The Readiness of Integrating AI (Artificial Intelligence) in Teaching Science: Perspectives of Private Higher Educational Institution Science Teachers in Bayombong, Nueva Vizcaya

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ABSTRACT

Successful integration of Artificial Intelligence (AI) in science education depends largely on teachers' readiness to effectively utilize emerging technologies in their instructional practices. Artificial Intelligence (AI) is the term used for systems that can learn from data, do tasks, and act like humans when it comes to reasoning, problem-solving, and making decisions. In this context, teachers' readiness includes teachers' perceived competence, resource accessibility, professional development and training, attitudes toward AI integration, and perceived barriers. This study sought to assess the preparedness of science educators at a private higher education institution in Bayombong, Nueva Vizcaya, for the integration of artificial intelligence in science instruction. Specifically, it examined their demographic profile, level of readiness across key dimensions, perceived barriers and challenges, differences when grouped by profile variables, and the relationship between readiness and perceived barriers. A quantitative descriptive-correlational research design was utilized, employing an adapted and validated questionnaire based on the Technology Acceptance Model (TAM). The study was conducted at a private higher education institution in Bayombong, Nueva Vizcaya, with the participation of 32 science educators. The data were analyzed using mean, standard deviation, t-test, ANOVA, Pearson correlation, and regression analysis. The results showed that teachers were somewhat ready, had mostly positive attitudes toward AI, and thought they were competent enough. Resource availability and professional development were somewhat accessible; however, significant obstacles, including time limitations, data privacy issues, and ambiguous institutional policies, were recognized. There were no significant differences when the groups were grouped by sex, but age and years of teaching experience had a significant effect on readiness and perceived barriers. There was also a strong negative correlation between readiness and perceived barriers. The study concludes that teachers are willing to use AI, but to make it work better in science education, they need more training, resources, and policy changes.

Key Words: Perceived Competence, Resource Accessibility, Professional Development, Technology Acceptance Model, Artificial Intelligence Integration

INTRODUCTION

Artificial Intelligence (AI) is the ability of a system to learn from existing data, to interpret external data correctly, to use the learnings from existing data to achieve their specific goals and to perform tasks such as problem-solving, rationalizing, learning, reasoning and decision making, that usually requires human interaction (Kaplan & Haenlein, 2018; IBM, 2024). It is also known by some as the industrial revolution (IR) 4.0 (Tai M.C., 2020). The increase in Artificial Intelligence (AI) studies as noted by Crompton & Burke (2023) contributes to the management of student learning, most especially in curriculum sequencing, instructional design and learning analytics. Although AI is defined in different ways, it is generally understood as the use of machines and computers to help humans solve problems and improve work processes. In simple terms, AI refers to intelligence that is created by humans and exhibited through machines. It describes systems or tools designed to replicate the "cognitive" functions of human intelligence, such as learning, reasoning, and decision-making (Russell & Norvig, 2016).

Artificial intelligence can be classified into two fundamental categories: weak AI and strong AI. Weak AI, or narrow AI, is designed to perform particular operations, like facial recognition, the voice assistant in Siri, or operating self-driving cars. Most AI systems at present fall in this category, said AI systems excel in limited functions but pose risks if they malfunction, such as disrupting power grids or damaging critical infrastructure. On the other hand, we have what we call strong AI, also known as Artificial General Intelligence (AGI) (Moore, 2018; Tai M.C., 2020). Artificial General Intelligence refers to software or hardware systems capable of achieving general intelligence comparable to, and potentially exceeding, human intelligence. These systems are designed to understand, learn, and perform a wide range of cognitive tasks across various domains without being limited to specific, predefined functions (Goertzel, 2014; McLean et al., 2021). Unlike narrow AI, which is limited to predefined tasks, AGI could surpass human capabilities in nearly all cognitive domains, potentially solving complex problems but also raising profound ethical and safety concerns (Joshi, 2024).

Artificial intelligence (AI) has immense potential to revolutionize education by reshaping methodologies and pedagogical strategies, enhancing teaching and learning processes (Vorotnykova, 2023; Alkanaan, 2022). Artificial Intelligence integration in science and mathematics learning depends on the preparedness, professional development and capacities of the science and mathematics teachers. Science and mathematics teachers, as enablers of technological integration in learning, require the ability to harness AI, a component that determines augmentative potential in enhancing learners' performance and individualization of learning (Čipková & Karolčík, 2018; Sallam et al., 2023). According to Vorotnykova (2023), there is a need to provide necessary and sufficient training programs to such teachers to advance their career and improve AI instruments in line with current education objectives.

Of course, together with the different opportunities AI helps improve students' achievement, personalized learning, etc., it reveals different challenges like overestimation of the role of technologies or data security. Attending these risks necessitates linking applications of AI to teachers' curricular imaginations and current modes of instruction. A survey of different analyses shows that the readiness of natural and mathematical science teachers to implement advanced AI training is quite encouraging due to their ability to implement this technology effectively when they are aided by particular skill development programs (Barsoum et al., 2022; Vorotnykova, 2023). By doing so, the educators can understand the challenges of AI in practice and how they can support the AI based system to achieve its intended purpose in the growing needs of today's education.

The growing integration and adoption of Artificial Intelligence in today's educational environment is being noticed for its possibilities to transform conventional forms of learning (Barsoum et al., 2022; Sallam et al., 2023; Alshorman, 2024). AI is an exciting prospect, not least when it comes to its potential to improve students' understanding of science as well as develop other essential skills for the 21st century (Chiu & Chai, 2020). Since AI empowers the society to receive compelling, targeted and effective educational experiences, the technology has the potential of altering education approaches in the society. However, the realization of these advancements lies in educators embracing AI use in science education where AI is transformative (Ayanwale et al., 2022; Lindner et al., 2019; Tshukudu et al., 2022).

An understanding of the level of preparedness of teachers of science to embrace AI in their classroom requires considering some factors. These encompass their current perception towards AI, level of self-efficacy when it comes to using AI tools, their expectation on what AI can bring to bear and availability of the right training and other tools for someone to be an AI practitioner. Also, certain situational factors characterizing schools as educational institutions and the potential difficulties of the teachers should also be taken into consideration to provide a proper integration of AI. Teacher perceptions are relevant in determining the feasibility of AI and the significance of AI in teaching science (Chiu and Chai, 2020; Su et al., 2022). In other words, supporting teachers, giving them enough resources, as well as training them properly so they can integrate AI is important (Wang et al., 2023). Parleys with these challenges are vital in a bid to make AI as a worthwhile asset in science learning to enhance students' experiences (Lin, 2022).

Statement of the Problem

This study aimed to look into the readiness of college science teachers in Bayombong, Nueva Vizcaya, in integrating AI (Artificial Intelligence) in teaching science.

Specifically, this study seeks to answer the following questions:

1. What is the demographic profile of the participants as measured by;
   a. Age;
   b. Sex; and
   c. Years of Teaching?
2. To what extent do the Bayombong Science teachers perceive themselves as ready to integrate AI (Artificial Intelligence) into their pedagogy, as measured by;
   a. Perceived Competence;
   b. Resources Accessibility;
   c. Professional Development and Training; and
   d. Attitudes Towards AI Integration?
3. What are the Perceived Barriers and Challenges to the adoption of Artificial Intelligence (AI) in teaching science among the College Science Teachers?
4. Is there a significant difference between the (a) their perceived readiness to integrate AI (Artificial Intelligence) in teaching Science Education; and (b) their perceived barriers and challenges to the adoption of Artificial Intelligence when respondents are grouped by their profile?
5. Is there a significant correlation between the perceived readiness of the science teachers to integrate AI (Artificial Intelligence) in teaching Science Education and their perceived barriers and challenges to the adoption of artificial intelligence?
6. Which among the profile variables significantly influence the extent of the Bayombong Science teachers' perceived readiness in integrating AI?

Conceptual Framework

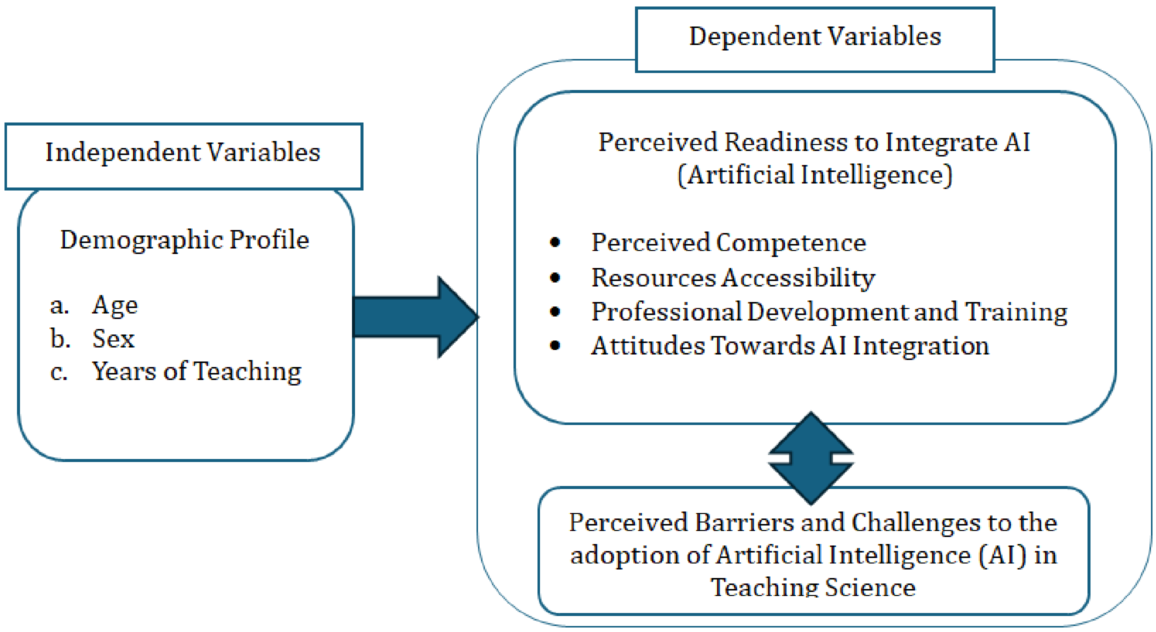

Figure1. Conceptual Framework of the Study

The conceptual framework analyzes the correlation between the independent variables (age, sex, and years of teaching experience) and the dependent variables (perceived readiness and obstacles to AI integration in science education). It talks about how demographic factors affect teachers' readiness, like their skills, access to resources, professional development, and attitudes. It also talks about barriers like poor infrastructure, lack of training, and systemic problems. The framework shows a cycle where more readiness makes AI integration easier, but barriers that don't go away make it harder. These insights are meant to help policymakers come up with specific plans to make teachers more prepared, make resources easier to get, and help AI be used more effectively in science education.

METHOD

Research Design

This study employed a quantitative research design to explore the readiness of science teachers from a private higher educational institution, specifically PLT College, Inc. in Bayombong, Nueva Vizcaya, to integrate Artificial Intelligence (AI) into their teaching practices. The design incorporated multiple approaches to address the objectives of the study: (a) The study was descriptive since it described the current state of science teachers' readiness to integrate AI, focusing on their attitudes, self-efficacy, perceived benefits, and challenges in utilizing artificial intelligence in science education; (b) Comparative analysis was conducted since it examined readiness of the teachers and to determine the significant differences in readiness levels; (c) correlational approach looked into the relationships between readiness levels and variables like age and years of teaching experience.

This design was chosen to comprehensively examine the factors that could influence science teachers' readiness for Artificial Intelligence integration, providing insights into their preparedness and potential areas for support.

Research Environment

The study was conducted at Bayombong, Nueva Vizcaya, specifically at PLT College, Inc. The institution was founded in 1965 and has a long-standing reputation for providing humane quality education in the region. The institution vision is *"PLT College, Inc: An Icon in Humane Education"* while its mission *"We dedicate ourselves to develop humane individuals who are professionally competent, socially responsible, and God-centered"* focuses on fostering intellectual, social, and moral development to produce competent and responsible professionals.

PLT College has made notable strides in educational development by providing updated facilities and programs that address the evolving needs of learners and the community. Its graduates have performed well in academia, business, and various technological fields. Most recently, the institution achieved a significant milestone by producing two topnotchers in the fields of Criminology and Nursing.

PLT College was selected because of its progressive approach to education, which continuously incorporates technology in the learning process. This diversity in faculty and students within the institution will give rich meanings to the readiness of science teachers in teaching AI-based subjects. This setting is very relevant to educational stakeholders in Nueva Vizcaya and further afield.

Respondents of the Study

The sample of the study consisted of 32 science education teachers in one private higher educational institution in Bayombong, Nueva Vizcaya. The limiting documentary access into the other private higher educational institutions in the area accounts for the reasons of an investigation focused in one institution. Even though narrowed, the study still provides an opportunity for more in-depth investigation on AI readiness in that specific educational context.

The sample size has been purposely smaller than standard benchmarks set for simple random samples, in consideration with the exploratory nature of the research and limitations. The urban setting of the institution guarantees access to technological resources and exposure to AI tools, providing an ideal entry point for the understanding of readiness to integrate into science teaching. It is important to note that the findings of this study pertain only to the institution under investigation and may not hold for the perspectives of science teachers from other private institutions in the area. Future studies on this exploration may be encouraged to include other private higher educational institutions in Bayombong, Nueva Vizcaya, for more encompassing understanding of AI readiness within the local educational landscape.

Table 1. Table for the Profile of the Respondents

Profile	Categories	Frequency	Percent
Age	21 to 30 years old	10	31.3
	31 to 40 years old	9	28.1
	41 to 50 years old	5	15.6
	More than 50	8	25.0
Sex	Male	11	34.4
	Female	21	65.6
Years of Teaching	1 to 5 years	10	31.3
	6 to 10 years	12	37.5
	More than 10 years	10	31.3

Research Instrument

This research utilized a quantitative survey questionnaire that was adapted and designed based on the validated questionnaire used in the study of Alshorman et al. (2024), titled “The Readiness to Use AI in Teaching Science: Science Teachers’ Perspective”, which was published in the Journal of Baltic Science Education.

The said questionnaire included several sections that address key dimensions of AI readiness, grounded in the principles of the Technology Acceptance Model (TAM). These sections included demographic information to gather contextual data on participants' age, gender, years of teaching experience, and exposure to AI technologies. The Perceived Usefulness (PU) section focused on measuring teachers' beliefs about AI’s potential to enhance science education, such as its ability to improve student engagement, support personalized learning, and increase instructional efficiency. The PEOU section measured the extent to which teachers believed they could easily use AI tools and how comfortable they felt using them in their instructional processes. Another section covered Barriers and Challenges: this section looked into what may hinder the integration of AI, such as resources, ethical issues, and the sufficiency of institutional support. Lastly, the Professional Development Needs section gauged the readiness and effectiveness of training programs and support systems in preparing teachers for AI integration.

The questionnaire used a 4-point Likert scale that ranged from "Strongly Disagree" to "Strongly Agree" to capture the participants' responses. This modification from the original 5-point scale prompted more decisive responses by eliminating the neutral option, thereby providing a clearer understanding of the teachers' perspectives. The overall reliability of the instrument used was confirmed with a Cronbach's alpha of 0.85, which had high internal consistency. The instrument proved to be valid and reliable and was then used as the questionnaire for the study that looked into the perspectives of science educators in a private higher educational institution here in Bayombong, Nueva Vizcaya.

Data Gathering Procedure

The data collection was carried out using a structured survey questionnaire administered in person to guarantee a high response rate and to enable prompt clarification of any questions posed by the respondents. Before the actual data collection, the school administration gave formal permission for the study to take place at the school. The researcher also worked with the heads of each department to set up a time for the questionnaires to be given out that worked for the participants and didn't interfere with their teaching duties.

The respondents were given a clear explanation of the study's purpose and importance before they took the survey. They were told that it was completely up to them whether or not to take part and that they could say no or leave at any time without any problems. All participants gave their informed consent before taking part in the study.

The researcher personally handed out and collected the questionnaires to make sure that all the answers were complete and to lower the chance of missing data. The researcher was available to answer any questions about the questionnaire items during the process. This made the answers more accurate and reliable.

To keep ethical standards high during the data collection process, strict rules were put in place. We kept participants' anonymity by not asking for any identifying information on the survey forms, and we treated all responses with the highest level of confidentiality. The data that were gathered were safely stored and only used for research and academic purposes. These steps made sure that the rights, privacy, and well-being of the people taking part in the study were fully protected.

Statistical Treatment

The researcher used the software SPSS (Statistical Package for Social Sciences) in data analysis and treatment. The data collected were analyzed using quantitative and correlational methods to identify the science teachers' perspectives regarding their readiness to integrate Ai into science teaching. In addition to computing means and standard deviations to evaluate the central tendency and dispersion of responses for each item, more advanced statistical techniques were used. Correlation analysis was used to examine relationships between different variables, such as perceived ease of use and perceived usefulness. Analysis of variance or One-way ANOVA was conducted to determine whether significant differences existed in AI readiness levels based on demographic factors such as teaching experience or prior exposure to AI technologies. Below are the scales used in measuring the perceptions of science teachers in AI integration along with their respective interpretations.

Table 2. Likert Scale for Perceived Competence on AI

QV (Quantitative Value)	Mean Range	QD (Qualitative Descriptor)	Interpretation
1	1.00 - 1.49	Strongly Disagree	The teacher feels that they lack the knowledge and skills in using AI effectively.
2	1.50 - 2.49	Disagree	The teacher feels that they have limited competence in AI and need further knowledge and skill development about it.
3	2.50 - 3.49	Agree	The teacher feels reasonably competent and ready to integrate AI in science education.
4	3.50 - 4.00	Strongly Agree	The teacher feels fully confident in their ability to use AI in science education

Table 3. Likert Scale for Perceived Availability and Accessibility of Resources

QV (Quantitative Value)	Mean Range	QD (Qualitative Descriptor)	Interpretation
1	1.00 - 1.49	Strongly Disagree	The teacher feels that there is no access to necessary AI tools and resources.

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2	1.50 - 2.49	Disagree	The teacher feels that resource availability is limited for AI integration.
3	2.50 - 3.49	Agree	The teacher feels that there is adequate access to resources needed for AI integration.
4	3.50 - 4.00	Strongly Agree	The Teacher believes that all necessary resources for AI integration are readily available.

Table 4. Likert Scale for Professional Development and Training

QV (Quantitative Value)	Mean Range	QD (Qualitative Descriptor)	Interpretation
1	1.00 - 1.49	Strongly Disagree	The teacher feels that there are no opportunities for training in AI-related topics.
2	1.50 - 2.49	Disagree	The teacher believes that there are insufficient opportunities for AI-training.
3	2.50 - 3.49	Agree	The teacher feels that there are good opportunities for training in AI integration.
4	3.50 - 4.00	Strongly Agree	The teacher feels that they have excellent training opportunities for effective AI use.

Table 5. Likert Scale for Attitude Towards AI in Education

QV (Quantitative Value)	Mean Range	QD (Qualitative Descriptor)	Interpretation
1	1.00 - 1.49	Strongly Disagree	The teacher is resistant or opposed to using AI in their teaching practices..
2	1.50 - 2.49	Disagree	The teacher is skeptical about the benefits of AI in education.
3	2.50 - 3.49	Agree	The teacher has a positive attitude and are open to using AI in education.
4	3.50 - 4.00	Strongly Agree	The teacher is enthusiastic and strongly supportive of integrating AI in education.

Table 6. Likert Scale for Barriers and Challenges

QV (Quantitative Value)	Mean Range	QD (Qualitative Descriptor)	Interpretation
1	1.00 - 1.49	Strongly Disagree	The teacher perceives no significant barriers to AI integration.

2	1.50 - 2.49	Disagree	The teacher feels there are only minor challenges to integrating AI.
3	2.50 - 3.49	Agree	The teacher recognizes significant barriers to using AI in education.
4	3.50 - 4.00	Strongly Agree	The teacher perceives major challenges and obstacles to integrating AI effectively.

RESULTS AND DISCUSSIONS

Perceived Competence in AI

The science teachers' perceived competence in AI was determined through the mean and standard deviation of the responses of the students. The mean scores were interpreted using the table below:

Table 7. Table for Interpretation on Perceived Competence in AI

Mean Range	Perceived Competence in AI
1.00 - 1.49	Not Competent
1.50 - 2.49	Somewhat Competent
2.50 - 3.49	Competent
3.50 - 4.00	Highly Competent

Table 8. Frequency Distribution Table for Perceived Competence of Respondents

Perceived Competence in AI	Frequency	Percent
Somewhat Competent	10	38.9
Competent	14	38.9
Highly Competent	8	22.2
Total	32	100.0

Table 8 presents the level of competence of the 32 science teachers in using and integrating AI into their teaching practices. The responses reveal that a significant proportion of respondents perceive themselves as either Somewhat Competent or Competent. Specifically, 10 teachers (Percent = 38.9%) identified as Somewhat Competent, indicating they have a basic understanding of AI but lack confidence in its application. Meanwhile, 14 teachers (Percent = 38.9%) considered themselves Competent, suggesting a moderate level of proficiency. Additionally, 8 teachers (Percent = 22.2%) reported being Highly Competent, reflecting advanced skills and confidence in applying AI in their teaching strategies.

The distribution suggests that while many teachers feel moderately prepared, additional training and support are necessary to help more teachers reach higher levels of competence, bridging the gap between foundational understanding and advanced proficiency in AI integration. This pattern is supported by recent evidence showing a clear disparity between foundational familiarity and advanced competence. For instance, (Roshan et al., 2024) reported that although 40% of teachers were somewhat familiar with AI, only 5% demonstrated high confidence, with 70% lacking professional development—yet those who received training showed significantly higher confidence. Similarly, (Lucas et al., 2025) found that pre-service teachers were not fully prepared to integrate

AI despite prior exposure, while (Aravantinos et al., 2026) emphasized that continuous, not merely technical, training is essential for effective integration. However, gaps persist as professional development initiatives are often fragmented and short-term in nature (Shardey et al., 2025), further reinforcing the need for sustained and structured capacity-building programs.

Table 9. Table for the Perceived Competence on AI

Statements	Mean	SD	QD
1. I understand the basic concepts of AI relevant to education.	3.06	.669	Agree
2. I am confident in my ability to use AI tools for teaching science subjects	2.69	.738	Agree
3. I can easily learn new AI tools that are introduced for educational purposes	3.19	.780	Agree
4. I feel prepared to troubleshoot minor issues with AI technology in the classroom.	3.00	.803	Agree
5. I am able to evaluate the effectiveness of AI tools in enhancing science learning.	2.69	.693	Agree
6. I am comfortable explaining the benefits and limitations of AI to my students.	3.09	.734	Agree
7. I can integrate AI teaching tools with traditional teaching methods effectively.	3.00	.718	Agree
Overall Mean	2.9598	.54457	Competent

Table 9 summarizes the perceived competence of respondents in integrating AI into teaching science, with an overall mean score of 2.96 (SD = 0.54457), indicating a general level of competence. Most statements received agreement from respondents, reflecting confidence in understanding basic AI concepts (Mean = 3.06, SD = 0.669), learning new AI tools (Mean = 3.19, SD = 0.780), and explaining AI's benefits and limitations to students (Mean = 3.09, SD = 0.734). Respondents also expressed agreement on their preparedness to troubleshoot minor issues (Mean = 3.00, SD = 0.803) and effectively integrate AI teaching tools with traditional methods (Mean = 3.00, SD = 0.718).

However, there was slightly lower agreement on confidence in using AI tools for teaching science subjects (Mean = 2.69, SD = 0.738) and evaluating the effectiveness of AI in enhancing science learning (Mean = 2.69, SD = 0.693). These results highlight moderate competence overall but suggest the need for further training to improve confidence and skills, particularly in effectively assessing the impact of AI tools on learning outcomes.

The results show that teachers generally have a good understanding of basic AI knowledge and how to use it in the classroom, but they are less sure about how to judge how well AI works. This is a gap that has been noted in other studies, where teachers are better at using AI in the classroom than at higher-level skills like evaluating its effectiveness and measuring its impact. This pattern is corroborated by research indicating that, despite teachers acknowledging the significance of AI and acquiring fundamental competencies, deficiencies in training, infrastructure, and comprehensive pedagogical insight endure (Shakeel et al., 2026). Furthermore, research underscores that technical training alone is inadequate, as effective AI integration necessitates ongoing professional development, pedagogical expertise, and reflective practice (Aravantinos et al., 2026). Current programs frequently exhibit fragmentation and an excessive emphasis on transient technical skills, neglecting critical evaluation and ethical considerations (Shardey et al., 2025). These results suggest that meaningful AI integration in science education necessitates a transition from mere skill acquisition to pedagogical empowerment; without the capacity to critically evaluate AI's influence on learning, implementation may be superficial and diminish its instructional value.

Availability and Accessibility of Resources

The science teachers' perceived availability and accessibility of resources in relation to AI was determined through the mean and standard deviation of the responses of the students. The mean scores were interpreted using the table below:

Table 10. Table for Interpretation on Availability and Accessibility Resources

Mean Range	Availability and Accessibility of Resources
1.00 - 1.49	Not Available/Accessible
1.50 - 2.49	Minimally Available/Accessible
2.50 - 3.49	Moderately Available/Accessible
3.50 - 4.00	Highly Available/Accessible

Table 11. Frequency Distribution Table for Availability and Accessibility of Resources

Availability and Accessibility of Resources	Frequency	Percent
Not Available/Accessible	1	3.1
Minimally Available/Accessible	8	25.0
Moderately Available/Accessible	7	21.9
Highly Available/Accessible	16	50.0
Total	32	100.0

Respondents' answers in Table 11 show how easy it is for them to find and use resources. Most people (50.0%) said that resources are Highly Available/Accessible, and 21.9% said they are Moderately Available/Accessible. A smaller percentage (25.0%) said that resources were either "Minimally Available/Accessible" or "Not Available/Accessible." These results indicate that although fifty percent of the respondents possess adequate access to resources, a considerable segment continues to encounter restrictions. This pattern corresponds with existing literature that suggests that while certain educational resources are readily accessible, access to more advanced or digital resources is still limited, often due to a lack of electronic materials and inadequate infrastructure (Folasade et al., 2019). Other studies also show that even when resources are available, they aren't always easy for users to find, which points to problems with adequacy and usability (Ayaowei et al., 2024).

Table 12. The Level of Perceived Availability and Accessibility of Resources

Statements	Mean	SD	QD
1. I have access to adequate AI resources for teaching science.	3.25	.950	Agree
2. My school provides sufficient hardware for utilizing AI in the classroom.	3.16	.920	Agree
3. I have access to a variety of AI software and applications designed for education.	2.87	1.212	Agree

4. My school provides the necessary technical support for using AI tools.	3.03	.999	Agree
5. I have a reliable internet connection in the classroom to support AI activities.	3.12	1.070	Agree
6. The AI teaching resources available to me are up-to-date and relevant.	2.81	.998	Agree
7. I have the necessary instructional materials to complement AI tools in science teaching	3.16	1.139	Agree
Overall Mean	3.0580	.94193	Moderately Available/ Accessible

Table 12 illustrates the respondents' opinion of the availability and access of AI resources in teaching science, with an overall mean of 3.06 (SD = 0.942) and therefore resources are Moderately Available/Accessible. They are generally of the view that they can have adequate AI resources to teach science (Mean = 3.25, SD = 0.950) and sufficient hardware for implementing AI in their classroom (Mean = 3.16, SD = 0.920).

Access to reliable internet, (Mean = 3.12, SD = 1.070), and necessary instructional materials for AI tools (Mean = 3.16, SD = 1.139), were also rated highly. Yet perceptions of the availability of current, and relevant AI resources (Mean = 2.81, SD = 0.998) and availability of a variety of AI software for education purposes, (Mean = 2.87, SD = 1.212) were much weaker.

The results show that most people think AI resources are somewhat available and easy to find, but there are still big gaps in the availability of up-to-date and diverse AI tools. This shows a difference between basic access and resource quality. This pattern aligns with existing literature indicating that while foundational resources and infrastructure may exist, access to more advanced, contemporary, and diverse digital resources is frequently constrained (Folasade et al., 2019). Furthermore, even when such resources are available, they are not always readily accessible or adequate to fulfill instructional requirements (Ayaowei et al., 2024). These findings indicate that the challenge extends beyond the mere existence of AI-related resources to encompass their relevance, diversity, and usability in facilitating effective teaching. To make AI a bigger part of science education, we need to not only make more resources available, but also make sure that we have up-to-date, high-quality, and contextually appropriate tools, as well as systems that make it easier to use them in the classroom.

Professional Development and Training

The science teachers' perceived level of professional development and training in relation to AI was determined through the mean and standard deviation of their responses. The mean scores were interpreted using the table below:

Table 13. Table for Interpretation of Professional Development and Training Levels

Mean Range	Professional Development and Training Level
1.00 - 1.49	Not Provided
1.50 - 2.49	Minimally Provided
2.50 - 3.49	Moderately Provided
3.50 - 4.00	Highly Provided

Table 14. Frequency Distribution Table for Professional Development and Training

Professional Development and Training	Frequency	Percent
Not Available/Accessible	4	12.5
Minimally Available/Accessible	4	12.5
Moderately Available/Accessible	6	18.8
Highly Available/Accessible	18	56.3
Total	32	100.0

In Table 15 above, you can see the numbers for professional development and training on how to use AI in science classes. The majority of participants (56.3%, n = 18) indicated that professional development and training were Highly Available/Accessible. Some of them (18.8%, n = 6) said it was Moderately Available/Accessible, while 12.5% (n = 4) said it was Minimally Available/Accessible, and another 12.5% (n = 4) said it was Not Available/Accessible. These results indicate that while the majority of respondents have access to professional development and training opportunities, a considerable segment continues to face significant barriers, highlighting the need to rectify unequal access. This pattern is corroborated by current research indicating that numerous educators still experience inadequate exposure to AI-related professional development (Roshan et al., 2024), and that limited training opportunities persist as a significant obstacle to effective AI integration (Alshorman et al., 2024). Additionally, differences in access are often caused by things like the resources and infrastructure of the institution, which makes the differences between teachers even more clear (Somabut et al., 2025). These findings collectively highlight the necessity for more equitable, accessible, and enduring professional development programs to assist all educators in effectively incorporating AI into science education.

Table 15. The Level of Perceived Professional Development and Training Level

Statements	Mean	SD	QD
1. I have received training on how to use AI in teaching	3.13	1.100	Agree
2. Ongoing professional development in AI is available to me	3.09	.963	Agree
3. I am encouraged by my school to attend workshops or conferences about AI in education.	3.13	.942	Agree
4. The professional development I receive is tailored to my subject area and grade level.	3.00	1.016	Agree
5. I am satisfied with the level of training provided for AI integration into the curriculum.	2.88	1.070	Agree
6. I actively seek out new learning opportunities related to AI.	3.16	.987	Agree
7. The training I received has been practical and applicable to my teaching context.	3.13	1.118	Agree
Overall Mean	3.0737	.92750	Moderately Provided

Table 15 reveals the perceived availability of professional development and training for AI integration among the science teachers. The results indicated that respondents generally agreed on the fact that they were trained on the use of AI in teaching (Mean = 3.13, SD = 1.100) and, at the same time, agreed that the training was more practical and applicable to teaching contexts (Mean = 3.13, SD = 1.118). They also agreed that they can access ongoing professional development in AI (Mean = 3.09, SD = 0.963) and that their schools encourage them to attend workshops or conferences on AI in education (Mean = 3.13, SD = 0.942). However, satisfaction with the level of training provided for AI integration into the curriculum received the lowest agreement (Mean = 2.88, SD = 1.070), indicating room for improvement in tailoring training to meet educators' needs. The overall mean score of 3.07 (SD = 0.927) indicates that professional development and training opportunities for AI integration are Moderately Provided, suggesting that while teachers are generally supported, there is a need for more targeted and comprehensive training initiatives.

The findings indicate that although teachers view professional development for AI integration as generally accessible and practical, their diminished satisfaction with its adequacy signifies a disparity between availability and efficacy, aligning with literature that suggests current training is frequently inadequate or unevenly allocated (Roshan et al., 2024; Alshorman et al., 2024). This means that there may be professional development programs, but they may not be broad enough, long-lasting enough, or responsive enough to the needs of teachers in their specific situations. Moreover, differences in access to and quality of training, which are often caused by the capacity and infrastructure of the institutions, show systemic inequalities that make it harder to fully integrate AI (Somabut et al., 2025). Consequently, it is imperative to transition towards more focused, ongoing, and contextually relevant professional development programs that not only facilitate access but also guarantee relevance, depth, and equitable support for all educators.

Attitudes Towards AI in Education

The science teachers' perceived level of attitudes toward AI in education was determined through the mean and standard deviation of their responses. The mean scores were interpreted using the table below:

Table 16. Table for Interpretation of Professional Development and Training Levels

Mean Range	**Attitudes Towards AI in Education**
1.00 - 1.49	Strongly Negative
1.50 - 2.49	Negative
2.50 - 3.49	Positive
3.50 - 4.00	Strongly Positive

Table 17. Frequency Distribution Table for Attitudes Towards AI in Education

Attitudes Towards AI in Education	Frequency	Percent
Strongly Negative	1	3.1
Negative	8	25.0
Positive	7	21.9
Strongly Positive	16	50.0
Total	32	100.0

Table 17 presents the attitudes of the 32 science teachers toward AI in education. The responses indicate that the majority of respondents have a positive outlook on the use of AI in their teaching practices. Specifically, 16 teachers (Percent = 50.0%) reported a "Strongly Positive" attitude, reflecting a high level of enthusiasm and support for AI integration in education. Moreover, 7 teachers (Percent = 21.9%) had a "Positive" attitude, which means that they were generally in favor but not very strong. On the other hand, 8 teachers

(Percent = 25.0%) reported a "Negative" attitude, and 1 teacher (Percent = 3.1%) had a "Strongly Negative" attitude, which means that they were against AI in education with varying degrees of reservations.

These results suggest that while most teachers see positive aspects of AI in education, a significant minority still sees negative attitudes, suggesting an area for concern and providing avenues for support to bring out greater acceptance.

Table 18. The Attitudes of Science Teachers Towards AI Integration

Statements	Mean	SD	QD
1. I believe that AI can enhance the quality of science education.	3.16	.934	Agree
2. I am excited about the potential of AI to personalize learning for my students.	3.16	1.003	Agree
3. I think that AI can help me to be a more effective teacher	3.10	.978	Agree
4. I am open to experimenting with AI in my teaching practice.	3.16	1.003	Agree
5. I believe that AI can support critical thinking and problem-solving skills in science.	2.97	1.110	Agree
6. I feel that AI will become an essential part of education in the future.	3.00	.984	Agree
7. I am concerned about AI replacing human elements in teaching	3.03	.933	Agree
Overall Mean	3.0915	.82350	Positive

Table 18 shows the attitudes of science teachers towards AI integration in education. The overall mean score of 3.09 (SD = 0.824) indicates a generally Positive attitude. There was a Generally Positive attitude toward AI in education. The majority of the respondents asserted that AI will improve science education quality (Mean = 3.16, SD = 0.934) and help differentiate instruction for learners (Mean = 3.16, SD = 1.003). Teachers also showed willingness to try AI in their practice of teaching (Mean = 3.16, SD = 1.003) and thought that AI would make them better teachers (Mean = 3.10, SD = 0.978). However, somewhat lower agreement was noted in terms of the support for AI for critical thinking and problem-solving abilities (Mean = 2.97, SD = 1.110) and the integration of AI in future education (Mean = 3.00, SD = 0.984).

These findings suggest that science teachers have a very optimistic view of AI, believing that it can actually improve education and are therefore open to adopting it; however, there are some concerns and areas of uncertainty that will need to be addressed to foster greater confidence in AI integration.

Barriers and Challenges

The science teachers' perceived barriers and challenges of integrating AI in Science Education was determined through the mean and standard deviation of their responses. The mean scores were interpreted using the table below:

Table 19. Table for Interpretation of Barriers and Challenges

Mean Range	Perceived Barriers and Challenges
1.00 - 1.49	Strongly Negative

1.50 - 2.49	Negative
2.50 - 3.49	Positive
3.50 - 4.00	Strongly Positive

Table 20. Frequency Distribution Table for Barriers and Challenges

Barriers and Challenges	Frequency	Percent
Strongly Negative	4	12.5
Negative	4	12.5
Positive	6	18.8
Strongly Positive	18	56.3
Total	32	100.0

Table 20 presents the perceived barriers and challenges to AI integration in education. Majority of the respondents (56.3%, n = 18) rated the barriers as Strongly Positive, which implies that they consider the challenges significant and likely to cause much trouble. Another 18.8% (n = 6) rated the barriers as Positive, which implies that they found the challenges notable but not insurmountable. On the contrary, a total of 12.5 percent (n = 4) rated the barriers as negative, meaning that they assume the challenges to be either minor or manageable. Similarly, 12.5% (n = 4) viewed the barriers as strongly negative, an indication of very minimal challenges.

These results indicate that although the respondents acknowledge significant to noticeable challenges in implementing AI, there is a proportion of the respondents who find the problems not so impactful. The implication is that perceived challenges can be addressed through targeted training and support to ease the integration process.

Table 21. Perceived Barriers and Challenges of Integrating AI

Statements	Mean	SD	QD
1. I am concerned about data privacy and security issues related to using AI in the classroom.	2.66	.827	Agree
2. I perceive a lack of clarity in my school's policy on AI use in education.	2.63	.976	Agree
3. I believe there is insufficient time during the school day to integrate AI effectively.	2.78	.792	Agree
4. I am worried about the ethical implications of AI in education.	2.59	.911	Agree
5. I think that AI could potentially widen the gap between different groups of students.	2.69	.780	Agree
6. I find it challenging to keep up with the rapid development of AI technologies.	2.69	.821	Agree

7. I am concerned about the reliability of AI assessments in understanding student progress.	2.75	.718	Agree
Overall Mean	2.6830	.67078	Positive

Table 21 shows the Perceived Barriers and Challenges toward Incorporating AI into Science Instruction. Overall mean score for the perceived barriers and challenges regarding integration into science instruction was 2.68, SD = 0.671 falls under the Positive range, hence indicating that the respondents accepted quite significant but manageable challenges regarding AI integration. Among the specific barriers, the most rated concern was about the time not available within the school day to integrate AI in the best way (Mean = 2.78, SD = 0.792) and then issues of AI assessments not being reliable about understanding students' progress (Mean = 2.75, SD = 0.718). It shows a lack of feasibility and practicability in the case of the teacher.

Data privacy and security concerns also ranked as concerns (Mean = 2.66, SD = 0.827) as well as there is a lack of clearness in school policies regarding AI use (Mean = 2.63, SD = 0.976). Ethical implications of AI in education (Mean = 2.59, SD = 0.911) and AI would further increase gaps between the groups of students (Mean = 2.69, SD = 0.780) are some other structural and institutional barriers.

The results of the study reveal that the teachers, on average, are willing to accept AI, but still have several barriers to overcome that require specific interventions. Thus, with appropriate policy guidelines, professional development, and ethical frameworks, these challenges can be overcome, and AI can successfully be integrated into education.

Significant Difference in Readiness in Integrating Artificial Intelligence as Measured by the different Factors and Barriers and Challenges when Grouped by Sex

Table 22. Table for Significant Differences between Sex and AI Integration Readiness Determinants

Sex		N	Mean	Std. Deviation	Test Statistic
Perceived Competence	Male	11	2.7662	.49186	t(30)= -1.483
	Female	21	3.0612	.55434	p= .148
Resources Accessibility	Male	11	2.9740	.84230	t(30)= -.360
	Female	21	3.1020	1.00726	p= .721
Professional Development and Training	Male	11	3.0974	.93584	t(30)= .103
	Female	21	3.0612	.94607	p= .919
Attitudes Towards AI Integration	Male	11	3.1234	.73962	t(30)= .156
	Female	21	3.0748	.88135	p= .877
Overall Mean	Male	11	2.9903	.66722	t(30)= -.312
	Female	21	3.0748	.75777	p= .757

*significant at 0.05

Table 22 presents the significant difference in perceived readiness to integrate Artificial Intelligence (AI) as measured by various factors (Perceived Competence, Resources Accessibility, Professional Development and Training, and Attitudes Towards AI Integration) when grouped by sex. For Perceived Competence, the mean

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score of female respondents (M = 3.06, SD = 0.55) was slightly higher than that of male respondents (M = 2.77, SD = 0.49). However, the t-test result, *t*(30) = -1.483, *p* = 0.148, indicates that the difference is not statistically significant. This suggests that both male and female respondents perceive themselves similarly in terms of competence to integrate AI. With regards to Resources Accessibility, female respondents reported a higher mean score (M = 3.10, SD = 1.01) compared to males (M = 2.97, SD = 0.84). Despite this difference, the t-test result, *t*(30) = -0.360, *p* = 0.721, shows no significant difference in the perceived availability of resources between the two groups.

In terms of Professional Development and Training, male respondents had a slightly higher mean score (M = 3.10, SD = 0.94) than females (M = 3.06, SD = 0.95). The t-test result, *t*(30) = 0.103, *p* = 0.919, confirms no statistically significant difference between the two groups in their access to professional development opportunities. For Attitudes Towards AI Integration, the mean score of males (M = 3.12, SD = 0.74) was slightly higher than that of females (M = 3.07, SD = 0.88). However, the t-test result, *t*(30) = 0.156, *p* = 0.877, indicates no significant difference in attitudes towards AI integration based on sex. Finally, when examining the Overall Readiness, female respondents had a higher mean score (M = 3.07, SD = 0.76) compared to males (M = 2.99, SD = 0.67). Yet, the t-test result, *t*(30) = -0.312, *p* = 0.757, suggests no significant difference between the two groups in their overall readiness to integrate AI.

Overall, these results demonstrate that there are no statistically significant differences in the readiness to integrate AI between male and female respondents across the measured factors. This implies that both male and female teachers exhibit similar levels of perceived readiness for AI integration in education.

Table 23. Table for Significant Differences between Sex and Barriers and Challenges

Sex		**N**	**Mean**	**Std. Deviation**	**Test Statistic**
Barriers and Challenges	Male	11	2.7662	.49186	t(28.289)= -.678
	Female	21	3.0612	.55434	p= .503

*significant at 0.05

Table 23 shows the results of the analysis on the significant differences between sex and the perceived barriers and challenges to integrating AI in education. The mean score for male respondents was lower than that for female respondents, M = 2.77, SD = 0.49, M = 3.06, SD = 0.55, indicating a slight difference in the perceived barriers and challenges between the two groups. The t-test result is not statistically significant, t(28.289) = -0.678, p = 0.503. Since the p-value is larger than the conventional significance level of 0.05, then it is likely that the observed differences in mean scores are due to chance rather than an actual underlying difference between the groups.

In conclusion, there is no significant difference in how male and female respondents perceive the barriers and challenges associated with integrating AI into education. Both groups show similar levels of perceived obstacles toward adopting AI in their teaching practices.

Significant Difference in Readiness in Integrating Artificial Intelligence as Measured by the Different Factors and Barriers and Challenges when Grouped by Age

Table 24. Table for Significant Differences between Age and AI Integration Readiness Determinants

Age		N	Mean	Std. Deviation	Test Statistic
Perceived Competence	21 to 30 years old	10	3.2000	.67411	F(3)= 1.388
	31 to 40 years old	9	2.9841	.47080	p= .267

	41 to 50 years old	5	2.8571	.56243	
	More than 50 years old	8	2.6964	.35355	
Resources Accessibility	21 to 30 years old	10	3.7286	.37766	F(3) = 19.266 p= .000
	31 to 40 years old	9	3.4921	.44671	
	41 to 50 years old	5	2.9143	.98250	
	More than 50 years old	8	1.8214	.56502	
Professional Development and Training	21 to 30 years old	10	3.7429	.29199	F(3) = 14.570 p= .000
	31 to 40 years old	9	3.3968	.53346	
	41 to 50 years old	5	3.0143	.97729	
	More than 50 years old	8	1.9107	.71199	
Attitudes Towards AI Integration	21 to 30 years old	10	3.7000	.21770	F(3) = 32.562 p= .000
	31 to 40 years old	9	3.4444	.27147	
	41 to 50 years old	5	3.1571	.64760	
	More than 50 years old	8	1.8929	.53316	
Overall Mean	21 to 30 years old	10	3.5929	.31551	F(3) = 21.775 p= .000
	31 to 40 years old	9	3.3294	.30970	
	41 to 50 years old	5	2.9857	.67556	
	More than 50 years old	8	2.0804	.43228	

Table 24 displays the findings of the analysis on whether there are significant differences between age groups and their perceived readiness to integrate AI in education, measured using four key determinants. For Perceived Competence, the results show that there is no significant difference across age groups, with a p-value of 0.267, suggesting that teachers' perceived competence in integrating AI is not influenced by age. However, in the factor of Resources Accessibility, there existed a significant difference, where younger instructors (21 to 30 years of age) reported better access to AI resources (M = 3.73) than old instructors (more than 50 years of age, M = 1.82), as shown through the ANOVA result (F(3) = 19.266, p = 0.000). Similarly, a great deal of variation was found in Professional Development and Training, where again the younger teachers felt they had more access to training opportunities than older teachers, M = 3.74 vs. M = 1.91, as shown by the significant ANOVA, F(3) = 14.570, p = 0.000. In terms of Attitudes Towards AI Integration, younger teachers also reported more positive attitudes (M = 3.70), while older teachers (more than 50 years old) had the lowest scores (M = 1.89), with a p-value of 0.000 (F(3) = 32.562). Finally, Overall Readiness to integrate AI followed a similar trend, with younger teachers (M = 3.59) being more ready than older teachers (M = 2.08), supported by the significant ANOVA result (F(3) = 21.775, p = 0.000).

Overall, these results indicate that younger teachers view themselves as having greater access to resources, more professional development opportunities, a more positive attitude toward the integration of AI, and a higher overall readiness to integrate AI into their teaching, while older teachers report lower levels in these areas. However, no significant difference was found in Perceived Competence between the age groups.

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Table 25. Tabulation of the Scheffe Test for the Significant Differences between Age and AI Integration Readiness Determinants

Scheffe[a,b]	Age	N	Subset for alpha = 0.05	
			1	2
Resources Accessibility	More than 50 years old	8	1.8214	
	41 to 50 years old	5		2.9143
	31 to 40 years old	9		3.4921
	21 to 30 years old	10		3.7286
	Sig.		1.000	.074
Professional Development and Training	More than 50 years old	8	1.9107	
	41 to 50 years old	5		3.0143
	31 to 40 years old	9		3.3968
	21 to 30 years old	10		3.7429
	Sig.		1.000	.175
Attitudes Towards AI Integration	More than 50 years old	8	1.8929	
	41 to 50 years old	5		3.1571
	31 to 40 years old	9		3.4444
	21 to 30 years old	10		3.7000
	Sig.		1.000	.111
Overall Mean	More than 50 years old	8	2.0804	
	41 to 50 years old	5		2.9857
	31 to 40 years old	9		3.3294
	21 to 30 years old	10		3.5929
	Sig.		1.000	.066

Means for groups in homogeneous subsets are displayed.

Uses Harmonic Mean Sample Size = 7.461

As reflected in the results in Table 25 of the Scheffé test results, one can conclude that there are no variations in readiness for AI incorporation since the p-values for all contrasts go beyond the significance value threshold of 0.05. For Resources Accessibility, the youngest group (21 to 30 years old) has the highest mean, 3.7286, and the oldest group (more than 50 years old) has the lowest mean, 1.8214, but these are not statistically significant, with p-values of 1.000 and 0.074, respectively. Likewise, with regards to Professional Development and

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Training, younger teachers (21-30 years old with a mean of 3.7429 and 31-40 years old with a mean of 3.3968) have higher levels of training compared to older teachers more than 50 years old with a mean of 1.9107, but no differences exist as the p-values are 1.000 and 0.175. In terms of Attitudes Towards AI Integration, younger teachers again show more positive attitudes, with a mean of 3.7000 for those aged 21 to 30 years, but the differences between age groups are not statistically significant (p = 1.000 and p = 0.111). Finally, for Overall Readiness, the youngest group (21 to 30 years old) has the highest mean (3.5929), but once again, there is no significant difference in readiness across age groups, with p-values of 1.000 and 0.066. These findings suggest that although there are observable differences in the perceived readiness to integrate AI across age groups, these differences are not statistically significant, indicating that age does not significantly influence teachers' perceived readiness to integrate AI into their teaching practices.

Table 26. Table for Significant Differences between Age and Barriers and Challenges

Age		N	Mean	Std. Deviation	Test Statistic
Barriers and Challenges	21 to 30 years old	2.2857	.26937	2.2857	F(3)= 22.141 p= .000
	31 to 40 years old	2.3333	.44032	2.3333	
	41 to 50 years old	2.6000	.36978	2.6000	
	More than 50 years old	3.6250	.44484	3.6250	
	Total	2.6830	.67078	2.6830	

Table 26 presents the significant differences between age groups and the perceived barriers and challenges to integrating AI in education. The results show that there are statistically significant differences across age groups, with an F-value of 22.141 and a p-value of 0.000, indicating that age influences how teachers perceive barriers to AI integration. The 21 to 30 years old age group of teachers reported the lowest perceived barriers with a mean score of 2.29 (SD = 0.27). This indicates that the younger teachers have fewer obstacles when integrating AI into their teaching. Teachers aged more than 50 years reported the highest perceived barriers, with a mean score of 3.63 (SD = 0.44), meaning more challenges in adopting AI in their teaching practice. The 31 to 40 years old and 41 to 50 years old groups also reported higher perceived barriers than the 21 to 30 age group, with mean scores of 2.33 (SD = 0.44) and 2.60 (SD = 0.37), respectively. However, these groups did not experience as many barriers as those in the older age group.

Table 27. Tabulation of the Scheffe Test for the Significant Differences between Age and Barriers and Challenges

Scheffe[a,b]	Age	N	Subset for alpha = 0.05	
			1	2
Barriers and Challenges	21 to 30 years old	10	2.2857	
	31 to 40 years old	9	2.3333	
	41 to 50 years old	5	2.6000	
	More than 50 years old	8		3.6250
	Sig.		.488	1.000

Means for groups in homogeneous subsets are displayed.

Uses Harmonic Mean Sample Size = 7.461

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Table 27 presents the results of the Scheffé post-hoc test examining differences in perceived barriers and challenges to AI integration across age groups. The findings show that teachers aged 21 to 30 (M = 2.29), 31 to 40 (M = 2.33), and 41 to 50 (M = 2.60) belong to the same homogeneous subset, indicating no significant differences in their perceptions. In contrast, teachers aged more than 50 (M = 3.63) form a separate subset, reflecting higher perceived barriers. Although no significant differences exist within subsets, the separation of the oldest group suggests that they experience greater challenges compared to younger groups. Overall, the results indicate that older teachers perceive more barriers to AI integration, highlighting the need for targeted support.

Table 28. Table for Significant Differences between Years of Teaching and AI Integration Readiness Determinants

Years of Teaching		N	Mean	Std. Deviation	Test Statistic
Perceived Competence	1 to 5 years	10	3.3286	.58728	F(2)= 3.977 p= .030
	6 to 10 years	12	2.7976	.48141	
	more than 10 years	10	2.7857	.41650	
	Total	32	2.9598	.54457	
Resources Accessibility	1 to 5 years	10	3.6714	.42083	F(2) = 18.485 p= .000
	6 to 10 years	12	3.3929	.55202	
	more than 10 years	10	2.0429	.89100	
	Total	32	3.0580	.94193	
Professional Development and Training	1 to 5 years	10	3.6286	.35762	F(2) = 23.242 p= .000
	6 to 10 years	12	3.4940	.51097	
	more than 10 years	10	2.0143	.83149	
	Total	32	3.0737	.92750	
Attitudes Towards AI Integration	1 to 5 years	10	3.6000	.26769	F(2) = 22.696 p= .000
	6 to 10 years	12	3.4464	.34205	
	more than 10 years	10	2.1571	.83422	
	Total	32	3.0915	.82350	
Overall Mean	1 to 5 years	10	3.5571	.32871	F(2) = 21.913 p= .000
	6 to 10 years	12	3.2827	.32784	
	more than 10 years	10	2.2500	.68408	
	Total	32	3.0458	.71815	

Table 28 the outcome of the analysis of the differences in AI integration readiness determinants by years of teaching experience. From the results, it shows that the experience of teaching influences the readiness to integrate AI in education in all aspects. For Perceived Competence, teachers with 1 to 5 years of experience (mean = 3.33) reported a higher level of perceived competence in AI integration compared to those with 6 to 10 years (mean = 2.80) or more than 10 years of experience (mean = 2.79). This is evident from the significant F-test result at 3.977 with p =.030. Regarding Resources Accessibility, teachers with 1 to 5 years of experience (mean = 3.67) reported better access to AI resources than those with 6 to 10 years (mean = 3.39) or more than 10 years of experience (mean = 2.04), with a highly significant F-test value of 18.485 (p =.000). The Professional Development and Training factor showed similar trends, where teachers with 1 to 5 years of experience (mean = 3.63) reported receiving more training opportunities than those with 6 to 10 years (mean = 3.49) or more than 10 years of experience (mean = 2.01), supported by a significant F-test value of 23.242 (p = .000). In terms of Attitudes Towards AI Integration, teachers with experience from 1 to 5 years had a mean score of 3.60 against teachers with experience from 6 to 10 years with a mean score of 3.45 and more than 10 years of experience with mean = 2.16 and F-test value as significant at 22.696, p =.000. Finally, the Overall Mean scores confirmed that teachers with 1 to 5 years of experience (mean = 3.56) had the highest overall readiness for AI integration, followed by those with 6 to 10 years (mean = 3.28), while teachers with more than 10 years of experience (mean = 2.25) had significantly lower readiness, as indicated by the significant F-test value of 21.913 (p = .000). Overall, the results suggest that teachers with fewer years of teaching experience tend to feel more competent, have better access to resources, receive more professional development, and display more positive attitudes toward AI integration, while teachers with more than 10 years of experience report lower readiness across all areas.

Table 29. Tabulation of the Scheffe Test for the Significant Differences between Years of Teaching and AI Integration Readiness Determinants

Scheffe[a,b]	Years of Teaching	N	Subset for alpha = 0.05	
			1	2
Resources Accessibility	more than 10 years	10	2.0429	
	6 to 10 years	12		3.3929
	1 to 5 years	10		3.6714
	Sig.		1.000	.616
Professional Development and Training	more than 10 years	10	2.0143	
	6 to 10 years	12		3.4940
	1 to 5 years	10		3.6286
	Sig.		1.000	.874
Attitudes Towards AI Integration	more than 10 years	10	2.1571	
	6 to 10 years	12		3.4464
	1 to 5 years	10		3.6000
	Sig.		1.000	.803
Overall Mean	more than 10 years	10	2.2500	
	6 to 10 years	12		3.2827
	1 to 5 years	10		3.5571
	Sig.		1.000	.415

Means for groups in homogeneous subsets are displayed.

Uses Harmonic Mean Sample Size = 10.588

The group sizes are unequal. The harmonic mean of the group sizes is used.

Table 29 presents the Scheffe test results in terms of the significance differences between years of teaching experience and the determinants of readiness for AI integration. As shown, no significant difference can be seen among groups of varying years of teaching experience regarding all factors for readiness of AI integration. Specifically, for Resources Accessibility (p =.616), Professional Development and Training (p =.874), Attitudes Towards AI Integration (p =.803), and the Overall Mean (p =.415), the p-values are higher than the 0.05 significance threshold, meaning that the years of teaching experience do not affect teachers' perceptions on these aspects.

This indicates that regardless of having 1-5 years, 6-10 years, or more than 10 years of experience, teachers indicate that the same amount of access to AI resources, similar professional development training, and attitudes towards integrating AI, and readiness to integrate AI in teaching is given. That is to say, teaching experience seems to play no role in the assessment or preparation for AI integration among teachers.

Table 30. Table for Significant Differences between Years of Teaching and Barriers and Challenges

Years of Teaching		N	Mean	Std. Deviation	Test Statistic
Barriers and Challenges	1 to 5 years	10	2.2143	.32472	F(2)= 21.913 p= .000
	6 to 10 years	12	2.4524	.34904	
	more than 10 years	10	3.4286	.60234	
	Total	32	2.6830	.67078	

Table 30 reports the analysis of significant differences between the years of teaching experience and the perceived barriers and challenges in integrating AI in education. The results are found to be statistically significant with a p-value of.000, which is less than the 0.05 significance threshold. The F-test statistic is 21.913, which further supports the fact that the years of teaching experience significantly influence teachers' perceptions of the barriers and challenges associated with AI integration.

Teachers with 1 to 5 years of experience have the lowest mean, 2.2143, for barriers and challenges, which means they perceive fewer obstacles to integrating AI. In a general sense, it indicates teachers with 6-10 years of experience see an average of 2.4524, and a bit more barriers for these, whereas the highest mean stands for teachers with over 10 years of experience-3.4286 (which shows that the majority perceive the most barriers when adopting AI in their classroom teachings. This would then mean that the longer their teaching experience is, the more they are likely to perceive barriers and could even be due to factors like resistance to change or less familiarity with new technologies.

Table 31. Tabulation of the Scheffe Test for the Significant Differences between Years of Teaching and Barriers and Challenges

Scheffe[a,b]	Years of Teaching	N	Subset for alpha = 0.05	
			1	2
Barriers and Challenges	1 to 5 years	10	2.2143	
	6 to 10 years	12	2.4524	
	more than 10 years	10		3.4286
	Sig.		.466	1.000

Means for groups in homogeneous subsets are displayed.

Uses Harmonic Mean Sample Size = 10.588

The group sizes are unequal. The harmonic mean of the group sizes is used.

Table 31 presents the results of the Scheffe test of the differences between years of teaching experience and perceived barriers and challenges. The test splits teachers with 1 to 5 years of experience, 6 to 10 years of experience, and more than 10 years of experience into two homogeneous subsets. Teachers with 1 to 5 years of experience (mean = 2.2143) and 6 to 10 years of experience (mean = 2.4524) are clustered together, with no significant difference in the perception of barriers and challenges (p =.466). Both groups perceive relatively similar levels of barriers to AI integration.

Teachers who have more than 10 years of experience (mean = 3.4286) constitute a different group of teachers, and they view the barriers and challenges in teaching as significantly higher at p = 1.000. This indicates that teachers with more than 10 years of teaching experience find more challenges in AI when applied to their teaching skills, which further supports Table 31 findings that there is a positive correlation between teaching experience and the level of perceived barriers to teaching with AI.

Significant Correlation between Perceived Readiness of Integrating AI in Science Education, and The Barriers and Challenges in AI Integration

Table 32. Tabulation of the Scheffe Test for the Significant Differences between Readiness in Integrating AI and Barriers and Challenges

		Readiness on Integrating AI	**Barriers and Challenges**
Readiness on Integrating AI	Pearson Correlation	1	-.858**
	Sig. (2-tailed)		.000
	N	32	32
Barriers and Challenges	Pearson Correlation	-.858**	1
	Sig. (2-tailed)	.000	
	N	32	32

***Correlation is significant at the 0.01 level (2-tailed)*

Table 32 describes the Pearson correlation between a teacher's readiness to embrace AI in the classroom with the barriers and challenges that confront teachers about AI integration. The Pearson correlation coefficient found was -0.858, signifying a strong inverse relationship. This means that in line with the perception of most barriers and challenges, a higher readiness of teachers to employ AI will significantly decrease with increased perceived barriers and challenge to the integration of AI. Conversely, the ones feeling fewer barriers and challenges prefer to be more ready to put AI into their teaching practices.

The p-value of 0.000 is less than the 0.05 level of significance. This supports the fact that the connection is statistically significant, and its negative correlation is not related to random chance, but, instead, there is a rather robust inverse relationship between both factors. This, in practical terms, means that the more difficulties teachers see—limited resources, lack of training, ethical issues, or resistance to change—the less likely they are to embrace AI technologies. Conversely, the fewer challenges they see, the more confident and better prepared they will be to take AI into their classrooms.

Profile Variables that Significantly Influence the Readiness in Integrating Artificial Intelligence in Teaching Science

Table 33. Tabulation of the Linear Regression for Profile variables that Significantly Influence the Readiness in Integrating Artificial Intelligence in Teaching Science

Variables	B	Std. Error	Beta	T	Sig.
(Constant)	4.436	.279		15.872	.000
Sex	-.488	.216	-.328	-2.259	.032
Age	-1.042	.210	-.683	-4.957	.000
Years of Teaching	-.809	.218	-.554	-3.715	.001

The results in Table 33 show that the independent variables Sex, Age, and Years of Teaching have a significant influence on the readiness of teachers to integrate AI in teaching science. The regression equation can be written as follows:

Readiness = 4.436 - 0.488(Sex) - 1.042(Age) - 0.809(Years of Teaching).

This means that for every unit increase in Sex (with males coded as a higher unit), readiness decreases by 0.488 units. Similarly, for every unit rise in Age, readiness drops by 1.042 units, and for every extra year of teaching experience, readiness drops by 0.809 units. The t-values for Sex (-2.259, $p = .032$), Age (-4.957, $p = .000$), and Years of Teaching (-3.715, $p = .001$) all have statistical significance since their p-values are less than 0.05. This indicates that these demographic variables are strong predictors of readiness to integrate AI.

The findings suggest that there is a need for targeted interventions to address the decline in readiness associated with increasing age and teaching experience. In addition, the observed lower readiness among males necessitates further exploration to design gender-sensitive strategies for AI integration.

CONCLUSION

This study looked into the readiness of science teachers from PLT College Inc. in Bayombong, Nueva Vizcaya, in implementing AI in their classrooms. Results showed a moderate overall level of readiness for AI integration; the teachers exhibited a certain level of confidence about the basic concepts but have issues with the implementation in class. Resource availability and accessibility were not even. There was a gap concerning access to current AI tools, as well as infrastructure in some cases. Teachers voiced dissatisfaction with current professional development offerings, saying they need to be more practical and individualized.

Demographic factors were important for AI readiness. Younger teachers (ages 21–30) and teachers with fewer years of teaching experience (1–5 years) were found to have higher readiness compared to older and more experienced educators. Gender differences also came out, with female teachers reporting slightly lower readiness levels. This means that there needs to be targeted support towards addressing these disparities. The ethical concerns such as data privacy, security, and equity emerged as significant barriers, in addition to practical challenges such as time constraints and unclear institutional policies on AI use. Despite these challenges, the study revealed a strong willingness of teachers to embrace AI, provided they receive adequate training and support.

In summary, the findings recommend a comprehensive strategy to improve AI readiness in science education by addressing the barriers, improving resource allocation, and providing structured professional development. These are some measures to ensure the effective incorporation of AI in science teaching to enable teachers to optimize the use of AI and make it an instrument of improved student learning.

RECOMMENDATIONS

The study's findings yield several strategic and actionable recommendations aimed at improving science teachers' preparedness for the integration of Artificial Intelligence (AI) in education. Schools should improve their professional development programs by adding AI-specific training that is useful, relevant to the subject, and meets the needs of teachers. These programs should include more than just general orientation. They should also include hands-on workshops that focus on how to use AI in the classroom, how to fix problems, and how to evaluate its effect on student learning. This will help turn policy into practice.

It's just as important to make it easier for people to get to resources and infrastructure. Policymakers and school leaders should put money into new AI tools, software, and reliable internet connections at the top of their list of priorities. They should also make sure that all schools get an equal share. Working with technology companies can help make access even more affordable. These actions show that the policies are clear and directly address the gaps in accessibility and usability that already exist.

To get rid of ethical and institutional barriers, policies must also be put into action. Schools need to set clear, enforceable rules about data privacy, security, and how to use AI ethically. They also need to hold regular orientations and training sessions to make sure that all teachers understand and follow these rules.

Also, teachers at different levels of readiness should be supported by using both broad and specific strategies. Less confident teachers can become more skilled through mentorship programs, differentiated training, and capacity-building initiatives. Adding AI education to pre-service and in-service training makes sure that teachers are ready for the long term.

Lastly, it's important to create a professional environment that encourages teamwork and support. Promoting peer learning, sharing knowledge, and working together to try out AI can help teachers who are more experienced feel more comfortable with it and less resistant to it. These strategies, which are based on policy and practice, work together to make AI readiness stronger and help science education use AI more effectively.

Limitations of the Study

This study offers significant insights into the preparedness of science teachers to incorporate Artificial Intelligence (AI) into their instruction; however, several limitations must be recognized. The sample size was relatively small, comprising 32 respondents from a single private higher education institution in Bayombong, Nueva Vizcaya, which may restrict the generalizability of the findings. The study utilized self-reported data, which may be influenced by bias, as participants might overestimate or underestimate their readiness due to personal perceptions or social desirability. Additionally, the cross-sectional design only shows teachers' readiness at one point in time and does not take into account changes in attitudes, access to resources, or improvements in AI technologies.

The results are also specific to the context, showing the technological infrastructure and institutional support that were available in the chosen educational setting, which may not be the same at other institutions. Even with these things in mind, the study gives us useful information about how ready science education is for AI. Subsequent research may expand upon these findings by incorporating larger and more heterogeneous samples from various institutions and regions, in addition to investigating longitudinal methodologies to gain a deeper understanding of the evolution of teachers' readiness over time.

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Ethics Declaration: This study adhered to established ethical standards in educational research. Prior approval was obtained from the appropriate institutional authorities before data collection. Participation of respondents was voluntary, and informed consent was secured prior to the administration of the survey. Participants were informed of the purpose of the study, their right to withdraw at any time, and the confidentiality of their responses. No identifying information was collected, ensuring anonymity. All data gathered were used solely for academic purposes and were handled with strict confidentiality throughout the research process.

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