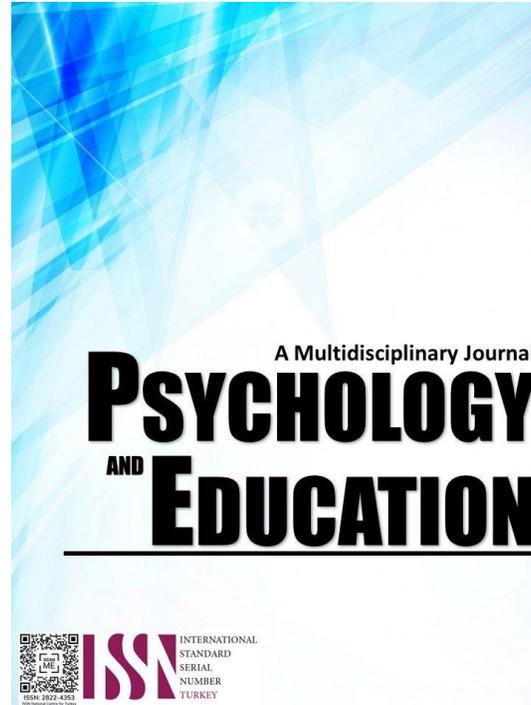


PERCEIVED IMPACT OF INTEGRATING ARTIFICIAL INTELLIGENCE IN TEACHING-LEARNING



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Perceived Impact of Integrating Artificial Intelligence in Teaching-Learning

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Abstract

This research focused on the understandings and experiences of primary teachers in Iligan City regarding the incorporation of artificial intelligence (AI) in teaching and learning practices. A descriptive-correlational design was employed to collect data from a sample of 189 teachers from five public schools in the North III District using a validated survey instrument. Results showed that teachers held strong positive views about AI in education, particularly its potential to make learning more enjoyable and reduce workload. They rated themselves highly in basic computer skills and digital communication and collaboration, but reported lower confidence in advanced technological skills. AI was perceived to have a positive impact on student engagement, teaching roles, critical thinking and collaboration, and support and resources. Regression analysis revealed that teachers' perceptions and digital collaboration skills significantly predicted AI's impact on student engagement. Advanced skills also predicted access to support and resources. The findings emphasized the importance of sustained professional development and institutional support to help teachers confidently and effectively integrate AI into their teaching practices.

Keywords: *artificial intelligence (AI), teacher perceptions, technology integration, seasoned teachers, teaching-learning, North III District, Division of Iligan City*

Introduction

The rapid advancement of AI technology has led to significant changes across various sectors, with education being no exception. Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems. Examples of AI applications include expert systems, natural language processing (NLP), speech recognition and machine vision (Craig, 2025). These technologies promise to revolutionize education by providing more tailored learning experiences.

The implementation of artificial intelligence within education has made strides in recent years. That said, there are still many lessons to be learned in utilizing the technology to its maximum potential in a classroom setting. Most of the literature currently available on the subject tends to be more focused on the complexities of AI; rather than its practical relevance to the classroom or teachers' attitudes towards it. In addition to this, ways in which students' engagement levels, critical thinking skills, and the efficiency of teaching practices are affected by this advancement is perhaps the most concerning question that is typical of this matter. On top of everything, ensuring that AI technologies do not interfere with accomplishing educational goals requires more investigation into potential abuses of AI, including data privacy, bias, and over-dependence on AI tools.

Integrating AI in language learning reinforces teaching and captivates learners with digital devices. However, in the context of an elementary classroom in the Philippines, there are several obstacles that may impede the effective application of such technologies. While there appears to be literature on the successful acceptance these technologies focusing on the pros and cons of AI integration (Yang & Appleget, 2024; Shen & Guo, 2024), there exists a gap in understanding the adaptation of AI by teachers aged fifty to sixty years who, as a matter of course, teach students who fall under Generation Alpha, the so-called digital natives.

The image which comes to the mind of the average public school elementary teacher in the Philippines is that of a teacher handling huge numbers of students for extensive periods of classes as well as not having enough opportunities for self-improvement. This makes it even more difficult for experienced teachers, and therefore not so digitally literate, to successfully employ AI in their teaching practice. Layering this problem is the ever-changing curriculum that leaves little time, if any, for lesson plan creativity. This results in a poorly-resourced and unsupported teacher attempting to integrate AI into his or her lessons.

Indeed, one of the commonly discussed topics in education is the increasing importance of AI in improving learning experiences for elementary learners globally. The adoption of AI in elementary education is widely studied, especially those which focus on its impact. For example, a study by Common Sense Media found that nearly 30% of parents with children aged 0–8 reported that their kids have used AI for learning purposes (Morrone, 2025). With its many potentials, integrating AI literacy into elementary education is necessary for sustainable development (Yeter et al., 2024). In schools, AI tools mainly support students and are usually used for activities (Arriola-Mendoza & Valerio-Ureña, 2024).

The integration of AI in education offers several advantages, especially for young learners. As Rathore et al. (2023) stated, the application of AI technology in elementary school education could help improve the learning interface, advance creativity and innovation, enhance problem solving skills, and prepare students for the demands of the 21st century. Additionally, Rachmadtullah et al. (2024) reported that elementary school teachers appreciate AI's role in facilitating access to information and creating engaging learning content.

In the Philippines, the use of AI is rapidly expanding. Over 83% of Filipino students utilized AI tools for academic purposes, surpassing

the global average (Instructure, 2023). AI applications such as ChatGPT have become particularly popular to students, with 83% using them for research and writing, 52% for test preparation, and 47% for language learning (Instructure, 2023). Apart from student adoption, educational institutions have also started to recognize the importance of AI. For instance, the University of the Philippines, has taken proactive steps by creating guidelines for responsible AI use (Gajete, 2023).

Even educators are trying to adapt to this technological shift. Sibug et al. (2024) claimed that Filipino teachers generally view AI as a valuable complement to their traditional teaching methods, specifically in improving personalized learning experiences. Some teachers remain cautious, but a number of them feel ready to work with AI in their classrooms, especially when they have institutional support through policies and training (Sibug et al., 2024).

Many studies have vouched for the use of AI technologies to enhance lesson planning, constructive feedback, and active learning integration (Hutauruk & Daulay, 2024). But, the problems about experienced teachers in the Philippines remain unresolved. Although teachers acknowledge the benefits of using AI tools in creating a more personalized instruction and enhancing participation of students, they also attest that hindrances, which include lack of resources and insufficient skill training on the use of AI for teaching, are serious issues (Arvin et al., 2023).

Thus, this research strives to fill these above-mentioned gaps by studying the demographic data of teachers, their attitudes towards AI, their self-reported levels of proficiency, the effect of AI on their teaching practice, the relationship of their perceptions towards other factors, the relationship between their profile towards other factors, and, in the end, creating a training program based on the findings.

This study was conducted during the third quarter of the School Year 2024–2025 in the North III District of the Iligan City Division. It specifically focused on five key schools within the district: Bagong Silang Elementary School, Cabili Village Elementary School, Iligan City North Central School, Luinab Elementary School, and Tambo Central School.

The researcher has six (6) years of teaching experience in the Department of Education and teaches Math, Reading and Literacy, Language, Makabansa, and GMRC to Grade 1 learners at Cabili Village Elementary School. She is also the Grade 1 grade leader. As the Grade 1 grade leader, she facilitated collaborative planning, provided instructional support to fellow teachers, and ensured the effective implementation of the curriculum. Her expertise in early childhood education, coupled with her leadership role, positions her well to explore innovative teaching strategies that enhance learning outcomes.

Research Objectives

This study aimed to examine teachers' perspectives on AI, assess their technological skills, and explore the relationship between these factors and AI adoption in teaching by addressing these issues. Specifically, it aimed to attain the following objectives:

1. To describe the profile of the respondents in terms of:
 - 1.1. age;
 - 1.2. sex; and
 - 1.3. years of teaching experience.
2. To explore teachers' perceptions towards artificial intelligence (AI) in the context of teaching and learning;
3. To determine the technological proficiency levels of teachers in terms of:
 - 3.1. basic computer skills;
 - 3.2. digital literacy;
 - 3.3. digital communication and collaboration; and
 - 3.4. advanced technological skills.
4. To determine the impact of AI on teaching and learning in terms of:
 - 4.1. student engagement and learning,
 - 4.2. teaching and teacher role,
 - 4.3. critical thinking and collaboration, and
 - 4.4. support and resources for implementing artificial intelligence.
5. To examine the relationship between respondents' perceptions towards artificial intelligence, technological proficiency level and the impact of artificial intelligence on teaching and learning.
6. To analyze the relationship namely: the respondents' profile, perceptions towards artificial intelligence, technological proficiency level and the impact of artificial intelligence on teaching and learning.
7. To design a training program based on the findings that enhances teachers' technological skills and promotes effective use of AI in teaching and learning.

Methodology

Research Design

This study used a descriptive-correlational research design to explore how elementary school teachers perceive artificial intelligence (AI), assess their level of technological proficiency, and examine how these factors relate to the impact of AI on teaching and learning.

This design was employed because it aligns with the study's intent to both describe existing conditions among teachers and analyze relationships between key variables without manipulating them.

The descriptive component aimed to present a clear picture of the respondents in terms of their age, sex, and years of teaching experience. It also described their perceptions of AI, their self-reported technological proficiency (covering basic computer skills, digital literacy, communication and collaboration, and advanced technological skills), and their views on the role and effect of AI in classroom teaching and student learning.

The correlational component investigated how these variables are connected. Specifically, it examined the relationships between teachers' perceptions of AI, their technological skills, and how these factors influence their experiences with AI in education. It also analyzed how demographic factors might affect these relationships. To do this, statistical tools such as Pearson's correlation coefficient and linear regression analysis were used.

This type of research design was appropriate because it helped the researcher understand what teachers are currently experiencing and how certain factors are connected, all without changing anything in their environment. The results served as a basis for creating a training program that aims to help teachers improve their technological skills and use AI more effectively in their teaching.

Respondents

This study focused on elementary school teachers from five schools in the North III District of the Iligan City Division: Bagong Silang Elementary School, Cabili Village Elementary School, Iligan City North Central School, Luinab Elementary School, and Tambo Central School.

A total population of 284 elementary teachers yielded a sample size of 164 teachers at a 95% confidence level and 5% margin of error through the Raosoft sample size calculator. The target sample size was increased to 200 to provide adequate coverage and cater to possible non-responses. In the end, only 189 responded to the survey, giving the survey a fairly high return rate of 94.5%.

A random sampling method was employed to draw the participants. This approach ensured that the study captured insights from teachers across different age groups, sex, levels of technological proficiency, and years of teaching experience. By selecting participants through this method, the study aimed to present a well-rounded understanding of how AI tools are perceived and integrated into teaching. The final sample size provided a strong foundation for statistical analysis, which offered valuable insights into the evolving role of AI in elementary education.

Procedure

A set of adapted questionnaires was developed based on various established frameworks and literature. The items were primarily anchored on the concepts from the Diffusion of Innovations by Rogers (2003), the self-assessment framework from Lochner and Conrad (2007), and the Digital Competence Framework for Citizens (DigComp 2.1) by the European Commission (2020). The ISTE Standards (2016) were also used to support technology integration in education.

The questionnaire consists of four sections. The first collected demographic data, including age, sex, teaching experience, and technological proficiency. The second assessed teachers' perceptions of AI through 12 statements on attitudes, beliefs, and acceptance. The third evaluated technological proficiency across four areas: basic computer skills (10 items), digital literacy (10), digital communication and collaboration (13), and advanced technological skills (13). The fourth examined AI's perceived impact on teaching and learning, covering student engagement (10), teaching roles (10), critical thinking (10), and implementation support (10). Sections two to four of the questionnaire used a four-point Likert scale ranging from 1 (Strongly Disagree) to 4 (Strongly Agree).

To validate the adapted questionnaire, a pilot test was conducted at MSU-IIT National Coop Academy in Bagong Silang, Iligan City, and St. Therese De Avila Learning Center in Brgy. Poblacion, Iligan City with 30 elementary teachers who answered through Google Forms. The primary objective of the pilot test was to evaluate the clarity, reliability, and internal consistency of the instrument.

For the actual conduct of the study, the researcher distributed the questionnaire to four of the five participating schools: Bagong Silang Elementary School, Cabili Village Elementary School, Luinab Elementary School, and North III Central School. The questionnaires were personally administered to each teacher-respondent, as Cabili Village Elementary School was also where the researcher taught. The principals at the other three schools—Bagong Silang Elementary, North III Central School, and Luinab Elementary School—helped to administer the questionnaires to the teachers at their respective schools.

The principal of Bagong Silang Elementary School advised that the completed questionnaires be picked up the next day, and it was carried out accordingly. At North III Central School and Luinab Elementary School, completed questionnaires were picked up after a week, as agreed with the school principals. For Tambo Central School, the researcher opted for the online administration of the questionnaire for convenience. The questionnaire was developed using Google Forms and disseminated through the teachers' group chat, with the assistance of the principal. Initially, more responses were anticipated from Tambo, but only a few teachers were able to respond due to the teachers' preparation for a big school event during the data collection period. Responses were collected two weeks after distribution from Tambo Central School. This mixed method allowed the researcher great flexibility in questionnaire distribution and responsiveness to specific needs and schedules.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) was utilized to analyze and interpret the collected data using appropriate statistical methods. A combination of descriptive statistical approaches was employed to address each research objective effectively. Specific statistical treatments were applied to ensure accurate analysis and meaningful interpretation of the data.

For the first objective, to examine teachers' backgrounds, specifically their age, sex, and years of teaching experience, Frequency and Percentage were used.

For the second objective, to explore teachers' perceptions towards artificial intelligence (AI) in the context of teaching and learning, Weighted Mean was used.

For the third objective, to determine the technological proficiency levels of teachers in terms of basic computer skills, digital literacy, digital communication and collaboration and advanced technological skills, Weighted Mean was used.

For the fourth objective, to determine the impact of AI on teaching and learning as to student engagement and learning, teaching and teacher role, critical thinking and collaboration, and support and resources for implementing artificial intelligence, Weighted Mean was used.

For the fifth objective, to examine the relationship between respondents' perceptions towards artificial intelligence, technological proficiency level and the impact of artificial intelligence on teaching and learning, Pearson's Correlation Coefficient was used.

For the sixth objective, to analyze the relationship between the respondents' profile, perceptions towards artificial intelligence, technological proficiency level and the impact of artificial intelligence on teaching and learning, Linear Regression was used.

By applying these statistical treatments, each objective was analyzed with precision, which then allowed for a clear interpretation of teachers' perceptions, perceived impacts, and demographic influences on the integration of AI in education.

Ethical Considerations

The study was carefully designed to respect and protect the rights of all participants. Respondents were not required to provide their names unless they chose to do so, and any identifying information that was shared was kept strictly confidential. Before answering the questionnaire, participants were informed that their involvement was completely voluntary—they could choose not to complete or submit it at any time, without any negative consequences. The researcher also obtained approval from the appropriate ethics committee before beginning the data collection. All responses were treated with care and used solely for academic purposes. To further protect participants' privacy, codes or pseudonyms were used when necessary, and all data was securely stored to prevent unauthorized access. Throughout the study, ethical standards were closely followed to ensure the dignity, privacy, and well-being of every participant.

Results and Discussion

This section presents the data gathered to answer the study's problems. It also analyzes and interprets the data collected by the researcher to solve based on the objectives of the study.

Profile of the Respondents

Table 1. Age

Age	Frequency	Percentage (%)
21 – 25 years old	3	1.6
26 – 30 years old	25	13.2
31 – 35 years old	33	17.5
36 years and above	128	67.7
Total	189	100.0

As shown in Table 1, the majority of the respondents—67.7%—were aged 36 years and above. This indicated that most of the participants in the study were older teachers who had already accumulated years of classroom experience. Their perspectives and attitudes toward innovations like artificial intelligence (AI) were likely influenced by their familiarity with traditional teaching practices and tools.

Previous research suggested that older educators tended to approach new technologies with more caution. Utami et al. (2023) found that teachers in the older age group perceived more risks and difficulties in using digital tools, which affected their willingness to adopt such innovations. Zhao (2024) also observed that older teachers often had limited experience with ICT (Information and Communication Technology), making it more challenging for them to integrate AI into their instruction effectively.

Despite these challenges, age did not automatically equate to resistance. Experience remained a strong asset. Keržič et al. (2021) reported that during the sudden transition to online learning, older teachers demonstrated that—with sufficient support—they could effectively use digital platforms just like their younger colleagues. Similarly, Amirova et al. (2023) discovered that older teachers in Kazakhstan made greater use of synchronous online teaching tools than younger ones during the pandemic, showing that older

educators were capable of adapting when given the opportunity.

The dominance of older respondents in this study underscored the importance of inclusive professional development programs. As Purcell, Buchanan, and Friedrich (2013) pointed out, many older teachers expressed a lack of confidence in navigating digital environments, highlighting the need for tailored training that addressed their specific concerns.

Considering that the Department of Education in the Philippines had been pushing for digital transformation across schools, the findings of this study emphasized the need to support mid- and late-career teachers in the transition. With the right training and encouragement, these educators could become powerful adopters of AI, combining technological tools with their deep pedagogical experience to enhance teaching and learning outcomes.

Table 2. *Sex*

<i>Sex</i>	<i>Frequency</i>	<i>Percentage (%)</i>
Male	30	15.9
Female	159	84.1
Total	189	100.0

Table 2 displays the sex of the respondents. This sex distribution of the respondents in the study on teachers' perspectives on AI. The majority of respondents were female (84.1%), while male teachers made up only 15.9% of the total sample. This aligned with national trends in the teaching profession, where the majority of females work in basic education levels as teachers (UNESCO, 2021; PSA, 2023).

The results also indicated a concentration at age 36. This could be the outcome of the current hiring and employment of teachers, with those employed early in 2010 now reaching their mid-thirties with the Department of Education (DepEd). According to PSA (2023), the age group of teachers employed by the government is mostly 35 to 39, which showed that the teachers were more likely to be settled by tenure within the service, and possibly within their careers. This meant that many teachers entered the public school system within the mid to late twenties and tend to stay in their positions for long periods of times due to job security and benefits offered through the government. Hence, the clustering at age 36 implied a well-represented number of mid-career professional teachers with decadal experience at teaching is an important factor in understanding their views on the adoption of new technologies like AI in the classroom.

Table 3. *Teaching Experience*

<i>Years</i>	<i>Frequency</i>	<i>Percentage (%)</i>
3 years and below	14	7.4
4 – 6 years	32	16.9
7 – 9 years	25	13.2
10 – 12 years	18	9.5
13 – 15 years	30	15.9
16 – 18 years	17	9.0
19 – 21 years	9	4.8
22 – 24 years	23	12.2
25 – 27 years	11	5.8
28 – 30 years	7	3.7
31 – 33 years	2	1.1
34 years and above	1	.5
Total	189	100.0

Table 3 presents the respondents' years of teaching experience. The data showed a diverse range of teaching experience, with a significant portion having between 4 and 6 years (16.9%) and 13 to 15 years (15.9%) of experience. Other major groups included 7–9 years (13.2%) and 22–24 years (12.2%). Meanwhile, there were 18 teachers who were in 10 to 12 years (9.5%), 17 (6%) of them were teaching for 16 to 18 years; 9 (4.8%) were teaching for 19 to 21 years. 11 respondents (5.8%) were teaching for 25 to 27 years. There were 7(3.7%) who were teaching for 28 to 30 years, and a small percentage (1.1%) had 31–33 years of experience. There was only 1 respondent (0.5%) had more than 34 years of experience.

The wide distribution of teaching experience opinions on AI in education may change depending on their level of experience. Maybe they were raised in a more technologically advanced learning environment, teachers with less experience (those with three years or less, 7.4%) would be more receptive to incorporating AI into their lesson plans. Teachers with more than 25 years of experience, on the other hand, might use more conventional teaching methods and find it difficult to embrace AI because they are not accustomed to using digital tools.

The high concentration in the 4–6-year category (16.9%) could be explained because DepEd undertook massive recruitment and hiring of teachers in a short period of time, from 2016 to 2019, as noted by DepEd and the Civil Service Commission. Again, as indicated by DepEd reports, the massive hiring of teachers responded to the insufficiency of teachers when implementing the K–12 reform. During these years under the K–12 reform, hundreds of thousands of new positions were created, resulting in a larger pool of teachers who had recently entered the DepEd system (Department of Budget and Management, 2017; DepEd, 2019).

Consolidated government employment data further revealed that the average age of entry-level public school teachers was around 25-28 years, in agreement with average of 4-6 years of teaching experience for teachers hired following between 2017 and 2019 (PSA, 2023).

Less-experienced teachers appeared to be more willing to use technology, having been exposed to the most recent technologies, as Ertmer and Ottenbreit-Leftwich, (2010) suggested. More-experienced teachers seemed to undergo additional barriers in integrating AI, due to years of teaching with little formal training with newer technology.

Teachers' Perceptions towards Artificial Intelligence (AI) in the Context of Teaching and Learning

Table 4. *Perceptions towards Artificial Intelligence*

<i>Indicator</i>	<i>Mean</i>	<i>Description</i>
1. Using AI tools may help teachers to acquire more content knowledge.	3.33	Strongly Agree
2. AI tools enable teachers and students to interact and communicate in new and innovative ways.	3.32	Strongly Agree
3. AI tools can assist teachers in improving academic achievement and grades among students.	3.23	Strongly Agree
4. AI Tools may assist in making teaching and learning interesting and enjoyable.	3.37	Strongly Agree
5. AI may assist in activating teaching and learning during lessons.	3.27	Strongly Agree
6. AI tools may help teachers to meet the different needs of the learners in the classroom.	3.22	Agree
7. AI tools can enhance traditional teaching methods, like group discussions, by providing instant answers to support students' learning.	3.24	Agree
8. Knowledge of AI's ethical issues encourages teachers to use it confidently.	3.16	Agree
9. AI tools can help standardize academic assessments, ensuring fairness and consistency in evaluating students.	3.12	Agree
10. AI helps students become more independent learners while also appreciating the guidance and expertise of their teachers.	3.08	Agree
11. Having sufficient facilities motivates teacher educators to use AI tools effectively.	3.25	Strongly Agree
12. Teachers need to learn how AI tools can be used appropriately and how they can be generated into the current curriculum effectively.	3.37	Strongly Agree
Weighted Mean	3.25	Strongly Agree

Legend: 3.25-4.00 – Strongly Agree; 2.50-3.24 – Agree; 1.75-2.49 – Disagree; 1.00-1.74 – Strongly Disagree.

Table 4 shows teachers' perceptions towards artificial intelligence (AI) in the context of teaching and learning. The weighted mean of 3.25 indicates that respondents strongly agreed with the positive impacts of AI on teaching and learning. The highest-rated statements included: AI Tools May Assist in Making Teaching and Learning Interesting and Enjoyable (Mean = 3.37); Teachers Need to Learn How AI Tools Can Be Used Appropriately and Integrated into the Curriculum (Mean = 3.37); and Using AI Tools May Help Teachers Acquire More Content Knowledge (Mean = 3.33).

The lowest-rated but still positively regarded statements were AI Tools Can Help Standardize Academic Assessments (Mean = 3.12), AI Helps Students Become More Independent Learners (Mean = 3.08), and Knowledge of AI's Ethical Issues Encourages Teachers to Use It Confidently (Mean = 3.16). These findings reflect teacher awareness of AI's instructional benefits, alongside a need for further understanding of its ethical and pedagogical implications.

The strongest conviction among teachers is AI's potential to make learning enjoyable. Research supports this, showing that AI tools like chatbots and adaptive simulations can transform classrooms into dynamic environments that support motivation and conceptual clarity (Zawacki-Richter et al., 2019). However, concerns remain regarding AI's role in promoting student autonomy. The relatively lower agreement on AI fostering independence suggests some hesitation, possibly due to fears of weakened student-teacher interaction or over-reliance on automation. Selwyn (2019) acknowledged this tension, noting that AI can promote independent learning but must be pedagogically integrated to avoid replacing essential human guidance.

Technological Proficiency Levels of Teachers in terms of Basic Computer Skills, Digital Literacy, Digital Communication and Collaboration, and Advanced Technological Skills

Table 5 presents the technological proficiency levels of teachers in terms of basic computer skills. The result showed teachers' self-assessment of their basic computer skills, with a weighted mean of 3.12, indicating that respondents agree with their proficiency in fundamental digital competencies.

Based on the result, highest-rated indicators include: "I know how to use email for sending, receiving, and organizing messages" (Mean = 3.26, Strongly Agree); "I am confident in using basic computer applications such as Microsoft Word and Excel" (Mean = 3.25, Strongly Agree); "I can prepare presentations with multimedia elements (e.g., images, audio)" (Mean = 3.21, Agree). These findings suggest that teachers are comfortable using common productivity tools, such as Microsoft Office, emails, and presentation software.

However, the lowest-rated indicator is "I can troubleshoot basic computer issues, such as connectivity problems or software installation" (Mean = 2.86, Agree). This implies that while teachers can effectively use digital tools, some may struggle with basic troubleshooting

tasks, indicating a potential area for improvement.

Table 5. *Basic Computer Skills*

<i>Indicator</i>	<i>Mean</i>	<i>Description</i>
1. I am confident in using basic computer applications such as Microsoft Word and Excel.	3.25	Strongly Agree
2. I can troubleshoot basic computer issues, such as connectivity problems or software installation.	2.86	Agree
3. I can navigate and use online platforms effectively (e.g., email, browsers, social media)	3.14	Agree
4. I can effectively use a word processor to create and format documents.	3.14	Agree
5. I can prepare presentations with multimedia elements (e.g., images, audio).	3.21	Agree
6. I know how to use email for sending, receiving, and organizing messages.	3.26	Strongly Agree
7. I can set up and manage basic system settings, such as language preferences.	3.10	Agree
8. I can install and uninstall software on my device.	3.06	Agree
9. I am capable of using shortcuts and other time-saving tools to enhance productivity.	3.05	Agree
10. I am familiar with basic security practices, such as creating strong passwords.	3.12	Agree
Weighted Mean	3.12	Agree

Legend: 3.25–4.00 – Strongly Agree; 2.50–3.24 – Agree; 1.75–2.49 – Disagree; 1.00–1.74 – Strongly Disagree.

The results highlighted the need for continuous digital literacy training for teachers such Cybersecurity Awareness. While respondents agreed that they were familiar with basic security practices (Mean = 3.12), it is essential to reinforce knowledge on data protection, phishing awareness, and password management to safeguard school and student data.

The significance of digital literacy in education is shown by recent studies. Nearly half of educators were worried about how AI might affect teaching and learning, according to a 2023 Education Week article. This underscored the importance of having strong digital literacy to successfully negotiate these obstacles. Furthermore, according to a 2024 Pew Research Center survey, 25% of public K–12 teachers think AI tools were more detrimental to education than beneficial. This highlighted the need for thorough digital literacy training to reduce any potential risks related to integrating AI.

Table 6. *Digital Literacy*

<i>Indicator</i>	<i>Mean</i>	<i>Description</i>
1. I can critically evaluate the reliability of online sources.	2.99	Agree
2. I understand the ethical implications of sharing digital content.	3.06	Agree
3. I can detect and report cyber threats, such as phishing attempts.	2.84	Agree
4. I am knowledgeable about copyright laws and fair use policies.	2.92	Agree
5. I can use digital tools to fact-check and verify information.	2.94	Agree
6. I can recognize biased or misleading information in digital media.	2.99	Agree
7. I am familiar with managing my digital footprint and online privacy.	2.96	Agree
8. I can differentiate between personal and professional digital communication.	3.00	Agree
9. I understand the importance of balancing screen time and offline activities.	3.11	Agree
10. I can use digital tools to create original and ethical content.	3.02	Agree
Weighted Mean	2.98	Agree

Legend: 3.25–4.00 – Strongly Agree; 2.50–3.24 – Agree; 1.75–2.49 – Disagree; 1.00–1.74 – Strongly Disagree.

In Table 6 presents the technological proficiency levels of teachers in terms of digital literacy. The findings indicated that teachers agreed (weighted mean = 2.98) with the statements related to their digital literacy skills. Based on the result, among the highest-rated indicators were understanding the ethical implications of sharing digital content (M = 3.06) and the importance of balancing screen time and offline activities (M = 3.11). This suggested that teachers recognized responsible digital behavior and the need for managing technology use effectively. However, slightly lower ratings, such as the ability to detect and report cyber threats (M = 2.84) and knowledge about copyright laws (M = 2.92), indicate areas that may require further training or support.

These findings were consistent with those of Nguyen et al. (2022), who highlighted that although teachers typically possess a moderate level of digital literacy, they frequently lack advanced knowledge of cybersecurity and intellectual property laws. This implies that ongoing professional development courses on data privacy, cyber awareness, and content production in the digital era are necessary. Additionally, digital literacy is now required in modern schooling, according to Kumar and Chandrasekaran (2023). Teachers need to be able to evaluate internet sources critically and help pupils securely navigate digital environments.

Table 7 presents the technological proficiency levels of teachers in terms of digital communication and collaboration. The result showed that teachers generally agree (weighted mean = 3.09) with their ability to use digital tools for communication and collaboration. The highest-rated statement, "I understand digital etiquette for professional communication" (M = 3.37, Strongly Agree). This suggested that teachers recognized the importance of appropriate online behavior in professional settings.

However, slightly lower ratings for "I can effectively communicate ideas using visual storytelling tools (M = 2.97)" and "I am familiar with accessibility features for inclusive digital communication (M = 2.95)" indicated potential gaps in utilizing advanced digital communication strategies.

Table 7. *Digital Communication and Collaboration*

<i>Indicator</i>	<i>Mean</i>	<i>Description</i>
1. I effectively communicate using online tools such as email, messaging apps, or video conferencing platforms.	3.18	Agree
2. I am comfortable collaborating on projects using digital platforms (e.g., Google Drive, Microsoft Teams).	3.10	Agree
3. I understand and implement proper online communication etiquette.	3.19	Agree
4. I am confident in using video conferencing tools to collaborate with others.	3.11	Agree
5. I can effectively use online platforms to share and discuss ideas with a team.	3.12	Agree
6. I understand digital etiquette for professional communication.	3.37	Strongly Agree
7. I can manage and organize collaborative projects using tools	3.01	Agree
8. I am skilled at creating and sharing collaborative documents (e.g., Google Docs).	3.08	Agree
9. I can effectively communicate ideas using visual storytelling tools (e.g., Canva).	2.97	Agree
10. I am familiar with accessibility features for inclusive digital communication.	2.95	Agree
11. I can integrate feedback from collaborators to improve shared projects.	2.98	Agree
12. I know how to use social media responsibly to network and share professional content.	3.11	Agree
13. I can identify and adapt to cultural differences in digital communication.	3.05	Agree
Weighted Mean	3.09	Agree

Legend: 3.25–4.00 – Strongly Agree; 2.50–3.24 – Agree; 1.75–2.49 – Disagree; 1.00–1.74 – Strongly Disagree.

Teachers use digital platforms to collaborate and communicate effectively. They also understand digital professionalism and use social media in a responsible manner. Nonetheless, improving proficiency with accessible technologies, visual storytelling, and sophisticated collaboration techniques would increase the efficacy of instruction in digital settings (Reyes & Tan, 2021). These results are consistent with those of Garcia et al. (2022), who discovered that although educators are skilled in the fundamentals of digital collaboration, they need more instruction in inclusive communication platforms and sophisticated content-sharing techniques. Similar to this, Brown and Lee (2021) stressed that in order to successfully engage different learners in digital spaces, educators must cultivate multimodal communication abilities, such as visual storytelling and accessibility adjustments.

Table 8 presents the technological proficiency levels of teachers in terms of advanced technological skills. The result showed that teachers generally agree (weighted mean = 2.68) with their ability to use advanced technological tools. The highest-rated indicator, is "I am confident in using technology to automate tasks and increase efficiency" ($M = 2.85$, Agree). The result suggested that teachers are comfortable integrating digital tools to enhance productivity. However, skills related to coding and troubleshooting computer issues received lower ratings ($M = 2.43$ and $M = 2.44$, respectively), indicating a lack of confidence in these areas.

Table 8. *Advanced Technological Skills*

<i>Indicator</i>	<i>Mean</i>	<i>Description</i>
1. I can use advanced tools like programming languages, data analysis software, or graphic design applications.	2.65	Agree
2. I am confident in using technology to automate tasks and increase efficiency.	2.85	Agree
3. I stay updated with technological trends and integrate new tools into my work.	2.83	Agree
4. I can analyze data using advanced spreadsheet functions (e.g., pivot tables, charts).	2.76	Agree
5. I am skilled at creating visually appealing and professional presentations.	2.84	Agree
6. I can use collaborative tools like Google Workspace or Microsoft Teams effectively.	2.81	Agree
7. I know how to set up and use cloud storage solutions for file sharing and backup.	2.71	Agree
8. I can code or program using basic scripting languages (e.g., Python, HTML).	2.43	Disagree
9. I am proficient in using video editing software to create and edit content.	2.60	Agree
10. I can manage and analyze large datasets using software like Tableau or Excel.	2.59	Agree
11. I am skilled at troubleshooting complex hardware or software issues.	2.44	Disagree
12. I am knowledgeable about optimizing device performance, such as clearing cache or updating drivers.	2.65	Agree
13. I can evaluate and choose appropriate digital tools for specific tasks.	2.75	Agree
Weighted Mean	2.68	Agree

Legend: 3.25–4.00 – Strongly Agree; 2.50–3.24 – Agree; 1.75–2.49 – Disagree; 1.00–1.74 – Strongly Disagree.

According to a study, teachers have a moderate level of proficiency with advanced technology abilities; they excel in digital collaboration and automation, but they struggle with coding, troubleshooting, and complex data analysis. Additionally, schools must put in place focused professional development initiatives to improve technical proficiency in data-driven decision-making, programming, and IT troubleshooting (Reyes & Tan, 2021).

This result is consistent with that of Jones and Wang (2022), who discovered that although educators use automation and collaboration technologies efficiently, however, many do not have formal expertise in sophisticated data analysis, programming, or IT troubleshooting. Similar to this, Rodriguez et al. (2023) pointed out that instructors' low coding skills hinder their capacity to include computational thinking—a concept that is becoming more and more important in education for the twenty-first century—into their lessons.



Impact of Artificial Intelligence on Teaching and Learning as to Student Engagement and Learning, Teaching and Teacher Roles, Critical Thinking and Collaboration, and Support and Resources for Implementing Artificial Intelligence

Table 9. Student Engagement and Learning

Indicator	Mean	Description
1. I understand how AI-powered tools can personalize learning experiences for my students.	3.03	Agree
2. I believe AI can help improve student engagement in the classroom.	3.01	Agree
3. I am aware of AI applications that can support differentiated instruction.	2.97	Agree
4. I feel confident integrating AI-driven educational tools into my teaching.	2.93	Agree
5. I believe AI can assist in identifying students' learning gaps more effectively.	2.95	Agree
6. I understand the ethical considerations of using AI in education.	3.03	Agree
7. I am familiar with AI-powered assessment tools and their impact on student learning outcomes.	2.88	Agree
8. I believe AI can reduce the workload of teachers by automating certain tasks.	3.14	Agree
9. I think AI can foster creativity and critical thinking among elementary pupils.	2.98	Agree
10. I am knowledgeable about AI's potential risks and challenges in education.	2.98	Agree
Weighted Mean	2.99	Agree

Legend: 3.25–4.00 – Strongly Agree; 2.50–3.24 – Agree; 1.75–2.49 – Disagree; 1.00–1.74 – Strongly Disagree.

Table 9 presents the impact of artificial intelligence on teaching and learning in terms of student engagement and learning. The result showed that teachers generally agree (weighted mean = 2.99) with the benefits and applications of AI in education. The highest-rated indicator, "I believe AI can reduce the workload of teachers by automating certain tasks" (M = 3.14, Agree). This suggested that teachers see AI as a valuable tool for streamlining administrative and instructional duties. Yet, the indicator "I am familiar with AI-powered assessment tools and their impact on student learning outcomes" (M = 2.88, Agree) received a slightly lower rating, indicating a need for more awareness and training in AI-driven assessment technologies.

Schools must put in place professional development programs that expose teachers to AI-based grading systems, adaptive assessments, and learning analytics (Johnson & Patel, 2023) because the indicator "I am familiar with AI-powered assessment tools and their impact on student learning outcomes" had the lowest mean (M = 2.88). Teachers can become more adept at integrating AI by receiving training on formative assessment technologies like Grammarly, Quillionz, and ChatGPT (Brown & Lee, 2021).

These results were consistent with those of Xu and Chen (2022), who observed that AI applications in education greatly lessen instructors' workloads by automating monotonous chores, freeing them up to concentrate more on the quality of instruction. Similarly, Garcia et al. (2023) stressed that although AI promotes engagement and individualized learning, many educators are still unsure of its ethical ramifications and the validity of AI-driven tests. Although teachers are aware of AI's potential to improve student engagement, automate work, and encourage creativity, they still need to get more comfortable using AI-powered tests and differentiated instruction resources. Schools must fund AI literacy education initiatives that emphasize evaluation instruments, individualized learning apps, and ethical issues (Reyes & Tan, 2021).

Table 10 presents the impact of artificial intelligence on teaching and learning in terms of teaching and teacher roles. The result showed that teachers generally agree (weighted mean = 3.09) that AI plays a significant role in supporting teaching and learning. Notably, the highest-rated indicator, "AI tools make learning more engaging for students" (M = 3.26, Strongly Agree). This suggested that teachers recognized AI's potential to enhance student engagement. Additionally, "AI enhances but does not replace the teacher's role" (M = 3.23, Agree) reflected a balanced perspective, acknowledging AI as a support tool rather than a replacement. However, the statement "I need professional development to integrate AI effectively" (M = 3.15, Agree) also received a high score, indicating a need for further training and capacity building among teachers.

Table 10. Teaching and Teacher Roles

Indicator	Mean	Description
1. AI tools make learning more engaging for students.	3.26	Strongly Agree
2. AI helps identify and address individual student needs.	2.98	Agree
3. AI supports early literacy and numeracy development.	3.03	Agree
4. AI provides timely feedback to enhance student learning.	3.04	Agree
5. AI assists in differentiating instruction for diverse learners.	3.06	Agree
6. AI reduces routine tasks, giving me more time for students.	3.08	Agree
7. AI enhances but does not replace the teacher's role.	3.23	Agree
8. AI supports students with special needs through personalization.	3.00	Agree
9. AI improves communication with parents about student progress.	3.01	Agree
10. I need professional development to integrate AI effectively.	3.15	Agree
Weighted Mean	3.09	Agree

Legend: 3.25–4.00 – Strongly Agree; 2.50–3.24 – Agree; 1.75–2.49 – Disagree; 1.00–1.74 – Strongly Disagree.

The findings suggested that schools should spend money on platforms like Kahoot, Quillionz, and ChatGPT to develop interactive lessons since AI tools make learning more interesting. The necessity of AI literacy training, workshops, and certifications is shown by the high rating for "I need professional development" (M = 3.15).

These findings supported the studies of Nguyen and Park (2022), who highlighted that while AI-driven instructional tools improve engagement and difference, their successful integration needs professional training. Similarly, Garcia et al. (2023) discovered that although AI aids educators, issues with appropriate application and professional preparedness still exist.

According to the findings, AI improved teacher effectiveness, engagement, and differentiation. Nevertheless, successful integration still requires professional growth and training. Schools should encourage AI-based learning techniques, put in place structured AI training programs, and make sure that AI is used responsibly in the classroom (Johnson & Patel, 2023).

Table 13 presents the impact of artificial intelligence on teaching and learning in terms of critical thinking and collaboration. The result showed the highest mean score (3.06) is associated with the statement:

"I am aware of the potential risks of AI in replacing meaningful student-to-student interactions." This finding suggested that teachers recognized the possible drawbacks of AI in collaborative learning.

While AI-powered tools can support teamwork, excessive reliance on them may reduce direct student interaction, which is important for developing social and communication skills. Teachers' awareness of this issue highlighted their cautious approach to AI integration, ensuring that technology complements rather than replaces human interaction.

Furthermore, while artificial intelligence (AI) enhanced education, excessive reliance on technology might affect student relationships, leading to a reduction in social engagement and teamwork skills (Selwyn, 2022). However, Chiu et al. (2023) contended that AI should be utilized to support collaborative learning rather than to replace it, stressing the significance of striking a balance between peer-to-peer interaction and AI-driven customization.

Table 11. *Critical Thinking and Collaboration*

<i>Indicator</i>	<i>Mean</i>	<i>Description</i>
1. I understand how AI tools can enhance pupils' critical thinking skills.	3.00	Agree
2. I am aware of the ways AI can be integrated into classroom activities to promote problem-solving.	3.05	Agree
3. I can identify both the benefits and challenges of using AI to develop pupils' reasoning skills.	3.04	Agree
4. I am knowledgeable about how AI-generated content may affect pupils' ability to think independently.	3.00	Agree
5. I am familiar with strategies to balance AI assistance with fostering student creativity and analytical thinking.	2.98	Agree
6. I understand how AI-powered tools can facilitate student collaboration in learning activities.	2.98	Agree
7. I can explain how AI can be used to promote teamwork among elementary pupils.	2.96	Agree
8. I am aware of the potential risks of AI in replacing meaningful student-to-student interactions.	3.06	Agree
9. I can implement AI-driven activities that encourage peer discussions and cooperative learning.	2.96	Agree
10. I am knowledgeable about ethical considerations when using AI in collaborative learning settings.	2.99	Agree
Weighted Mean	3.00	Agree

Legend: 3.25–4.00 – Strongly Agree; 2.50–3.24 – Agree; 1.75–2.49 – Disagree; 1.00–1.74 – Strongly Disagree.

The following sentences are associated with the lowest mean score (2.96): "I can implement AI-driven activities that encourage peer discussions and cooperative learning." "I can explain how AI can be used to promote teamwork among elementary pupils." This implies that although educators acknowledge the importance of artificial intelligence (AI) in the classroom, they could lack the skills or confidence to use AI to encourage collaboration among young students. The lack of AI-powered collaborative learning resources in their classes or inadequate training could be the cause of this difference.

Luckin et al. (2023) discovered that a lot of teachers have trouble incorporating AI for collaborative learning because they are not familiar with AI tools that promote teamwork, like virtual discussion platforms or AI-driven group projects. Furthermore, it is recommended that professional development courses concentrate on AI-enhanced collaborative learning techniques, which would allow teachers to create AI-based team-building exercises. Because they are unfamiliar with AI tools that encourage teamwork, such as virtual discussion platforms or AI-driven group projects, many teachers struggle to integrate AI for collaborative learning, according to Luckin et al. (2023). Additionally, it is advised that professional development courses focus on collaborative learning strategies boosted by AI, enabling educators to design AI-based team-building activities.

Table 12 presents the impact of artificial intelligence on teaching and learning as to support and resources needed to implement artificial intelligence. Among the indicators, the result showed the highest mean score was "I have access to reliable internet and digital devices necessary for integrating AI into my lessons" (Mean = 2.77, Agree), while the lowest mean score was "I receive adequate funding or financial support for AI-related instructional resources" (Mean = 2.47, Disagree).

Based on the highest mean, teachers agreed they have access to reliable internet and digital devices (M = 2.77). This aligns with global trends in digital education, where investments in educational technology have increased. According to Luckin et al. (2023), access to stable internet and digital devices is a vital prerequisite for AI-driven education, as it enables teachers to integrate AI tools into their lessons effectively. The availability of such resources can enhance digital literacy among teachers and students, fostering a more interactive and engaging learning environment.

Furthermore, Selwyn (2022) highlighted that infrastructure has a major impact on the adoption of technology in schools. Better AI

integration results were shown in institutions that offer digital tools and high-speed internet. This suggested that schools can optimize the advantages of AI-assisted learning, resulting in enhanced teaching methods and student engagement, by giving priority to connectivity and device availability.

Table 12. *Support and Resources*

Indicator	Mean	Description
1. My school provides sufficient access to AI tools and technologies for teaching and learning.	2.65	Agree
2. I have access to reliable internet and digital devices necessary for integrating AI into my lessons.	2.77	Agree
3. The educational materials and curriculum guidelines I use include information on AI integration.	2.70	Agree
4. I receive adequate funding or financial support for AI-related instructional resources.	2.47	Disagree
5. Technical support is available when I encounter challenges in using AI-powered tools in my teaching.	2.54	Agree
6. I have received sufficient training on how to integrate AI effectively into my teaching practices.	2.47	Disagree
7. My school or educational institution offers professional development opportunities related to AI in education.	2.53	Agree
8. I feel confident in applying AI-driven strategies in the classroom due to the training and support provided.	2.62	Agree
9. I have access to a community or network of educators who share best practices for AI integration.	2.57	Agree
10. My school administration supports and encourages the use of AI in instructional activities.	2.70	Agree
Weighted Mean	2.60	Agree

Legend: 3.25–4.00 – Strongly Agree; 2.50–3.24 – Agree; 1.75–2.49 – Disagree; 1.00–1.74 – Strongly Disagree.

Conversely, "Lack of Funding for AI-related Instructional Resources" and "I have received sufficient training on how to integrate AI into my teaching practices" had the lowest mean scores. This illustrated a significant problem with the implementation of AI in education. According to Zawacki-Richter et al. (2022), who contended that AI-driven education necessitates consistent investment in hardware, software, and teacher training, financial limitations continue to be a major obstacle to AI implementation. Similarly, Chiu et al. (2023) claimed that although AI has the potential to revolutionize education, its efficacy may be limited by a lack of funding. This is especially true in schools with limited resources. The quality of AI-assisted instruction may suffer if teachers lack the funding to purchase adaptive learning software, personalized learning platforms, and other high-end AI tools.

The findings indicated that while teachers have access to reliable internet and digital devices, yet, they lack adequate financial support for AI-related instructional resources. These results highlighted the infrastructure versus funding paradox, where schools may possess the technical means to integrate AI but lack the necessary financial resources to maximize its potential. Addressing this challenge required a comprehensive funding strategy that supported AI integration at all levels, ensuring that technology adoption in education is both sustainable and equitable.

Relationship Between Respondents' Perceptions towards Artificial Intelligence, Technological Proficiency Level and the Impact of Artificial Intelligence on Teaching and Learning

Table 13. *Relationship¹ Perception, Technological Proficiency and Impact of AI as to Student Engagement and Learning*

Variables	Student Engagement and Learning		Remarks	Decision
	r-value	p-value		
Perception	0.585	<0.001	Significant	Reject Ho
Technological Proficiency				
Basic Computer Skills	0.605	<0.001	Significant	Reject Ho
Digital Literacy	0.559	<0.001	Significant	Reject Ho
Digital Communication and Collaboration	0.610	<0.001	Significant	Reject Ho
Advanced Technological Skills	0.518	<0.001	Significant	Reject Ho

Legend: 1 – based on Pearson's r Correlation; ns – $P > 0.05$; * – $P < 0.05$; ** – $P < 0.01$; *** – $P < 0.001$.

Table 13 illustrates the relationship between perceptions, technological proficiency, and the impact of AI on teaching and learning in terms of student engagement and learning. The result showed that the impact of AI on student engagement and learning had a highly significant correlation with perception and technological proficiency. Thus, the null hypothesis was rejected, which stated no significant correlation between the perceptions, technological proficiency, and impact of AI on teaching and learning as to student engagement and learning.

The findings in Table 13 results showed alignment with several foundational learning theories, which explained how AI and technological proficiency influence student engagement. According to Jean Piaget's Constructivist Learning Theory, students build their knowledge via their experiences and interactions with the world around them. Students actively use digital tools in AI-driven learning, which improves their capacity to organize, analyze, and remember information (Piaget, 1964). The result is supported by the correlation between AI and student engagement, since technology encourages critical thinking, problem-solving, and active learning as opposed to passive information consumption.

According to Piaget's theory, children can develop cognitive structures through self-paced learning and exploration with the use of AI-powered instructional tools like interactive simulations and adaptive learning platforms. The results of this study supported the notion that students who are proficient with technology are better able to construct knowledge, which raises engagement and improves learning outcomes.

Additionally, George Siemens' connectivism learning theory highlighted the significance of technology, digital information flow, and networks in contemporary education. The results of this study provided substantial support for this idea because they showed a significant relationship between student involvement and digital literacy, communication, and cooperation skills. According to connectivism, artificial intelligence (AI) and digital tools function as extensions of human cognition, enabling students to access enormous knowledge networks, participate in self-directed learning, and work together outside of the conventional classroom (Siemens, 2004). According to the findings, students who are proficient in technology may take advantage of AI-powered resources, which enhances their capacity to learn independently and maintain interest in networked learning settings.

Table 14. *Relationship¹ Perception, Technological Proficiency and Impact of AI as to Teaching and the Teacher Role*

Variables	Teaching and Teacher Role		Remarks	Decision
	r-value	p-value		
Perception	0.589	<0.001	Significant	Reject Ho
Technological Proficiency				
Basic Computer Skills	0.427	<0.001	Significant	Reject Ho
Digital Literacy	0.407	<0.001	Significant	Reject Ho
Digital Communication and Collaboration	0.474	<0.001	Significant	Reject Ho
Advanced Technological Skills	0.400	<0.001	Significant	Reject Ho

Legend: ¹ – based on Pearson's r Correlation; ns – $P > 0.05$; * – $P < 0.05$; ** – $P < 0.01$; *** – $P < 0.001$.

Table 14 illustrates the relationship between perceptions, technological proficiency, and the impact of AI on teaching and learning in terms of teaching and teacher roles. The result showed that the impact of AI on teaching and teacher roles had a highly significant relationship with perception and technological proficiency. Thus, the null hypothesis was rejected, which stated no significant relationship between the perceptions, technological proficiency, and impact of AI on teaching and learning to teaching and teacher roles.

This demonstrated that teachers who are technology proficient are more likely to incorporate AI into their lesson plans. These results were consistent with several learning theories that highlight how teachers' roles are changing in technologically enhanced learning settings. John Dewey's Experiential Learning Theory highlighted the importance of interactive, reflective, and application-based learning in this regard. The study's noteworthy correlations implied that AI facilitated experiential learning through interactive learning, real-world simulations, and hands-on teaching techniques. Intelligent tutoring systems, improved reality, and virtual reality powered by AI enabled educators to design dynamic, experiential learning environments that complemented Dewey's ideas. According to the findings, educators who possessed good digital literacy and teamwork abilities were better equipped to use AI tools to promote experiential learning (Dewey, 1938).

The null hypothesis was rejected because the data clearly showed strong and meaningful relationships between teachers' perceptions, their level of technological proficiency, and how they see AI affecting their teaching roles. The correlation between perception and the teaching role was the strongest ($r = 0.589$), which meant that the more positively teachers view AI, the more likely they are to embrace changes in their role brought about by its use. Likewise, important relationships were found between teaching roles and different areas of technological proficiency, such as communication and collaboration ($r = 0.474$) and basic computer skills ($r = 0.427$). This informed us that teachers who were more comfortable and skilled with technology were more open to integrating AI into their teaching. These results showed that both mindset and digital skills play a big part in how teachers experience the impact of AI in the classroom.

Additionally, because technology is changing education, teachers who are proficient in AI and digital literacy are better able to support interactive, experiential, and networked learning environments. To guarantee that AI-driven teaching strategies improve student engagement and learning results, schools must give priority to AI training for educators. This outcome was consistent with the Technology Acceptance Model (TAM) theory, which describes how perceived utility and perceived usability affect the adoption of technology in the classroom. Teachers who view AI as helpful and simple to include in their lessons are more inclined to do so, according to the high correlation found between AI, technological competence, and teaching positions. Teachers who are more technologically proficient and digitally literate are more inclined to use AI tools for interactive teaching, automated grading, and individualized learning. These bolsters TAMs claimed that increased digital competency increases the use of technology, which in turn changes traditional teaching roles (Davis, 1989).

Table 17 illustrates the relationship between perceptions, technological proficiency, and the impact of AI on teaching and learning in terms of critical thinking and collaboration. The result revealed that the impact of AI on critical thinking and collaboration had a highly significant association with perception and technological proficiency. Thus, the null hypothesis was rejected, which stated no significant relationship between the perceptions, technological proficiency, and impact of AI on teaching and learning as to critical thinking and

collaboration.

Table 15. *Relationship¹ Perception, Technological Proficiency and Impact of AI as to Critical Thinking and Collaboration*

Variables	Critical Thinking and Collaboration		Remarks	Decision
	r-value	p-value		
Perception	0.570	<0.001	Significant	Reject Ho
Technological Proficiency				
Basic Computer Skills	0.524	<0.001	Significant	Reject Ho
Digital Literacy	0.439	<0.001	Significant	Reject Ho
Digital Communication and Collaboration	0.515	<0.001	Significant	Reject Ho
Advanced Technological Skills	0.503	<0.001	Significant	Reject Ho

Legend: 1 – based on Pearson's *r* Correlation; ns – $P > 0.05$; * – $P < 0.05$; ** – $P < 0.01$; *** – $P < 0.001$.

The rejection of the null hypothesis signified that there was a statistically significant relationship between teachers' perceptions and their technological proficiency with the impact of AI on fostering critical thinking and collaboration among students. The correlation values ranging from 0.439 to 0.570 indicated moderate to strong positive relationships. Notably, perception ($r = 0.570$) had the strongest correlation, suggesting that how teachers perceive AI plays a crucial role in how they view its ability to develop critical thinking and collaborative skills. Basic computer skills ($r = 0.524$) and digital communication and collaboration ($r = 0.515$) also showed strong associations, emphasizing that even foundational technology skills can significantly influence how effectively AI tools are used in promoting 21st-century competencies. These relationships highlighted that as teachers become more confident and proficient with technology, they are more likely to appreciate and utilize AI tools that encourage student interaction, cooperation, and analytical thinking.

These findings also supported a number of learning theories that highlight the importance of contact, technology, and cognitive growth in contemporary schooling. According to Jean Piaget's constructivist learning theory, pupils build their knowledge via interaction and active participation. By pushing students to examine, assess, and produce knowledge, AI-powered technologies like interactive simulations, intelligent tutoring systems, and adaptive learning systems promote higher-order thinking abilities (Piaget, 1964).

Technology facilitated dynamic learning environments where students engage in inquiry-based and problem-solving activities. This idea is supported by the strong association found between AI perception and critical thinking.

Table 16 illustrates the relationship between perceptions, technological proficiency, and the impact of AI on teaching and learning in terms of support and resources. The result revealed that the impact of AI on support and resources had a highly significant relationship with perception and technological proficiency. Thus, the null hypothesis was rejected, which stated no significant relationship between the perceptions, technological proficiency, and impact of AI on teaching and learning as to support and resources.

Table 16. *Relationship¹ Perception, Technological Proficiency and Impact of AI as to Support and Resources*

Variables	Support and Resources		Remarks	Decision
	r-value	p-value		
Perception	0.258	<0.001	Significant	Reject Ho
Technological Proficiency				
Basic Computer Skills	0.275	<0.001	Significant	Reject Ho
Digital Literacy	0.339	<0.001	Significant	Reject Ho
Digital Communication and Collaboration	0.312	<0.001	Significant	Reject Ho
Advanced Technological Skills	0.532	<0.001	Significant	Reject Ho

Legend: 1 – based on Pearson's *r* Correlation; ns – $P > 0.05$; * – $P < 0.05$; ** – $P < 0.01$; *** – $P < 0.001$.

The rejection of the null hypothesis indicated that there is a meaningful correlation between how teachers perceive AI and their level of technological proficiency with the availability and use of support and resources in education. Although the correlation values for perception ($r = 0.258$) and basic computer skills ($r = 0.275$) were relatively lower, they are still statistically significant, showing that even foundational attitudes and skills have a measurable impact.

Notably, advanced technological skills had the strongest correlation ($r = 0.532$), suggesting that teachers with higher technical competence are more capable of accessing, utilizing, and even creating AI-driven support systems in the classroom. This implies that investments in upskilling teachers with advanced technological competencies could greatly enhance how support and resources are leveraged through AI tools in educational settings.

These findings supported Constructivist Learning Theory that teachers who possessed higher technological proficiency are more likely to utilize AI tools for enhancing support and resource accessibility in teaching and learning. This relationship is explained by this theory, emphasizing how technology transforms access to resources and support structures in modern education. In addition, Piaget suggested that learners build their knowledge through active engagement, discovery, and meaningful interactions with their

environment. AI-powered educational tools, such as learning management systems (LMS), virtual assistants, and adaptive learning platforms, provide scaffolded support. They ensure that students receive timely feedback, personalized learning pathways, and accessible digital resources.

Teachers who successfully integrated AI gave their pupils richer, more engaged learning experiences, according to the relationship between AI perception and resources and support. By focusing on scaffolding, artificial intelligence (AI) acts as a digital mentor, providing just-in-time resources and support to help students progress in their learning. This process aligned with Vygotsky's Zone of Proximal Development (ZPD), which enhances Piaget's constructivism (Vygotsky, 1978).

Regression Analysis Between the Respondents' Profile, Perceptions towards Artificial Intelligence, Technological Proficiency Level and the Impact of Artificial Intelligence on Teaching and Learning

Table 17. Variables¹ that Best Predict Impact of Artificial Intelligence in terms of Student Engagement and Learning

Indicator	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.562	.250		2.245	.026
Age	-.002	.036	-.004	-.068	.946
Sex	-.061	.063	-.049	-.963	.337
Teaching Experience	.007	.011	.044	.693	.489
Perceptions	.395	.053	.404	7.416	<.001***
Basic Computer Skills	.137	.074	.183	1.845	.067
Digital Literacy	.016	.075	.021	.208	.836
Digital Communication and Collaboration	.165	.075	.227	2.193	.030*
Advanced Technological Skills	.092	.057	.122	1.613	.108
R = 0.745		R ² = 0.555	F = 28.008	Sig. = <0.001***	

Legend: 1 – based on Linear Regression; ns – $P > 0.05$; * – $P < 0.05$; ** – $P < 0.01$; *** – $P < 0.001$.

Table 17 presents the variables that best predict artificial intelligence's impact on student engagement and learning. The impact of artificial intelligence in terms of student engagement and learning was affected by the respondents' perception with $\beta=0.404$, $t=7.416$, $p<0.001$, and digital communication and collaboration with $\beta=0.227$, $t=2.193$, and $p=0.030$. This implied that the respondents' perception and digital communication and collaboration were affected by the impact of artificial intelligence in terms of student engagement and learning.

The R² value of 0.555 implied that 55.5% of the variance in the impact of artificial intelligence in terms of student engagement and learning can be explained by the respondents' perception; and digital communication and collaboration. Hence, 44.5% of the respondents' student engagement and learning can be attributed to other variables not included in the regression model.

The regression analysis is significant, with an F-value of 28.008 and a p-value of <0.001. Therefore, the null hypothesis stating that "the respondents' profile, perceptions, and technological proficiency level did not significantly predict the impact of artificial intelligence in terms of student engagement and learning" was rejected as to respondents' perception and digital communication and collaboration. With respect to the regression coefficients, it was shown that perceptions ($\beta = 0.404$) had the strongest effect on AI's impact on learner engagement and learning. In other words, teachers with a more positive perception of AI are substantially more likely to experience or see positive effects in student engagement. Digital communication and collaboration ($\beta = 0.227$) was also a statistically significant predictor meaning teachers who have better digital communication and collaboration skills tend to see a greater impact of AI on their classroom. Other variables, like basic computer skills, and advanced technology skills showed positive but non-significant trends, and the p-values of these variables suggest they may have predictive power, but it may take more data or tailored training for this predictive power to show. Generally, the model provided an overall moderately strong model fit ($R = 0.745$), which substantiated the idea that perceptions and digital collaborative skills are critical determinants in realizing the benefits of AI for engaging students.

The p-values of <0.001 for perceptions and 0.030 for digital communication and collaboration indicated that both of these predictors are statistically significant in explaining the impact of AI on student engagement and learning. A p-value of <0.001 for perceptions suggested that the relationship between a teacher's perception of AI and its impact on student engagement is very unlikely to have occurred by chance, signifying a strong and reliable influence. This finding aligned with existing literature on the importance of teacher attitudes and beliefs about technology.

According to Boulton (2018), a teacher's positive perception of digital tools can influence their willingness to incorporate such tools effectively, which in turn enhances the learning environment. Similarly, the p-value of 0.030 for digital communication and collaboration further supported the importance of teachers' digital proficiency in leveraging AI effectively. A p-value of 0.030 suggested that this predictor is statistically significant, meaning that teachers who are more proficient in digital communication and collaboration are more likely to report a greater impact of AI on learning outcomes. This is supported by the research of Manca and Ranieri (2017), who emphasized that teachers' ability to engage in digital collaboration directly contributes to their capacity to integrate

digital technologies effectively in the classroom, enhancing overall student engagement.

These findings aligned with current educational research and well-established learning theories. They emphasized the importance of social contact, technology, and cognitive engagement in contemporary learning contexts. Students are given the freedom to experiment, engage, and control their learning. According to Hodges and Barbour (2022), AI-powered adaptive learning supports the constructivist idea of active knowledge creation by dramatically increasing student engagement by customizing content to meet individual requirements. Chen et al. (2023) also emphasized how AI encouraged self-regulated learning, enabling students to expand on existing knowledge in interactive learning settings.

Furthermore, the Connectivism Learning Theory emphasized how digital interactions, networks, and technology all contributed to learning. By allowing students to participate in digital learning networks, contribute to online communities, and access a variety of knowledge sources, the AI manages networked learning. As a result, AI facilitated self-directed, network-based learning by suggesting tailored information, which improves knowledge acquisition (Downes & Siemens 2022). Siemens' connectivist strategy is supported by Zawacki-Richter et al. (2023). They discovered that digital cooperation facilitated by AI improves knowledge sharing and social learning.

Table 18 presents the variables that best predict artificial intelligence's impact on teaching and teacher roles. The impact of artificial intelligence in terms of teaching and teacher role was affected by the respondents' perception with $\beta=0.496$, $t=8.169$, $p<0.001$, and digital communication and collaboration with $\beta=0.256$, $t=2.219$, and $p=0.028$. This implied that the respondents' perception and digital communication and collaboration affected the impact of artificial intelligence in terms of teaching and the teacher's role.

Table 18. Variables² that Best Predict Impact of Artificial Intelligence in terms of Teaching and Teacher Role

Indicator	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.269	.321		.837	.404
Age	.028	.046	.041	.603	.547
Sex	-.054	.081	-.038	-.672	.502
Teaching Experience	.018	.014	.093	1.314	.191
Perceptions	.558	.068	.496	8.169	<.001***
Basic Computer Skills	-.002	.095	-.002	-.017	.987
Digital Literacy	-.025	.096	-.029	-.255	.799
Digital Communication and Collaboration	.215	.097	.256	2.219	.028*
Advanced Technological Skills	.125	.073	.144	1.718	.088
R = 0.669 R ² = 0.447 F = 18.205 Sig. = <0.001***					

Legend: 2 – based on Linear Regression; ns – $P > 0.05$; * – $P < 0.05$; ** – $P < 0.01$; *** – $P < 0.001$.

The R² value of 0.447 implied that 44.7% of the variance in the impact of artificial intelligence in terms of teaching and teacher role can be explained by the respondents' perception; and digital communication and collaboration. Hence, 55.3% of the learners' teaching and teacher role differences can be attributed to other variables not included in the regression model.

The regression analysis is significant, with an F-value of 28.008 and a p-value of <0.001. Therefore, the null hypothesis stating that "the respondents' profile, perceptions, and technological proficiency level did not significantly predict the impact of artificial intelligence in terms of teaching and the teacher role" was rejected as to respondents' perception and digital communication and collaboration.

The significance of the p-value <.001 for perceptions showed a very strong relationship between how teachers perceive AI and its actual impact on their teaching. This meant that when teachers hold more positive views about AI, they are more likely to experience its benefits in their instructional roles. This finding aligned with the Technology Acceptance Model, which explains that teachers' acceptance and use of new technologies like AI largely depend on their perceptions of its usefulness (Teo et al., 2022).

Meanwhile, the p-value of 0.028 for digital communication and collaboration, though not as strong as the former, still indicates a statistically significant relationship. This meant teachers who are skilled in using digital tools to communicate and collaborate are more likely to maximize the benefits of AI in their teaching practices. This supports Ertmer and Ottenbreit-Leftwich's (2013) view that teachers who are comfortable with digital collaboration tend to adopt and integrate emerging technologies more effectively.

The findings are reflected in Jean Piaget's Constructivist Learning Theory, which postulated that knowledge is actively constructed by students through interactions and experiences. By creating dynamic learning environments that make use of digital tools, educators can adjust to the integration of AI (Säljö, 2022). By encouraging inquiry-based learning, customizing education, and involving students in higher-order thinking exercises, AI-powered platforms can improve constructivist learning (Jia et al., 2022).

Furthermore, the Experiential Learning Theory of John Dewey promoted learning through reflection and real-world experiences. The considerable impact of digital communication and cooperation in anticipating AI's involvement in teaching recommends that teachers embrace AI-driven experiential learning tools, such as virtual simulations and collaborative platforms (Kolb & Kolb, 2023). By

establishing immersive settings where students may participate in practical exercises, problem-solving, and peer collaboration, artificial intelligence (AI) improves experiential learning (Chen et al., 2023).

According to recent research, teachers are more likely to use AI-enhanced teaching practices if they are more proficient with technology and familiar with AI (Zhou & Sun, 2023). However, when it came to perception, the impact of the influence of teaching AI in education, was consistent with Fred Davis' Technology Acceptance Model. According to the theory, it is the teachers' positive perception of AI influences their willingness to integrate AI-powered tools in teaching (Teo et al., 2022).

Table 19 presents the variables that best predict the impact of artificial intelligence in terms of critical thinking and collaboration. The impact of artificial intelligence in terms of critical thinking and collaboration was affected by the respondents' sex with $\beta = -0.121$, $t = -2.257$, $p = 0.025$, perceptions with $\beta = 0.429$, $t = 7.497$, $p < 0.001$, basic computer skills with $\beta = 0.229$, $t = 2.200$, $p = 0.029$, and advanced technological skills with $\beta = -0.271$, $t = 3.422$, and $p = 0.001$. This implied that the respondents' sex, perceptions, basic computer skills, and advanced technological skills affected the impact of artificial intelligence in terms of critical thinking and collaboration.

Table 19. Variables³ that Best Predict Impact of Artificial Intelligence in terms of Critical Thinking and Collaboration

Indicator	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.736	.269		2.735	.007
Age	-.013	.038	-.022	-.335	.738
Sex	-.153	.068	-.121	-2.257	.025*
Teaching Experience	.022	.011	.127	1.906	.058
Perceptions	.429	.057	.429	7.497	<.001***
Basic Computer Skills	.175	.080	.229	2.200	.029*
Digital Literacy	-.156	.081	-.208	-1.933	.055
Digital Communication and Collaboration	.145	.081	.195	1.789	.075
Advanced Technological Skills	.209	14.061	.271	3.422	.001**
R = 0.714		R ² = 0.510	F = 23.401	Sig. = <0.001***	

Legend: 3 – based on Linear Regression; ns – $P > 0.05$; * – $P < 0.05$; ** – $P < 0.01$; *** – $P < 0.001$.

The R² value of 0.510 implied that 51.0% of the variance in the impact of artificial intelligence in terms of critical thinking and collaboration can be explained by the respondent's sex, perceptions, basic computer skills, and advanced technological skills. Hence, 49.0% of the difference in the impact of artificial intelligence in terms of critical thinking and collaboration can be attributed to other variables not included in the regression model.

The regression analysis is significant, with an F-value of 23.401 and a p-value of <0.001. Therefore, the null hypothesis stating that “the respondents' profile, perceptions, and technological proficiency level did not significantly predict the impact of artificial intelligence in terms of critical thinking and collaboration” was rejected as to respondents' sex, perceptions, basic computer skills, and advanced technological skills.

The significance of the variable sex ($p = .025$) suggested that gender may influence how teachers perceive and apply AI in developing students' critical thinking and collaboration. Although the relationship is negative, it could reflect differences in access to technology, confidence, or training opportunities between male and female educators. This aligned with Wang and He's (2021) findings, which emphasized that gender disparities in digital literacy can impact how effectively educators integrate AI into collaborative learning tasks. Meanwhile, perceptions toward AI again played a crucial role ($p < .001$), with a strong standardized coefficient ($\beta = 0.429$). This clearly showed that teachers who have a more positive outlook on AI are more likely to use it in ways that strengthen student interaction and deeper thinking.

Zhang and Li (2022) supported this, noting that optimistic attitudes toward AI often result in more meaningful integration of technology in instructional practices. Basic computer skills ($p = .029$) also turned out to be significant. This makes sense because teachers need to be confident with basic digital functions before they can comfortably explore AI tools. Without this foundation, it becomes harder to design activities that encourage student collaboration or critical thinking (Lee et al., 2022).

Lastly, advanced technological skills ($p = .001$) were found to have a strong impact. Teachers who are more adept at using technology can better implement AI in more complex and creative ways—setting up simulations, interactive tasks, or collaborative platforms that push students to analyze, reflect, and engage with others. Garcia and Torres (2023) emphasized that such skills are crucial for maximizing the collaborative and cognitive benefits AI can offer in today's classrooms.

Besides, Connectivism and AI's Role in Collaboration Siemens Connectivism Learning Theory emphasized the importance of digital networks. AI is also driven to facilitate knowledge sharing and collaborative learning. Recent research (Garcia & Torres, 2023) demonstrated that AI-enhanced learning platforms promoted peer-to-peer interactions, collaborative problem-solving, and the development of 21st-century skills, which are essential for future workforce demands.

Table 20. Variables⁴ that Best Predict Impact of Artificial Intelligence in terms of Support and Resources

Indicator	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	.768	.385		1.996	.047
Age	.087	.055	.118	1.587	.114
Sex	-.226	.097	-.143	-2.332	.021*
Teaching Experience	.011	.016	.053	.698	.486
Perceptions	.240	.082	.192	2.937	.004**
Basic Computer Skills	-.187	.114	-.196	-1.640	.103
Digital Literacy	.050	.115	.053	.430	.668
Digital Communication and Collaboration	-.027	.116	-.030	-.237	.813
Advanced Technological Skills	.606	.087	.629	6.931	<.001***
R = 0.598		R ² = 0.357	F = 12.515	Sig. = <0.001***	

Legend: 4 – based on Linear Regression; ns – $P > 0.05$; * – $P < 0.05$; ** – $P < 0.01$; *** – $P < 0.001$.

Table 20 presents the variables that best predict the impact of artificial intelligence in terms of support and resources. The learners' academic performance was affected by the respondents' sex with $\beta = -0.143$, $t = -2.332$, $p = 0.021$, perceptions with $\beta = 0.192$, $t = 2.937$, $p = 0.004$, and advanced technological skills with $\beta = 0.629$, $t = 6.931$, and $p < 0.001$. This implied that the respondents' sex, perceptions, and advanced technological skills affected the impact of artificial intelligence in terms of support and resources.

This result is significant because it showed how personal and professional characteristics shape access to and use of AI-related support and resources. The strong influence of advanced technological skills ($p < .001$) suggests that teachers who are more confident and capable with tech are more likely to explore and utilize AI tools, which often require a higher level of digital proficiency. This supported the idea that practical experience and comfort with technology drive meaningful integration of AI resources. Perceptions ($p = .004$) also matter—when teachers have a positive view of AI, they are more open to adopting and seeking support for these tools. Lastly, the significance of sex ($p = .021$) might reflect broader patterns in tech confidence or exposure, with some studies noting that female teachers report less familiarity or encouragement in using advanced technologies. These findings highlighted the need for tailored support systems that addressed both skills and attitudes to ensure equitable access to AI-driven teaching resources.

The R² value of 0.357 implied that 35.7% of the variance in the impact of artificial intelligence in terms of support and resources can be explained by the respondents' sex, perceptions, and advanced technological skills. Hence, 64.3% of the difference in the impact of artificial intelligence in terms of support and resources can be attributed to other variables not included in the regression model.

The regression analysis is significant, with an F-value of 12.515 and a p-value of < 0.001 . Therefore, the null hypothesis stating that “the respondents' profile, perceptions, and technological proficiency level did not significantly predict the impact of artificial intelligence in terms of support and resources” was rejected due to respondents' sex, perceptions, and advanced technological skills.

The impact of various predictors on the integration of Artificial Intelligence in terms of support and resources, results are interpreted using Experiential Learning Theory (Dewey, 1938), and Connectivism Learning Theory (Siemens, 2004),

The strongest predictor of AI integration is advanced technological skills which is supported by Connectivism Learning Theory (Siemens, 2004). This learning occurred through digital networks and technological proficiency is essential for navigating modern educational tools. Whereas, the Experiential Learning Theory (Dewey, 1938) highlights the importance of hands-on experience in mastering new technologies. Those teachers who actively experiment with AI applications develop stronger AI literacy, making them more likely to use AI for instructional purposes (Chen & Li, 2022).

However, the Technology Acceptance Model (TAM) further suggested that female educators often perceive AI as more complex and challenging than their male counterparts (Garcia et al., 2023). Studies indicated that gender-related social factors, rather than actual ability, contribute to this gap (Chen et al., 2023).

Nonetheless, despite expectations, digital literacy did not significantly predict AI adoption. This suggested that basic digital skills alone are insufficient for AI integration; rather, educators need specialized AI knowledge. This aligned with the Connectivism Learning Theory of Siemens which emphasized that modern learning extends beyond traditional digital literacy to include AI-driven decision-making and problem-solving skills (Lee & Park, 2024). Research suggested that teachers proficient in AI-specific skills, rather than general digital literacy, are more likely to integrate AI into their teaching methods (Nguyen & Zhou, 2023).

Conclusions

Most of the teachers in the North III District of Division of Iligan City were 36 years old and above, female, and had 4–6 years teaching experience.

In the Teachers' Perceptions towards Artificial Intelligence (AI) in the Context of Teaching and Learning, the indicator “AI Tools may assist in making teaching and learning interesting and enjoyable.” and “Teachers need to learn how AI tools can be used appropriately and how they can be generated into the current curriculum effectively.” obtained the highest mean which can be interpreted in the

strongly agree level.

In the Basic Computer Skills, the indicator “I know how to use email for sending, receiving, and organizing messages.” obtained the highest mean which can be interpreted in the strongly agree level.

In the Digital Literacy, the indicator “I understand the importance of balancing screen time and offline activities.” obtained the highest mean of which can be interpreted in the agree level.

In the Digital Communication and Collaboration, the indicator “I understand digital etiquette for professional communication.” obtained the highest mean which can be interpreted in strongly agree level.

In the Advanced Technological Skills, the indicator “I am confident in using technology to automate tasks and increase efficiency” obtained the highest mean which can be interpreted in agree level.

In the Student Engagement and Learning, the indicator “I believe AI can reduce the workload of teachers by automating certain tasks” obtained the highest mean which can be interpreted in agree level.

In the Critical Thinking and Collaboration, the indicator “AI tools make learning more engaging for students.” obtained the highest mean which can be interpreted in strongly agree level.

In the Teaching and Teacher Roles, the indicator “I am aware of the potential risks of AI in replacing meaningful student-to-student interactions.” obtained the highest mean which can be interpreted in agree level.

In the Support and Resources, the indicator “I have access to reliable internet and digital devices necessary for integrating AI into my lessons.” obtained the highest mean which can be interpreted in agree level.

In the Relationship Perception, Technological Proficiency and Impact of AI as to Student Engagement and Learning, the indicator “I have access to reliable internet and digital devices necessary for integrating AI into my lessons.” obtained the highest mean which can be interpreted in agree level.

The results of the correlation analysis revealed that there was a significant positive relationship between the respondents’ perceptions toward artificial intelligence (AI), their level of technological proficiency, and the perceived impact of AI on teaching and learning. Specifically, student engagement and learning had a strong correlation with perception, basic computer skills, digital literacy, digital communication and collaboration ($r = 0.610$), and advanced technological skills. This meant that teachers who hold positive perceptions and demonstrate stronger digital skills are more likely to experience the benefits of AI integration in improving student engagement and learning outcomes.

As for teaching and teacher roles, the impact of AI was also found to be significantly related to perception, basic computer skills, digital literacy, digital communication and collaboration, and advanced technological skills. This implied that technology-proficient teachers are more capable of redefining their teaching roles with the aid of AI tools.

In terms of critical thinking and collaboration, there were significant relationships between the perceived impact of AI and perception, basic computer skills, digital literacy, digital communication and collaboration, and advanced technological skills, confirming that technological competencies support the use of AI in promoting higher-order thinking and teamwork among students.

Moreover, the correlation results for support and resources showed significant relationships with perception, basic computer skills, digital literacy, digital communication and collaboration, and advanced technological skills. This meant that advanced digital skills particularly empower teachers to access and utilize available AI-related resources more effectively.

The regression analysis identified the best predictors of AI’s perceived impact across different domains. In terms of student engagement and learning, perception and digital communication and collaboration were the strongest predictors, with an R^2 value of 0.555 and F-value of 28.008, indicating a moderately strong model. Similarly, for teaching and teacher roles, perception and digital communication and collaboration emerged as the significant predictors, with an R^2 of 0.447 and F-value of 18.205.

When it comes to critical thinking and collaboration, perception, basic computer skills, and advanced technological skills were found to be the best predictors, with an R^2 of 0.510 and F-value of 23.401. Meanwhile, in terms of support and resources, perception, advanced technological skills, and sex were the significant predictors, with an R^2 of 0.357 and F-value of 12.515.

The null hypotheses, which stated that there were no significant relationships and no variables that best predicted the perceived impact of AI in teaching and learning, were all rejected. This confirms that both the attitudes of teachers and their technological proficiencies play crucial roles in realizing the benefits of AI integration in the educational setting.

The findings of this study supported the Technology Acceptance Model (TAM) by Davis (1989), which posited that perceived usefulness and ease of use influence technology adoption. Teachers with favorable perceptions toward AI are more inclined to integrate it effectively into their practices. In addition, the study affirms Jean Piaget’s Constructivist Learning Theory and John Dewey’s Experiential Learning Theory, which both emphasized the role of hands-on, reflective, and interactive learning. Furthermore, George Siemens’ Connectivism Theory was reinforced, as the findings highlighted the importance of digital networks and technological

proficiency in fostering collaboration and continuous learning through AI.

Based on the study's findings, the following recommendations are proposed to foster effective AI integration in teaching and learning: Educational institutions should integrate AI-driven instructional strategies that personalize and enhance student learning experiences. By ensuring responsible AI use, students can develop essential digital literacy skills that will prepare them for future academic and professional opportunities. Schools should provide AI training programs to equip teachers with both fundamental and advanced digital skills. Hands-on workshops, mentorship programs, and collaborative learning opportunities will help educators effectively integrate AI into their teaching while addressing potential challenges. Institutions should invest in technological infrastructure, such as stable internet connectivity and AI-powered learning platforms, to support AI integration. Clear policies, financial support, and structured professional development programs will help teachers navigate AI adoption more effectively. AI-related policies should be evidence-based and aligned with national and local education goals. Policymakers should collaborate with educators to ensure that AI implementation supports quality education, digital transformation, and teacher readiness. Developers should design AI tools that are user-friendly, accessible, and tailored to teachers' instructional needs. Insights from educators should inform the development of AI-driven platforms that align with pedagogical best practices and ethical considerations.

Awareness campaigns and resources should be provided to help parents understand AI's role in education. Guidance on responsible AI use, digital literacy, and screen time management will enable them to support their children's learning effectively. Local government units, NGOs, and industry partners should collaborate with schools to promote AI-driven education initiatives. Partnerships that provide funding, training, and technology access can help ensure equitable AI integration across diverse educational settings. Future researchers should examine AI integration across various educational settings, including different grade levels and under-resourced schools, to gain a broader understanding of its impact. Longitudinal studies on AI's effects on student learning and teacher adaptability, along with research on ethical challenges and best practices, would provide valuable insights for AI-enhanced education. By addressing these recommendations, schools and educators can navigate AI's evolving role in education more effectively, ensuring that its benefits are maximized while minimizing potential risks. With proper support and training, teachers can harness AI's potential to create more dynamic, engaging, and equitable learning experiences for students.

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