

Artificial Intelligence Literacy Among Teachers: An ABCE Framework Approach to Educational Management and Institutional Development

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ABSTRACT

Artificial intelligence is increasingly shaping teaching, assessment, classroom management, and school administration, making AI literacy an essential competence for elementary teachers. However, many schools still lack clear evidence on teachers' readiness, actual AI practices, conceptual understanding, and ethical awareness. This study assessed the artificial intelligence literacy of elementary faculty at San Fernando Central Elementary School using the Affective, Behavioural, Cognitive, and Ethical (ABCE) Framework as a basis for educational management and institutional development. Employing a descriptive-correlational design, the study involved 30 elementary faculty members selected through purposive sampling. Data were gathered using an adapted AI Literacy Questionnaire and analyzed using frequency, percentage, weighted mean, standard deviation, and analysis of variance, along with related inferential procedures. Findings showed that teachers demonstrated favourable AI literacy across all ABCE dimensions. The affective dimension obtained the highest aggregate mean, indicating positive attitudes and readiness toward AI integration. The behavioural dimension reflected teachers' use of AI tools for lesson planning, task efficiency, collaboration, and instructional support. The cognitive dimension demonstrated adequate understanding of AI concepts, though further training is needed to evaluate and apply AI tools. The ethical dimension revealed awareness of accountability, fairness, privacy, and the responsible use of AI. Significant differences appeared across profile variables, including age, teaching experience, grade-level assignment, educational attainment, and access to AI-related technologies. The study proposes a structured educational management plan emphasizing AI training, ethical guidelines, equitable resources, peer collaboration, and institutional development.

Keywords: Artificial Intelligence Literacy; ABCE Framework; Elementary Teachers; Educational Management; Institutional Development

INTRODUCTION

The accelerated development of artificial intelligence (AI) technologies has significantly influenced many sectors, with education experiencing one of the most notable transformations. AI-powered systems are now increasingly used in teaching platforms, student assessment, classroom management, and school administration (Luckin et al., n.d.). As these technologies become more common in schools, it is important for teachers—especially those at the elementary level—to have enough AI literacy to understand, use, evaluate, and question AI tools in appropriate and responsible ways (Ng et al., 2021). Since elementary

teachers guide children during their formative years, they play a critical role in introducing technology in ways that are developmentally suitable, ethically sound, and educationally meaningful (Holmes et al., 2019).

The focus on elementary school teachers is particularly important because AI literacy at this level presents distinct challenges compared to secondary or higher education contexts. Unlike older students, elementary learners are still developing foundational cognitive, social, and digital skills (Traga Philippakos & Rocconi, 2025). This means that elementary teachers must not only understand AI tools themselves but also carefully decide when, how, and why to introduce them to young learners. Elementary students are more vulnerable to confusion, misinformation, and overdependence on technology if AI is used without proper guidance.

AI literacy is broadly conceptualized as the capacity to understand, apply, evaluate, and critically reflect on AI technologies (Chiu, 2025). Within the teaching profession, AI literacy encompasses not only technical knowledge but also pedagogical discernment, professional judgment, and ethical awareness in the use of AI-driven tools for instruction, assessment, and classroom management (Sperling et al., 2024). Prior research underscores that AI literacy is a multidimensional construct comprising cognitive understanding, behavioural competence, affective dispositions, and ethical considerations related to AI use (Lee et al., 2021).

To account for this complexity, the Affective, Behavioural, Cognitive, and Ethical (ABCE) framework was advanced as a comprehensive model for examining AI literacy. The affective dimension refers to teachers' attitudes, beliefs, and emotional responses toward AI, which significantly influence their openness to adopting and innovating with AI (Macasawang, 2025). The behavioural dimension captures teachers' practical engagement with AI technologies in professional practice (Ng et al., 2024). The cognitive dimension reflects teachers' understanding of AI concepts, functions, and limitations, whereas the ethical dimension addresses their awareness of critical issues, including data privacy, algorithmic bias, transparency, and the responsible use of AI in educational contexts (Sun & Chan, 2025a). Collectively, these dimensions provide a holistic perspective on AI literacy that extends beyond technical proficiency. Despite growing academic interest in AI literacy, empirical investigations of teachers—particularly elementary school faculty—remain relatively limited. Existing studies have predominantly emphasized the cognitive dimension of AI literacy, often focusing on conceptual knowledge related to algorithms or machine learning (Mills et al., 2024). In contrast, less attention has been paid to examining teachers' affective readiness, behavioural practices, and ethical awareness regarding AI integration. This gap is especially consequential at the elementary level, where teachers' competencies and attitudes directly shape classroom practices and influence institutional norms surrounding technology use.

The ethical dimension is especially important in elementary education because the use of AI can pose real risks to young students when not properly managed. For example, if an AI-powered application uses a student's name, image, voice, academic performance, or other personal information without proper parental consent, this may violate data privacy policies and put the child's personal information at risk. In some cases, AI systems may collect, store, or process student data in ways that teachers and schools do not fully understand (Sperling et al., 2024). There is also the risk that AI tools may generate biased or inappropriate outputs, misidentify students, or make recommendations that are not suitable for children's developmental needs. This highlights why ethical awareness and responsible decision-making should be central components of AI literacy among elementary educators.

In addition, the connection between teachers' AI literacy and broader educational management and institutional development has not been sufficiently explored. Educational management involves planning, implementing, and evaluating resources and strategies to improve teaching quality and institutional effectiveness (Liu et al., 2025). Teachers' AI literacy constitutes a critical component of institutional capacity, as it directly affects the successful adoption, governance, and sustainability of AI-driven initiatives within schools. Systematic assessment of AI literacy among elementary faculty can therefore inform evidence-based professional development, resource allocation, and policy formulation (*Digital Education Council AI Literacy Framework*, n.d.).

This study assesses elementary school teachers' AI literacy using the ABCE framework and examines its implications for educational management and institutional development. By systematically analyzing teachers' affective, behavioural, cognitive, and ethical orientations toward AI, the study aims to contribute to the growing body of literature on teacher-centred AI literacy and to provide actionable insights for school leaders, policymakers, and educational administrators.

RELATED LITERATURE

The Concept and Importance of AI Literacy in Elementary Education

Artificial intelligence (AI) has become an integral force shaping contemporary societies, economies, and educational systems. Its growing presence in learning management systems, assessment platforms, adaptive instructional software, and administrative decision-making tools underscores the urgent need for AI literacy among educators, particularly those in elementary education (Sperling et al., 2024). AI literacy, in this context, refers to teachers' ability to understand the fundamental principles of AI, critically evaluate its applications, and responsibly integrate AI-supported technologies into instructional and institutional practices (Sun & Chan, 2025). For elementary faculty, AI literacy extends beyond operational competence to include pedagogical judgment, ethical responsibility, and leadership in shaping early learning environments (Chiu et al., 2024).

Elementary teachers occupy a uniquely influential position in the educational ecosystem. They serve not only as instructors but also as curriculum interpreters, role models, and gatekeepers of technology use for young learners. As AI-driven tools increasingly automate routine instructional tasks and provide personalized learning experiences, teachers must be prepared to make informed decisions about when, how, and why to use such technologies (Casal-Otero et al., 2023). Research suggests that without adequate AI literacy, teachers may rely uncritically on AI systems, potentially reinforcing inequities, misunderstandings, or inappropriate instructional practices (Long & Magerko, 2020). Conversely, AI-literate elementary educators can leverage these tools to enhance learning while maintaining pedagogical integrity and child-centred values.

Importantly, AI literacy encompasses far more than technical proficiency. Scholars emphasize that effective AI literacy integrates cognitive understanding with ethical awareness, reflective judgment, and contextual sensitivity (UNESCO, 2021). For elementary teachers, this means explaining AI concepts in age-appropriate ways, recognizing the limitations of AI-generated outputs, and addressing ethical concerns, including data privacy, algorithmic bias, and transparency (Pinski & Benlian, 2024). International frameworks, including UNESCO's AI in Education recommendations and the AI4K12 initiative, emphasize that early educational experiences shape learners' long-term relationships with technology, making teachers' AI literacy foundational to the responsible adoption of AI in schools (Casal-Otero et al., 2023).

Despite its growing relevance, AI literacy remains unevenly developed across elementary education systems. Many teachers interact daily with AI-enabled platforms—such as adaptive reading tools, behaviour-monitoring software, and automated grading systems—without a clear understanding of how these technologies function or how they influence instructional decisions (Chu et al., 2022). This disconnect highlights a critical institutional challenge: preparing elementary faculty not merely to use AI tools, but to engage with them thoughtfully, ethically, and strategically in support of holistic educational goals.

The ABCE Framework of AI Literacy for Elementary Teachers

The ABCE framework proposed by Ng et al., (2024) offers a comprehensive model for understanding AI literacy through four interconnected dimensions: affective, behavioural, cognitive, and ethical. Applied to elementary faculty, this framework provides valuable insights into teachers' readiness to integrate AI into educational management and classroom practice (Tan et al., 2025).

The affective dimension addresses teachers' beliefs, attitudes, and emotional responses toward AI technologies. Elementary teachers' perceptions—such as curiosity, confidence, anxiety, or resistance—strongly influence their willingness to adopt AI tools and experiment with innovative practices (Ma et al., 2025). Positive affective dispositions foster openness to professional learning and instructional change, whereas fear or skepticism may impede meaningful engagement (Belkina et al., 2025). Understanding these affective factors is essential for designing supportive professional development programs.

The behavioural dimension focuses on how teachers actually use AI technologies in instructional planning, classroom activities, assessment, and school administration. This includes the extent to which elementary faculty explore AI-enhanced tools, apply them responsibly, and model appropriate use of technology for students (Ng et al., 2024). Teachers who critically evaluate AI-generated outputs, adjust settings to protect student data, and align AI use with pedagogical goals demonstrate higher levels of applied AI literacy (Mohammadi et al., 2025). Behavioural indicators also serve as measurable outcomes for evaluating institutional technology initiatives.

The cognitive dimension refers to teachers' conceptual understanding of AI, including foundational ideas such as algorithms, machine learning, data inputs, and system limitations (*Teacher Pedagogical Beliefs: The Final Frontier in Our Quest for Technology Integration*, 2005). For elementary educators, deep technical expertise is less critical than conceptual clarity that enables accurate explanations, informed instructional decisions, and the ability to address students' questions in developmentally appropriate ways. The ethical dimension encompasses teachers' awareness of moral, legal, and societal issues related to AI, including fairness, bias, accountability, and data privacy (Zhou, 2024). This dimension is particularly crucial in elementary settings, where teachers are responsible for safeguarding young learners and for modeling ethical use of technology. Integrating all four ABCE dimensions allows schools to view AI literacy as a holistic professional competency rather than a purely technical skill.

Current Status and Challenges of AI Literacy among Elementary Faculty

Despite increased advocacy for AI in education, empirical evidence suggests that AI literacy among elementary teachers remains limited and uneven. Research Park (2025) indicates that many educators possess only a surface-level understanding of AI, often shaped by media narratives rather than formal training. Such limited knowledge can lead to misconceptions, including overestimating AI's capabilities or underestimating its risks, which may affect instructional and management decisions (Sat, 2025).

Several challenges contribute to this gap. First, AI-related competencies are rarely embedded in teacher education programs or in-service training, leaving many elementary educators unprepared to integrate AI

meaningfully (Picton & Clark, n.d.) Second, teachers often report insufficient institutional support, unclear guidelines, and limited access to age-appropriate AI resources (Philippakos & Rocconi, 2025). Additionally, disparities in school infrastructure and access to technology further constrain the equitable development of AI literacy across institutions.

Ethical considerations present another significant challenge. Studies reveal that while teachers may recognize the efficiency benefits of AI tools, fewer demonstrate strong awareness of ethical risks such as student data misuse, algorithmic bias, or surveillance concerns (Baldrich et al., 2025). These ethical gaps are particularly concerning in elementary contexts, where vulnerable learners rely on teachers for protection and guidance. Addressing these challenges requires systematic, framework-based approaches to professional development and school leadership.

Technology Management in Elementary Schools

Effective technology management is a critical enabler of AI literacy development among elementary faculty. Technology management involves the strategic planning, implementation, monitoring, and evaluation of digital and AI tools to support teaching, learning, and institutional goals (Chugh et al., 2023). Schools that demonstrate strong technology leadership align digital initiatives with pedagogical priorities, invest in teacher capacity-building, and establish clear policies for responsible technology use.

A key component of effective management is aligning AI initiatives with teachers' existing competencies and needs (Çelik & Baturay, 2024). Diagnostic tools, such as AI literacy assessments based on the ABCE framework, allow school leaders to identify gaps across affective, behavioural, cognitive, and ethical dimensions. For instance, low affective readiness may warrant confidence-building workshops, whereas cognitive gaps may require targeted conceptual training.

Moreover, ethical governance must be central to technology management strategies. Schmitz et al. (2023) emphasize that educational leaders should balance innovation with responsibility by developing ethical guidelines, data protection policies, and professional norms for the use of AI.

Bridging AI Literacy, Educational Management, and Policy

Integrating AI literacy into educational management and policy is essential for sustainable institutional development. International and national policy frameworks increasingly emphasize the need to embed AI literacy within teacher standards and professional development systems (Karatas & Yuce, 2024). In elementary education, AI literacy should be recognized as a core professional competency that supports both instructional quality and responsible school governance.

Schools are encouraged to adopt comprehensive frameworks that connect AI literacy goals with curriculum design, teacher development, and technology management practices (Pei et al., 2026b). Embedding AI literacy modules within digital citizenship programs or professional learning communities enables teachers to explore AI tools while critically examining their educational and societal implications (Wiese et al., 2025). Integrating ABCE dimensions into institutional planning ensures balanced development across knowledge, practice, attitudes, and ethics.

Finally, data-informed technology management can strengthen evidence-based decision-making. Results from instruments such as the ABCE AI Literacy Questionnaire can guide investments in training, infrastructure, and policy refinement (Cardona et al., n.d.). Through this integrated approach, elementary schools can cultivate educators who are not only competent AI users but also reflective practitioners, ethical role models, and strategic contributors to institutional growth in an AI-driven educational landscape.

OBJECTIVES OF THE STUDY

This study aimed to assess the artificial intelligence (AI) literacy of elementary school faculty at San Fernando Central Elementary School during the School year 2025–2026 school year, using the ABCE framework as the basis for an educational management plan to enhance AI literacy. Specifically, it examined respondents' demographic profiles, including age, gender, years of teaching experience, grade-level assignment, and access to AI-related technologies and digital resources at school and at home. The study also determined the faculty's level of AI literacy across the affective, behavioural, cognitive, and ethical dimensions of the ABCE framework, focusing on attitudes and readiness toward AI integration, instructional use of AI tools, understanding of AI concepts and applications, and awareness of ethical and responsible AI practices.

METHODOLOGY

This study employed a descriptive–correlational research design to assess the levels of artificial intelligence (AI) literacy among elementary school teachers using the Affective, Behavioural, Cognitive, and Ethical (ABCE) framework, and to examine the interrelationships among these four dimensions within the context of educational management and institutional development.

A descriptive research design was appropriate because it enabled a systematic and accurate portrayal of elementary teachers' current levels of AI literacy without manipulating variables (Creswell, 2012). Through this approach, the study documented teachers' affective dispositions toward AI (including attitudes, confidence, and openness to AI integration), their behavioural practices related to the use of AI in instructional and administrative tasks, their cognitive understanding of AI concepts and educational applications, and their ethical awareness concerning issues such as data privacy, equity, and responsible AI use. Establishing this descriptive profile was essential for identifying existing strengths and gaps in AI literacy among elementary faculty and for providing a baseline for developing targeted professional learning programs, policy directions, and institutional capacity-building initiatives.

In addition, a correlational research design was utilized to explore the relationships among the four ABCE dimensions. Correlational research examined the degree to which variables were associated without implying causal relationships (Fraenkel, Wallen, & Hyun, 2019). Investigating the associations among teachers' affective, behavioral, cognitive, and ethical dimensions of AI literacy offered important insights into how these domains interacted and potentially reinforced one another. Such understanding was critical for educational leaders and administrators in designing coherent and integrated strategies for faculty development, technology governance, and institutional planning.

RESULTS AND DISCUSSION

It examines teachers' level of artificial intelligence literacy in terms of awareness, basic understanding, competence, and ethical application within the educational setting. The collected data are organized and interpreted to determine how teachers perceive, understand, and apply AI-related concepts in teaching, learning, and institutional practices. Through the ABCE framework, the analysis highlights the strengths, gaps, and developmental needs of teachers regarding AI literacy, providing meaningful insights to guide educational management decisions, professional development programs, and institutional strategies for adapting to the growing role of artificial intelligence in education.

Table 1
Distribution of the Respondents
N= 30

Respondents	Frequency	Percentage
Elementary Faculty	30	100.00
Total	30	100.00

Table 1 presents the distribution of research respondents, indicating that all 30 were Elementary faculty included in the study. This indicates that the entire identified population participated, resulting in complete representation and no sample attrition. The total frequency and percentage indicate that the data collected reflect the full sample of respondents, thereby strengthening the reliability and validity of the findings on artificial intelligence literacy among teachers in the research setting.

Table 2
Rate of Responses According to Age

Age	Frequency (f)	Percentage (%)
21-25 years old	6	20.00
26-30 years old	8	26.67
31-35 years old	2	6.67
36-40 years old	6	20.00
41 years old and above	8	26.67
TOTAL	30	100.00

Table 2 shows that the largest proportions of respondents were in the 26–30-year-old and 41-year-old and above age groups, each comprising 26.67% of the total sample. This indicates that the respondents were relatively evenly distributed across early and older adulthood, while the 31–35-year-old group had the lowest representation at 6.67%. Overall, the age profile suggests that the study captured responses from a range of age groups, allowing the findings to reflect perspectives from both younger and more mature respondents.

The age distribution of respondents is important because age may influence how individuals interpret questions, participate in surveys, and provide responses. Knäuper et al. (2016) emphasized that younger and older respondents may differ in self-reporting due to age-related cognitive and communicative factors. Similarly, Wagner et al. (2018) found that survey participation and non-response patterns may vary across older age groups, suggesting the need to consider age composition when interpreting research findings.

Table 3
Rate of Responses According to Sex

Sex	Frequency (f)	Percentage (%)
Male	13	43.33
Female	17	56.67
TOTAL	30	100.00

Table 3 shows that, of 30 respondents, the majority were female, comprising 17 (56.67%) of the total sample. Male respondents accounted for 13 (43.33%), indicating a slightly lower representation than females. This distribution suggests that the respondent group was moderately female-dominated, which may influence the overall findings depending on whether sex-related differences are relevant to the study variables.

The result is supported by Becker (2022) found that systematic gender differences are commonly observed in cross-sectional and panel surveys, particularly in relation to participation and nonresponse. Similarly, Smith (2008) reported that gender may influence online survey response behavior, suggesting that demographic composition should be considered when interpreting research findings.

Table 4
Rate of Responses According to Years of Teaching Experience

Years of Teaching Experience	Frequency (f)	Percentage (%)
0-3 years	5	16.67
4-6 years	8	26.67
7-10 years	9	30.00
More than 10 years	8	26.67
TOTAL	30	100.00

The data reveal that the largest proportion of respondents had 7–10 years of teaching experience (30.00%), indicating that most teachers had already gained considerable professional exposure. This suggests that the respondents generally possessed sufficient classroom experience, which may contribute to stronger instructional competence and decision-making. In contrast, teachers with 0–3 years of experience comprised the smallest group (16.67%), indicating that beginning teachers were underrepresented in the sample.

This finding is supported by Kini and Podolsky (2016), who found that teaching experience is generally associated with improved teacher effectiveness and student achievement. Similarly, Podolsky et al. (2019) emphasized that experienced teachers often contribute not only to learners’ academic outcomes but also to the overall improvement of school practices. However, Blömeke et al. (2019) noted that experience alone does not fully determine teaching effectiveness, as professional knowledge, instructional support, and continuing development also play important roles.

Table 5
Rate of Responses According to Grade Level Assignment

Grade Level Assignment	Frequency (f)	Percentage (%)
Grade 1	1	3.33
Grade 2	6	20.00
Grade 3	11	36.67
Grade 4	3	10.00
Grade 5	4	13.33
Grade 6	5	16.67
TOTAL	30	100.00

The results show that Grade 3 had the highest response frequency (36.67%), indicating that most respondents were assigned to or performed at this grade level. In contrast, Grade 1 had the lowest percentage (3.33%), indicating that very few respondents were placed in the lowest grade level. Overall, the distribution reveals that responses were concentrated in the middle grade levels, implying varied learner placement and the need for instruction responsive to different readiness levels.

Supporting literature explains that differences in grade-level assignment may be influenced by learners' readiness, prior knowledge, and instructional support. Tomlinson (2014) emphasized that differentiated instruction allows teachers to adjust learning activities based on students' readiness, interests, and learning profiles. Likewise, Vygotsky (1978) argued that learners progress more effectively when instruction is supported within their zone of proximal development. These perspectives support the need for appropriate instructional strategies that address learners' varied academic levels.

Table 6
Rate of Responses According to Highest Educational Attainment

Highest Educational Attainment	Frequency (f)	Percentage (%)
Bachelor's Degree	12	40.00
Master's Degree	16	53.33
Doctorate Degree	2	6.67
TOTAL	30	100.00

The data indicate that most respondents have attained a graduate-level education, with the Master's Degree group comprising the majority at 53.33%. Bachelor's Degree holders account for 40.00%, indicating that a substantial portion of respondents have met the basic tertiary qualification. Meanwhile, only 6.67% hold a Doctorate, suggesting that doctoral attainment remains limited among respondents.

This pattern aligns with OECD, which emphasizes that teacher and professional learning systems are strengthened when careers support sustained development and advancement. Similarly, research on teacher qualifications reports a positive association between advanced degrees, subject expertise, and learners' later educational attainment, although effects may vary by context (Graves & Parenteau, 2025). However, recent reviews also caution that graduate degrees alone do not automatically guarantee improved teaching quality, as their impact depends on program quality, experience, and instructional practice (Lee et al., 2021).

Table 7
Rate of Responses According to Access to AI-Related Technologies

Access to AI-Related Technologies	Frequency (f)	Percentage (%)
Limited Access	4	13.33
Moderate Access	16	53.33
High Access	10	33.33
TOTAL	30	100.00

The results show that most respondents had moderate access to AI-related technologies, accounting for 53.33% of all responses. This indicates that although AI-related tools are generally available, respondents

may still face limitations in connectivity, affordability, device ownership, or digital skills. The smaller percentage of respondents with limited access (13.33%) suggests that severe access barriers are less common, while the 33.33% with high access indicates a developing, but not yet fully equitable, level of AI technology availability.

The findings are supported by studies on the digital divide, which explain that access to technology involves not only device availability but also internet connectivity, infrastructure, affordability, and digital competence. According to the Organization for Economic Co-operation and Development (OECD, 2025), unequal access to digital tools and skills can create unequal opportunities for learning and participation. Similarly, the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2025) emphasized that AI and digital technologies affect educational access, equity, and quality. In addition, Trucano (2023) warned that AI may create a new digital divide in education when learners and schools differ in their capacity to access and use AI tools effectively.

Table 8

Level of Agreement of the Respondents on Their Level of AI Literacy Based on the ABCE Framework in Relation to Affective Dimension (Attitudes, Perceptions, and Readiness Toward AI Integration)

Statements	Weighted Mean	Standard Deviation	Categorical Response
1. Artificial intelligence is relevant to my everyday teaching and classroom activities.	4.30	0.65	Strongly Agree
2. Learning about artificial intelligence is interesting to me.	4.20	0.55	Agree
3. Learning about artificial intelligence helps make my teaching more meaningful.	4.23	0.68	Strongly Agree
4. I am interested in identifying new ways in which artificial intelligence can support learning.	4.20	0.55	Agree
5. I am confident in using simple AI tools for teaching and learning.	4.20	0.71	Agree
6. I feel confident using AI in classroom projects or activities with students.	4.03	0.56	Agree
7. I believe I can learn the basic knowledge and skills needed to use AI effectively.	3.70	0.53	Agree
8. I believe I can successfully apply AI-related ideas in my teaching practice.	4.27	0.58	Strongly Agree
9. I can understand AI-related resources and tools designed for educators.	4.03	0.61	Agree
10. I feel confident using artificial intelligence to support my work as an educator.	4.30	0.70	Strongly Agree
Aggregate Weighted Mean:	4.15		Agree
Aggregate Standard Deviation:		0.61	

Legend:

- 1.00 – 1.80 >>> Strongly Disagree (SD) 3.41 – 4.20 >>> Agree (A)
- 1.81 – 2.60 >>> Disagree (D) 4.21 – 5.00 >>> Strongly Agree (SA)
- 2.61 – 3.40 >>> Neutral (N)

The results show that respondents generally agree they possess AI literacy, as reflected in the aggregate weighted mean of 4.15. This suggests that they view artificial intelligence as relevant, useful, and supportive of teaching and learning, particularly in improving instruction, accessing resources, and supporting students’ learning experiences. However, since most indicators fall under “Agree” rather than “Strongly Agree,” the findings imply that while respondents are prepared and receptive to AI integration, further training and exposure may still be needed to strengthen their confidence and competence. Digital Promise defines AI literacy as the knowledge and skills needed to critically understand, evaluate, and use AI systems, which aligns with the respondents’ positive perceptions of AI as a teaching and learning support (Ruiz et al., 2024). Similarly, studies on teachers’ AI literacy indicate that AI acceptance, willingness to use AI, and confidence in digital tools are positively associated with stronger AI literacy and readiness for classroom integration (Deshen et al., 2026).

Table 9
Level of Agreement of the Respondents on Their Level of AI Literacy Based on the ABCE Framework in Relation to Behavioral Dimension (Actual Use and Instructional Practices Involving AI Tools)

Statements	Weighted Mean	Standard Deviation	Categorical Response
1. I use AI tools to support my lesson planning and classroom preparation.	4.13	0.57	Agree
2. I apply AI tools to improve my efficiency in completing teaching-related tasks.	4.33	0.66	Strongly Agree
3. I make an effort to explore AI tools that may be useful in my professional work.	4.10	0.48	Agree
4. I integrate AI into my teaching practices when appropriate.	4.23	0.73	Strongly Agree
5. I participate in training or self-learning activities to improve my use of AI in education.	4.17	0.70	Agree
6. I share useful AI tools or strategies with my fellow teachers.	4.33	0.61	Strongly Agree
7. I collaborate with colleagues in exploring how AI can be used in teaching and learning.	4.17	0.75	Agree
8. I contribute ideas on how AI can be used to improve school processes or services.	3.73	0.58	Agree
9. I support the responsible and practical use of AI in my school.	4.03	0.56	Agree
10. I participate in school activities or discussions related to the use of AI in education.	4.10	0.61	Agree

Aggregate Weighted Mean:	4.13		Agree
Aggregate Standard Deviation:		0.62	

Legend:

- 1.00 – 1.80 >>> Strongly Disagree (SD)
- 1.81 – 2.60 >>> Disagree (D)
- 2.61 – 3.40 >>> Neutral (N)
- 3.41 – 4.20 >>> Agree (A)
- 4.21 – 5.00 >>> Strongly Agree (SA)

The results indicate that the respondents generally demonstrate a favorable level of AI literacy within the ABCE framework, as reflected in the aggregate weighted mean of 4.13, interpreted as Agree. The highest-rated indicators show that respondents strongly recognize the usefulness of AI tools for improving work efficiency and for sharing AI-related strategies with colleagues, suggesting openness to collaborative, technology-supported instruction. However, the overall rating also implies that while AI use is positively perceived, continuous professional development remains necessary to strengthen teachers’ critical, ethical, and pedagogical integration of AI in education.

UNESCO (2024) emphasized that teachers need AI-related competencies to support responsible use of AI in instruction, professional development, and learner-centred education. Similarly, Chiu and Sanusi (2024) noted that teacher education plays a significant role in developing AI literacy and competency, while recent research also highlights that AI literacy supports teachers’ confidence, ethical awareness, and readiness to use AI tools in learning environments (Wang et al., 2024). Therefore, the respondents’ positive agreement aligns with literature showing that AI literacy enhances instructional efficiency, collaboration, and preparedness for AI-supported education.

Table 10

Level of Agreement of the Respondents on Their Level of AI Literacy Based on the ABCE Framework in Relation to Cognitive Dimension (Knowledge and Understanding of AI Concepts and Applications in Education)

Statements	Weighted Mean	Standard Deviation	Categorical Response
1. I understand what AI is and recall its definitions.	4.10	0.71	Agree
2. I am proficient with AI applications (e.g., Siri, chatbots).	4.10	0.71	Agree
3. I can compare AI concepts (e.g., deep learning, machine learning).	4.03	0.67	Agree
4. I can apply AI applications to solve problems.	3.93	0.78	Agree
5. I can create AI-driven solutions (e.g., chatbots, robotics) to solve problems.	4.10	0.48	Agree
6. I can evaluate AI applications and concepts across various contexts.	3.90	0.71	Agree
Aggregate Weighted Mean:	4.03		Agree
Aggregate Standard Deviation:		0.68	

Legend:

- 1.00 – 1.80 >>> Strongly Disagree (SD) 3.41 – 4.20 >>> Agree (A)
- 1.81 – 2.60 >>> Disagree (D) 4.21 – 5.00 >>> Strongly Agree (SA)
- 2.61 – 3.40 >>> Neutral (N)

The results indicate that the respondents generally possess a satisfactory level of AI literacy in the cognitive dimension, as reflected in an aggregate weighted mean of 4.03, which is interpreted as Agree. This suggests that they demonstrate adequate knowledge of AI concepts, applications, and functions, particularly in understanding AI definitions and recognizing common AI tools. However, the relatively lower ratings in evaluating AI applications and applying AI to solve problems suggest the need for more learning activities that strengthen critical thinking and practical AI application skills.

This finding is consistent with Long and Magerko’s (2020) view, who explained that AI literacy involves understanding AI concepts, recognizing AI applications, and critically evaluating AI technologies. Likewise, Ng et al. (2021) emphasized that AI literacy encompasses knowledge and understanding, use, evaluation, and ethical awareness of AI, thereby supporting the respondents’ demonstrated competence in the cognitive dimension. Moreover, UNESCO (2021) highlighted the importance of developing AI-related knowledge and skills in education to help learners engage responsibly and effectively with emerging technologies.

Table 11

Level of Agreement of the Respondents on Their Level of AI Literacy Based on the ABCE Framework in Relation to Ethical Dimension (Awareness of Ethical Considerations, Data Privacy, Fairness, and Responsible AI Use)

Statements	Weighted Mean	Standard Deviation	Categorical Response
1. I understand how the misuse of AI could pose substantial risks to humans.	4.03	0.72	Agree
2. I think AI systems need rigorous testing to ensure they work as expected.	4.13	0.68	Agree
3. I think that users are responsible for considering AI design and decision processes.	4.07	0.64	Agree
4. I think AI systems should benefit everyone, regardless of physical ability or gender.	4.00	0.59	Agree
5. I think that users should be made aware of the system's purpose, how it works, and the limitations that may be expected.	3.97	0.56	Agree
6. I think that people should be accountable for their use of AI systems.	4.30	0.47	Strongly Agree
7. I think that AI systems should meet ethical and legal standards.	4.10	0.61	Agree
8. I think that AI can be used to help disadvantaged people.	4.00	0.29	Agree
Aggregate Weighted Mean:	4.08		Agree

Aggregate Standard Deviation:		0.57	
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Legend:

1.00 – 1.80 >>> Strongly Disagree (SD)	3.41 – 4.20 >>> Agree (A)
1.81 – 2.60 >>> Disagree (D)	4.21 – 5.00 >>> Strongly Agree (SA)
2.61 – 3.40 >>> Neutral (N)	

The results indicate that respondents generally demonstrate a favorable level of AI literacy in terms of ethical awareness, as shown by the aggregate weighted mean of 4.08, interpreted as Agree. This implies that respondents recognize major ethical issues in AI use, including accountability, privacy, fairness, responsible decision-making, and possible misuse. The highest mean accountability score suggests that respondents strongly value responsible human involvement in the use of AI systems.

This finding is supported by Long and Magerko (2020), who emphasized that AI literacy encompasses the ability to understand, evaluate, and interact with AI systems responsibly. Similarly, Ng et al. (2021) identified ethical issues as a key component of AI literacy, particularly regarding the responsible use, fairness, and evaluation of AI technologies. In addition, UNESCO (2024) highlighted that students should develop AI competencies grounded in human-centred values, ethical principles, inclusivity, and responsible citizenship in an AI-driven society.

CONCLUSIONS

Based on the data gathered, the study concludes that elementary faculty generally possess a favourable level of artificial intelligence literacy across the affective, behavioural, cognitive, and ethical dimensions of the ABCE framework. The respondents showed positive attitudes toward AI, active engagement with AI tools, adequate understanding of AI concepts, and awareness of ethical concerns, including accountability, fairness, privacy, and responsible use. Significant differences in AI literacy were observed across several dimensions when respondents were grouped by age, years of teaching experience, grade-level assignment, highest educational attainment, and access to AI-related technologies, indicating that teacher background and resource availability influence AI literacy development. However, some variables showed no significant differences in specific dimensions, suggesting that AI literacy is shaped not only by demographic factors but also by exposure, training, institutional support, and opportunities for practical application. Therefore, the study concludes that a structured educational management plan is needed to strengthen teachers' AI knowledge, skills, confidence, ethical awareness, and responsible integration of AI in elementary education.

RECOMMENDATIONS

1. Implement regular AI literacy training for teachers. Since the respondents generally showed positive AI literacy but still needed stronger competence in practical and critical AI use, the school should conduct professional development programs focused on AI concepts, instructional applications, and hands-on use of AI tools.
2. Strengthen teachers' ethical awareness in AI use. Training sessions should cover data privacy, fairness, accountability, transparency, learner protection, and responsible AI integration to ensure that teachers use AI tools safely and appropriately in elementary education.
3. Provide equitable access to AI-related technologies and digital resources. Since access to AI tools and digital resources influenced some dimensions of AI literacy, school administrators should improve the

availability of devices, internet connectivity, AI-supported platforms, and technical support for teachers.

4. Develop a school-based AI integration policy. The school should create clear guidelines on the acceptable, ethical, and pedagogical use of AI in lesson planning, assessment, classroom activities, and administrative tasks to promote consistency and responsible practice.
5. Encourage collaborative learning and peer sharing among teachers. Teachers who are more confident or experienced in using AI should be encouraged to share strategies, tools, and best practices through learning action cells, mentoring, or professional learning communities.

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