Similarly, Hajam (2024) emphasized that gender does not significantly affect perceptions of AI, while factors such as field of study play a more significant role. Moreover, Vo and Nguyen (2024) also believed gender does not impact students' perceptions of generative AI. Lastly, a study by Al Darayseh (2023) found that science teachers' acceptance of AI remains high regardless of gender. The results indicate that efforts to improve educators' attitudes and engagement with AI should be concentrated on increasing exposure, training, and practical experience with AI tools, as these factors have a more significant impact than sex. Providing equal opportunities for AI-focused professional development ensures that educators, regardless of sex, can develop the confidence and competence needed to integrate AI effectively into their teaching practices.

Table 8 Differences in the Future Science Educators Attitudes toward AI when grouped according to age

Variable		*SS*	*df*	*MS*	*F*	*p*
Attitudes toward AI	Between Groups	.88	4	0.22	1.79	0.14
	Within Groups	9.48	77	0.12		
	Total	10.37	81			

The results in Table 8 show that there is no statistically significant difference in the attitudes of Future Science Educators toward AI when grouped according to age. The analysis of variance (ANOVA) resulted in an F-value of 1.79 and a p-value of 0.14, which is greater than the 0.05 significance level. This means that age does not significantly influence the attitudes of the respondents toward AI.

These findings align with studies emphasizing that age is not a significant factor in shaping attitudes toward AI. Preeth and Bapu (2024) observed no significant differences in AI attitudes among urban millennials when grouped by age. Similarly, Lucas et al. (2024) demonstrated that teachers' trust in AI is independent of age, reinforcing that attitudes are more closely tied to trust, digital competence, and exposure rather than demographic variables. The findings show that there is no impact of age on attitudes toward AI among the Future Science Educators. It therefore emphasizes the idea that training should focus on more exposure and competency building rather than the development of programs by age group. Only inclusive and age-neutral programs for training would ensure all ages have positive and consistent attitudes toward AI. In the institution, the equal opportunity of engaging with AI can foster readiness for science education and integrate effectively in the science classroom.

Table 9 Correlation matrix between Future Science Educators Attitudes toward AI and Frequency of AI Use

		Frequency of AI Use	*Attitudes toward AI*
Frequency of AI Use	Pearson Correlation	1	0.14
	P-value		0.20
	N	82	82
Attitudes toward AI	Pearson Correlation	0.14	1

	P-value	0.20	
	N	82	82

The results in Table 9 indicate a direct/positive very weak correlation between the frequency of AI use and attitudes toward AI with a Pearson correlation coefficient of 0.14. The relationship is not statistically significant, with a p-value of 0.20 (greater than 0.05). This means that there is no meaningful correlation between the frequency of AI use and participants' attitudes toward AI, suggesting that an increase in AI usage does not significantly impact attitudes.

These findings align with Hajam and Gahir (2024), who reported consistent attitudes toward artificial intelligence across educational levels, and with Preeth and Bapu (2024), who found that greater exposure to AI does not significantly influence attitudes toward AI or levels of tech anxiety. Together, these studies suggest that attitudes toward AI are shaped more by contextual and experiential factors than by demographic characteristics or mere usage. The findings imply that frequent usage of AI will not necessarily lead to more positive attitudes toward AI among educators. Institutions should focus on providing purposeful and structured opportunities for educators to engage with AI tools, such as practical training sessions, project-based applications, and guided experiences. In this way, the quality of interaction with AI is prioritized over frequency, and educators gain deeper understanding, reduce hesitation, and foster more favorable attitudes toward integrating AI in educational settings.

Table 10 Linear regression to predict the students' attitude on AI

Variables	*B*	*Std. Error*	*Beta*	*t*	*Sig.*
(Constant)	2.64	0.25		10.67	0
Sex	0.030	0.08	0.04	0.38	0.70
Age	-0.03	0.03	-0.13	-1.16	0.25
Frequency of AI Use	0.09	0.06	0.18	1.54	0.13

Dependent Variable: Attitudes toward AI; Adjusted R-square: 0.003, f(3)=1.077 , p=0.364

As shown in Table 10, the Adjusted R-square is 0.003, indicating that only 0.3% of the variances in attitudes toward AI can be explained by the model. The resulting equation is: Attitude = 2.64 + 0.030(sex) + 0.03(age) + 0.09(frequency of AI use). This means that for every unit increase in sex (e.g., from female to male), the attitude increases by 0.030, while for every unit increase in age, the attitude increases by 0.03. Additionally, for every unit increase in frequency of AI use, the attitude increases by 0.09. However, the ANOVA result shows that p = 0.364, meaning there is no significant linear relationship between the dependent variable (attitude toward AI) and the independent variables (sex, age, and frequency of AI use). The p-values for all predictors—sex (p = 0.70), age (p = 0.25), and frequency of AI use (p = 0.13)—are greater than 0.05, indicating that none of these variables are significant predictors of attitudes toward AI.

These findings are consistent with Al Darayseh (2023) and Nja et al. (2023), who reported that demographic variables such as age and sex do not significantly influence teachers' attitudes or behavioral intentions toward artificial intelligence. They are also aligned with Lucas et al. (2024), who demonstrated that teachers' trust in artificial intelligence is independent of demographic factors, including age, sex, teaching experience, and education level. Instead, previous studies indicate that factors such as perceived ease of use, expected benefits, self-efficacy, and knowledge of AI are more strongly associated with AI acceptance. While Fakhar (2024) identified some associations between AI proficiency and selected demographic variables, these relationships have not been consistently observed across the literature. Overall, existing evidence suggests that educators'

attitudes toward AI are shaped more by their knowledge, perceptions, and familiarity with AI technologies than by demographic characteristics.

The results indicate that sex, age, and frequency of AI use cannot be considered as significant predictors in attitudes toward AI among Future Science Educators. This means an effort should be made toward moving beyond demographic considerations towards factors that directly influence acceptance of AI, such as improving educators' perceived ease of use, enhancing educators' understanding of the benefit of AI, and further boosting their self-efficacy through structured training programs. Opportunity through hands-on learning can bring about trust in AI by providing educators with knowledge and experience. By prioritizing these factors, institutions can better prepare educators to adopt and integrate AI effectively into their teaching practices, regardless of demographic differences.

CONCLUSION

Based on the findings of this study, it can be concluded that Future Science Educators hold positive attitudes toward AI across cognitive, emotional, and behavioral dimensions. Though they are aware of the significance and value of AI, they are hesitant to apply AI to personal problem-solving tasks, especially in emotional and behavioral dimensions. No differences in attitudes were found across sexes or age groups, and attitudes were not significantly predicted by the frequency of AI use. This suggests that attitudes towards AI are more influenced by factors such as understanding, familiarity, and meaningful engagement rather than demographic characteristics or usage frequency.

Implications Of The Study

The findings of this study suggest several important implications for educational institutions and policymakers. First, enhancing science educators' understanding and acceptance of AI requires structured and meaningful engagement. While attitudes toward AI are positive, targeted training programs and practical applications are necessary to address hesitations and build confidence in its use. Second, integrating AI into science education curricula can provide science educators with formal opportunities to develop their AI literacy and explore its practical applications. By embedding AI-related lessons into academic programs, they can better understand its role in improving teaching and learning outcomes. Third, emotional hesitancy in using AI for personal tasks highlights the need to build trust and familiarity with AI tools. Providing hands-on experiences, guided applications, and real-world demonstrations of AI's benefits can help bridge this gap and foster greater emotional engagement. Finally, the study emphasizes that demographic factors such as sex and age should not be the focus of interventions aimed at improving attitudes toward AI. Rather, institutions should focus more on initiatives that enhance the digital competence, perceived ease of use, and self-efficacy with AI tools of the science educators, as these factors have stronger influence in the attitude shaping. This will then help educational institutions to narrow the gap between interest in AI and its actual use. With this, science educators will be well-equipped to incorporate AI into their teaching practices, thereby improving their proficiency and confidence and helping them utilize AI to its full potential for the transformation of science education.

Limitations Of The Study

This study has several limitations that should be considered. Firstly, the research was conducted exclusively among the members of the Future Science Educators Organization (FSEO) at Nueva Vizcaya State University, Bayombong Campus, thereby limiting the generalizability of the findings to other institutions or populations. The sample may not fully represent the broader attitudes of future science educators across different universities or regions in the Philippines. Secondly, the study focused solely on the variables of sex, age, and frequency of AI usage, omitting other potentially influential factors such as socio-economic status, ethnicity, educational background, and prior exposure to AI technologies. This narrowed scope may have excluded important variables that could further explain variations in attitudes toward AI. Thirdly, the research was conducted within a specific timeframe, the first semester of academic year 2024-2025, and therefore does not account for any longitudinal changes or evolving perceptions of AI that may occur beyond this period. These limitations highlight the need for future research to include more diverse populations, additional variables, and longitudinal designs to provide

a more comprehensive understanding of educators' attitudes toward AI. Future studies should also explore other factors, such as digital competence or AI training exposure, which may better predict educators' attitudes.

Author contribution: As the sole author, I was involved in the conceptualization, design, data collection, interpretation, writing, and critical revision of the research article.

Declaration of interest: The author has no conflict of interest to declare regarding the content of this study.

Ethics declaration: The author did not require formal ethical approval. However, the researcher observed and adhered to ethical practices applicable to scientific research. The respondents were members of the Future Science Educators Organization, and the survey was conducted anonymously. Informed consent was obtained prior to data collection, and strict confidentiality was maintained. No harm or coercion was imposed on individuals who chose not to participate in the survey.

Data Availability Statement: The data are available upon reasonable request.

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