

ARTIFICIAL INTELLIGENCE FOR DEEP LEARNING IN ELT CLASSROOMS: INSIGHTS FROM A NATIONAL SURVEY OF INDONESIAN TEACHERS

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Abstract: This study explores Indonesian EFL teachers' knowledge, attitudes, and practices (KAP) regarding the integration of Artificial Intelligence (AI) in English Language Teaching (ELT) within the framework of deep learning. Employing a convergent mixed-methods design, data were collected from 675 Indonesian EFL teachers across various educational levels and provinces via an online questionnaire. In addition, 40 participants were purposively selected from the survey sample for focus group discussions to ensure data triangulation. Findings indicate that teachers generally have limited technical knowledge and familiarity with AI but hold positive beliefs about its potential to enhance the development of materials, reduce workload, and support personalized learning. Classroom practices, however, remain fragmented and efficiency-oriented, with AI often used for lesson preparation rather than transformative pedagogy. A strong demand for professional development emerged, highlighting the need for systematic AI training. This study contributes to the growing body of literature on AI in EFL contexts by proposing a Holistic Implication Model, grounded in the Knowledge, Attitude, and Practice (KAP) framework, which synthesizes how limited technical literacy and positive teacher beliefs converge to shape classroom integration, offering actionable insights for teacher training, curriculum reform, and policy development.

Keywords: AI, deep learning, KAP framework

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The rapid advancement of Artificial Intelligence (AI) has transformed many aspects of education worldwide, including English Language Teaching (ELT). Recent studies highlight AI's role in generating instructional materials, scaffolding language practice, facilitating classroom activities, and offering feedback (Xin, 2024; Zhou & Hou, 2025). In Indonesia, AI has been reported to support assessment, enhance language skills, and foster engagement (Alberth, 2023; Drajati et al., 2025). Beyond the local context, global evidence demonstrates AI's potential to boost learner motivation, improve writing skills, and promote creativity (Alzubi et al., 2025; Lu, 2025; Yılmaz & Aydın, 2025). These findings underscore the increasing relevance of AI for enriching both teaching and learning.

Nevertheless, much of the existing scholarship remains descriptive and tool-oriented, emphasizing immediate benefits while neglecting broader pedagogical implications and challenges. While AI has been praised for improving efficiency and engagement, less attention

has been paid to its role in supporting deep learning, which requires critical thinking, creativity, collaboration, and metacognitive reflection (Jiang, 2022; Ricita et al., 2025). In Indonesia, the notion of deep learning has recently been adopted as a national policy priority at the ministerial level, signaling its strategic importance for advancing education quality (Kinarina, 2025). In practice, teachers often adopt AI for surface-level tasks—such as material modification or text generation—rather than designing learning experiences that cultivate higher-order thinking and sustained learner engagement. This tension raises important questions about whether AI is being used merely as a productivity tool or as a pedagogical partner capable of transforming ELT.

Existing scholarship in the Indonesian EFL context has significantly highlighted AI's utility in supporting assessment, enhancing engagement, and streamlining lesson preparation. For instance, recent investigations into teacher competence in Malang revealed that while educators possess basic familiarity and positive attitudes toward AI for productivity, they frequently face 'roadblocks' in advanced pedagogical integration and critical evaluation of AI-generated content (Ilma & Rohmah, 2025). This underscores a persistent disconnect between the availability of AI tools and the actual capacity of teachers to utilize them for fostering higher-order thinking. By shifting the focus from isolated competencies to a holistic KAP-based analysis, this study addresses the 'fragmented' nature of current AI integration, illustrating how a lack of deep technical literacy (Knowledge) can stifle the transformative potential of even the most positive pedagogical beliefs (Attitudes) in actual classroom settings (Practices). This is a critical issue, as teachers' perspectives ultimately determine whether AI reinforces traditional, surface-level approaches or facilitates meaningful, mindful, and joyful learning (Dai & Liu, 2024; Nurmala & Dewanti, 2024; Pokrivcakova, 2023).

Responding to this gap, the present study investigates Indonesian EFL teachers' knowledge, attitudes, and practices regarding AI in ELT through a national survey complemented by qualitative insights. This study aims to answer the following research questions: (1) What is the current level of knowledge and familiarity with AI tools among secondary and higher education EFL teachers in Indonesia? (2) How do Indonesian EFL teachers perceive the benefits and limitations of using AI in ELT classes using deep learning? (3) To what extent do EFL teachers in Indonesia integrate AI tools into their deep learning practices?

Based on the triangulated findings from the survey and focus group discussions, this study develops a Holistic Implication Model that synthesizes teachers' technical knowledge gaps, positive pedagogical beliefs, and current efficiency-driven practices. This model contributes to English language teaching by providing a structured framework to transition from surface-level AI use (e.g., text generation) to transformative pedagogy that supports deep learning, specifically by aligning AI tools with the mindful, meaningful, and joyful aspects of language acquisition and higher-order skills like critical reflection and creative production. By doing so, it contributes to the growing discourse on AI in education and provides actionable implications for teacher training, curriculum development, and policy.

AI Role in Generating Materials

Studies related to AI usage in education have indicated the significant importance of AI in generating materials. Existing research underscores that AI integration in ELT serves a dual

purpose: optimizing instructional efficiency and enriching the learner experience. From a pedagogical preparation standpoint, AI functions as a sophisticated assistant that enables teachers to modify complex texts, design interactive tasks, provide instructional suggestions (Xin, 2024), and offer immediate feedback (Zhou & Hou, 2025), thereby meeting diverse student needs more effectively than traditional manual methods (Alruwaili et al., 2025). Parallel to these teacher-oriented benefits, studies have consistently demonstrated that AI-driven materials foster significant student gains, specifically in boosting reading motivation (Yılmaz & Aydın, 2025), improving writing attitudes (Lu, 2025), increasing engagement and enjoyment (Lee et al., 2023; Yuan & Liu, 2024), and nurturing creative expression (Alzubi et al., 2025). However, while these studies confirm the affordances of AI, they often focus on isolated success stories or specific language skills. The present study builds upon this foundation by shifting from a tool-centric view to a holistic investigation of how teachers' internal dimensions, their knowledge, attitudes, and actual practices (KAP), either facilitate or hinder the consistent application of these benefits in the Indonesian classroom context. Identifying this interplay is essential to determine if the reported benefits of AI are being realized as transformative deep learning experiences or remain limited to superficial efficiency gains.

AI for Deep Learning in ELT Classrooms

The integration of AI in ELT aligns closely with the 'Deep Learning' framework currently championed by the Indonesian government, which emphasizes mindful, meaningful, and joyful learning as the cornerstone of educational reform (Ricita et al., 2025). Within this framework, AI serves as a critical enabler of pedagogical shifts. For instance, the 'joyful' aspect is supported by the inherently engaging and interactive nature of AI tools, which have been shown to significantly boost student enjoyment and motivation in EFL settings (Oraif, 2023; Yuan & Liu, 2024). Beyond mere engagement, AI facilitates 'mindful' and 'meaningful' learning by fostering higher levels of student mindfulness and nurturing positive long-term attitudes toward language acquisition (Khasawneh et al., 2025).

Furthermore, the transition from traditional, teacher-led instruction to a student-centered approach is accelerated by AI's capacity for personalization, interactivity, and adaptiveness (Nurmala & Dewanti, 2024). By overcoming the systemic limitations of traditional teaching methods, such as the inability to provide immediate, individualized feedback to large cohorts, AI enhances overall learning outcomes and ensures that the curriculum is responsive to the specific needs of each learner (Meng et al., 2025). Consequently, AI is not merely a technical add-on but a foundational support for the deep learning approach, bridging the gap between national policy ideals and actual classroom practice.

Teacher Knowledge, Attitude, and Practice (KAP)

The Knowledge, Attitude, and Practice (KAP) framework serves as a robust diagnostic tool for identifying behavioral patterns, misconceptions, and quality enhancement needs when integrating new educational technologies (Zarei et al., 2024). By analyzing these three dimensions, researchers can effectively design future learning scenarios and identify critical areas for professional development (Seufert et al., 2020). However, despite the acknowledged

benefits of AI, research applying the KAP framework to AI-supported ‘deep learning’ remains fragmented. While some studies have explored teachers’ perceptions of AI ethics and training needs (Metwally & Bin-Hady, 2025), and others have identified a discrepancy between positive attitudes and low technical knowledge among specific populations like Slovak teachers (Pokrivcakova, 2023), there is a distinct lack of comprehensive data from other national contexts.

Furthermore, much of the current literature on AI in EFL remains student-centered, leaving a significant gap in our understanding of the teacher’s perspective. Scholars have recently called for more extensive research involving larger, more diverse teacher cohorts across different geographical and educational contexts (Jiang, 2022a; Sumakul et al., 2022). This study addresses these calls by investigating the KAP of Indonesian EFL teachers, moving beyond localized or student-focused observations to provide a large-scale, teacher-centric analysis of AI integration within a national deep-learning framework.

METHOD

Research Design

This study employed a convergent mixed-methods design (Creswell & Clark, 2018) to explore Indonesian EFL teachers’ knowledge, attitudes, and practices regarding the use of Artificial Intelligence (AI) in English Language Teaching (ELT). Quantitative data were collected through a large-scale online questionnaire, while qualitative insights were obtained through Focus Group Discussions (FGDs). This study employed a convergent mixed-methods design, where quantitative and qualitative data were collected concurrently, analyzed independently, and then merged during the interpretation phase. The quantitative survey data (N=675) provided a broad map of generalizable patterns in teachers’ Knowledge, Attitudes, and Practices (KAP) across Indonesia. Simultaneously, the qualitative Focus Group Discussions (FGDs) (N=40) offered a granular look into the ‘why’ and ‘how’ behind these patterns, specifically exploring the ‘roadblocks’ and ‘contextual nuances’ that a survey alone cannot capture. The triangulation occurred by comparing survey results with FGD transcripts to see where they converged (e.g., high positive attitudes) or diverged (e.g., the gap between belief and classroom practice). This integration is crucial to the research as it validates the ‘Holistic Implication Model’ by ensuring that the proposed training and policy solutions are grounded in both statistical reality and the lived experiences of EFL practitioners.

Participants

A total of 675 English teachers from various educational levels—including elementary schools, junior and senior high schools, vocational schools, and universities—across different provinces in Indonesia participated in the survey (see Table 1). Participants were selected using a convenience sampling strategy due to its practicality in reaching a large number of teachers spread across diverse geographic locations in Indonesia within a limited time frame. The sampling was based on the researchers’ access to professional teacher networks, WhatsApp groups, mailing lists, and social media platforms associated with English teacher communities.

While this method does not allow for generalization to all Indonesian EFL teachers, it was effective in obtaining a large and diverse sample that offers valuable insights into current trends and perceptions surrounding AI integration in ELT.

Table 1. Demographic Information

	Total	Percentage
Gender		
Male	153	23%
Female	510	76%
Unknown	12	2%
Years of Teaching Experience		
0-2 years	48	7%
3-5 years	71	11%
6-10 years	136	20%
10+ years	420	62%
Teaching Level		
Young Learners	29	4%
Junior High School (SMP)	151	22%
Senior High School (SMA)	291	43%
Vocational High School (SMK)	101	15%
University	76	11%
Others	27	4%
Prior Experience of Joining AI for Educational Purpose Training		
Yes	284	42%
No	391	58%
Prior Experience of AI for Educational Purpose Independent Learning		
Yes	487	72%
No	188	28%

In the qualitative phase, 40 teachers participated in two Focus Group Discussions (FGDs) held in both online and offline formats.

Instruments and Data Collection

To collect data, a questionnaire and two FGDs were employed. The questionnaire consisted of five sections: demographic information, prior AI training and self-directed learning, knowledge and understanding of AI, attitudes toward AI use in ELT and deep learning, and actual practices and perceptions of deep learning integration.

The questionnaire was structured into three primary constructs based on the KAP framework, totaling 28 items. Table 2 provides a summary of these constructs, the number of items per category, and the specific focus of the questions.

Table 2. Specifications of Questionnaire Items

Construct	No. of Items	Focus Areas / Indicators
Knowledge (K)	8	Computational principles, AI terminology, technical awareness, and pedagogical familiarity with AI tools.
Attitude (A)	11	Beliefs regarding AI's role in material development, teacher workload, personalization, and ethical concerns.
Practice (P)	10	Frequency and nature of AI use in lesson planning, classroom activities, feedback, and student-centered tasks.

Most items were measured using a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The survey was distributed online via Google Forms on 24 May 2025 and was completed by the respondents from 25 May -26 July 2026.

The psychometric properties of the instrument were evaluated to ensure the data's integrity. Construct validity was assessed using the Kaiser-Meyer-Olkin (KMO) measure and the Average Inter-item Correlation (AIC). The KMO value of 0.966 exceeds the 0.60 threshold, indicating adequate sampling for factor analysis (Kaiser, 1974; Salleh & Omar, 2025). While the AIC (0.837) and Cronbach's Alpha (0.993) are high, potentially suggesting a degree of item redundancy, they nonetheless indicate strong internal consistency reliability and confirm that the items consistently align with the intended KAP constructs (Clark & Watson, 1995; de Almeida et al., 2016; Nunnally, 1978). These indices, taken together, provide a robust foundation for the subsequent analysis of teachers' responses (Joshi et al., 2015; Sullivan & Artino, 2013). To probe deeper into teachers' Knowledge, Attitudes, and Practices (KAP) regarding AI, two semi-structured FGD protocols were developed. Participants were recruited through an open invitation sent to all survey respondents; those who voluntarily expressed interest and availability were then selected to join the discussions. The FGD sessions lasted 30 minutes and 75 minutes, respectively. All discussions were audio-recorded and transcribed verbatim, resulting in nine pages of textual data, which were subsequently analyzed thematically to identify recurring qualitative patterns.

Data Analysis

Quantitative data were analyzed using descriptive statistics, including frequency counts, percentages, mean scores (M), and standard deviations (SD). To provide an interpretative layer to these scores, mean results were categorized into three levels—low, moderate, and high—based on a modified 4-point Likert scale interval. This allowed for a systematic comparison across the Knowledge, Attitude, and Practice (KAP) dimensions.

Simultaneously, the qualitative data from FGDs underwent thematic analysis (Braun & Clarke, 2006), which involved an iterative, interpretative process of coding and theme development. An initial round of coding was carried out by two trained research assistants who

had received guidance on the coding protocol and its application to the dataset. Following this, the research team conducted a quality assurance review to confirm coding accuracy and made necessary adjustments. Emerging themes were coded and categorized into domains corresponding to the survey structure: knowledge, attitudes, and practices.

Triangulation between the survey results and FGD narratives was used to validate the findings. This qualitative phase aimed not only to categorize teacher responses but to interpret the underlying contextual challenges and pedagogical beliefs that explained the statistical trends observed in the quantitative phase.

FINDINGS AND DISCUSSION

Findings

Knowledge and Familiarity

The first dimension of the KAP framework, Knowledge, was assessed through eight specific items (K1–K8) in the questionnaire. These items, shown in Table 3, were designed to measure two sub-domains: (1) Technical Awareness, covering computational principles and AI terminology (Items K1–K4), and (2) Pedagogical Familiarity, focusing on the use of AI for material development and language practice (Items K5–K8).

Table 3. Teachers' Knowledge and Familiarity

Items	1 (Strongly Disagree)	2 (Disagree)	3 (Agree)	4 (Strongly Agree)	Mean	SD
1. I have a sufficient level of familiarity with AI.	37	173	368	97	2.77	0.75
2. I have a sufficient level of understanding of the basic computational principles of AI.	45	234	325	71	2.63	0.76
3. I understand the limitations of AI.	37	186	357	95	2.76	0.76
4. I know how to use AI to design lessons that promote student understanding, application, and reflection.	47	231	323	74	2.63	0.77
5. I understand the ethical considerations and limitations of using AI in lesson planning.	45	194	348	88	2.71	0.77
6. I have adequate knowledge of AI tools that can be used to develop English teaching materials and support classroom instruction.	47	221	327	80	2.65	0.78
7. I know how to effectively create prompts when using AI.	48	207	335	85	2.68	0.78
8. I am aware of some ethical issues to consider when using AI in education.	29	156	383	107	2.84	0.73

Across the eight items measuring teachers' knowledge and familiarity with AI, mean scores ranged from 2.5 to 3, indicating responses generally fell between "disagree" and "agree", but leaning more to agree. The highest mean was for item 8 (I am aware of some ethical issues to consider when using AI in education, $M = 2.84$), while the lowest means were for item 2 (I have a sufficient level of understanding of the basic computational principles of AI.) and item 4 (I know how to use AI to design lessons that promote student understanding, application, and reflection.), both at $M = 2.63$. Furthermore, the standard deviation of the items above shows numbers between 0.73 and 0.78, indicating that there is not much variation between items related to knowledge and attitude of AI usage in EFL. The items with the highest standard deviation are item 6 (I have adequate knowledge of AI tools that can be used to develop English teaching materials and support classroom instruction) and item 7 (I know how to effectively create prompts when using AI). This means that the variation of answers in those two items spread widely compared to the mean. Meanwhile, item 8 (I am aware of some ethical issues to consider when using AI in education) became the one with the least amount of standard deviation value, indicating that the result is not as widespread as the other item.

The data shown in Table 3 indicate that most participants suggest neutral perceptions, in between agreeing and disagreeing about the knowledge and attitude of AI usage in EFL, since the number is below 3 (agree) but also above 2 (disagree). Data from the FGD validate this:

I know AI, the apps, how they work in general, and the basic ways to operate them. I'm familiar with some of the technical words like prompt and some other terms. (T13)

I don't have enough knowledge and skills to teach the students how to use AI effectively, efficiently, and wisely in relation to ethics. (T16)

I am still working on comprehending the usage of AI in my classroom. (T22)

I just know a little about AI. (T32)

I don't have enough knowledge and skills to teach the students how to use AI effectively, efficiently, and wisely in relation to ethics. (T39)

With regard to ethical awareness, items 5 and 8 score slightly higher than items dealing with technical or design-oriented tasks (Items 2, 4, 6). This may suggest teachers conceptually acknowledge the importance of AI ethics, even if their practical and computational knowledge is limited. Some teachers report in the FGD as follows:

As English teachers, having adequate knowledge and experience in using AI in the instructional process is absolutely important. (T21)

I use AI only if I get stuck with my mind. Therefore, I always need to re-read its result because sometimes it can be nonsense. (T23)

Teachers should verify all information before using it or communicating it to the students. (T16)

Still afraid of using AI more because I find it a little bit hard to trust in technology nowadays. (T26)

For me, AI helps me a lot in developing English material and quizzes as well. Actually, there are a lot of AI that can be applied in English learning and teaching. However, many teachers avoid applying it due to some unreasonable issues. (T5)

Since ethical awareness is relatively higher, it can be leveraged as an entry point to help teachers feel more confident in exploring AI tools. Embedding ethical discussions into lesson design can both deepen student engagement and align with 21st-century skill development. Hence, this shows the need for structured professional training on AI basics.

Furthermore, the low scores in computational principles (2.63) and AI tool knowledge (2.65) suggest that many teachers lack the foundational understanding needed for meaningful AI integration into deep learning pedagogies. Professional development programs should prioritize building baseline computational and technical fluency, not just awareness. Prompt creation and tool utilization remain challenging. Items 6 and 7 show moderate but still underwhelming scores (2.65 and 2.68). Data from the FGD strengthen the findings: “I think I need more tips to create appropriate prompts to have the right teaching material” (T3). This gap is crucial, as prompt engineering is foundational for effective AI usage, especially in supporting deep learning applications. With AI tools like ChatGPT, Gemini, and others becoming common in education, prompt literacy is essential. This is especially important for deep learning, where student inquiry and critical engagement hinge on teachers’ ability to guide and shape AI use effectively.

Furthermore, the teachers understand AI limitations and ethics, such as those mentioned by the teachers in the FGD, “For teacher, AI can be helpful if we want to create material or exercises for the students without spending so much time, but we must know the limitations of using AI (T1)” and “There are some things that can’t be thought of by AI” (T33). However, they are still eager to try and struggle to translate this into practical instructional design, “I need to know more about different apps or AI that can be used effectively to develop teaching materials” (T26). Targeted training modules on designing AI-supported learning activities—especially those that stimulate critical thinking, reflection, and creativity—are necessary. This is highlighted by the teachers in the FGD:

I need to know more about different apps or AI that can be used effectively to develop teaching materials. (T19)

AI (ChatGPT) assists me in developing English materials, such as student worksheets, for my teaching, although I, as the teacher, still need to adjust or review the results. (T35)

I always need to re-read its results because sometimes it can be nonsense. (T23)

Teachers should verify all information before using it or communicating it to the students. (T24)

The findings support the urgent integration of AI literacy into teacher training curricula, with clear links to learning outcomes, assessment strategies, and curriculum innovation for deep learning.

Attitudes and Beliefs

The findings of teachers’ attitudes and beliefs toward AI usage in EFL teaching can be seen in Table 4.

Table 4. Teachers' Attitudes and Beliefs

Items	1 (Strongly Disagree)	2 (Disagree)	3 (Agree)	4 (Strongly Agree)	Mean	SD
9. AI will improve education in general.	10	64	388	213	3.19	0.65
10. AI will help me develop materials and support English language teaching in the classroom.	3	21	374	277	3.37	0.57
11. AI will reduce workload and support repetitive or administrative teaching tasks.	3	60	375	237	3.25	0.63
12. AI education should be included in my school curriculum.	13	101	384	177	3.07	0.70
13. AI tools are useful for developing English teaching materials across language skills (grammar, vocabulary, listening, reading, speaking, writing).	2	32	378	263	3.34	0.58
14. AI tools are useful for teaching English in the classroom across language skills (grammar, vocabulary, listening, reading, speaking, writing).	4	36	386	249	3.30	0.59
15. AI is helpful to personalize learning for my students	10	66	392	207	3.18	0.66
16. AI will significantly enhance and play a larger role in English teaching and learning in the future.	9	54	392	220	3.22	0.64
17. I believe AI may challenge the role of human EFL teachers in the future.	20	80	357	218	3.15	0.73
18. Teachers should be cautious about skill loss and critical use of AI in their practice.	10	75	357	233	3.20	0.69
19. I believe there is a risk that AI tools could be used inappropriately in educational settings.	8	49	360	258	3.29	0.65

Table 4 shows that among the 11 items, the value of mean in each items ranges between 3.07-3.37. These numbers demonstrate that teachers mostly agree with the statements, since it shows numbers higher than 3 (agree). In addition to that, the average numbers of teachers' perception related to attitudes and beliefs toward AI usage indicate a higher level of agreement compared to other aspects, such as classroom integration and practices, and knowledge and familiarity. Moreover, the standard deviation of these items ranged between 0.57 and 0.73. Item 10 became the item with the least amount of standard deviation, while also becoming the item with the highest mean in this aspect of the survey. Additionally, item 17 (I believe AI may challenge the role of human EFL teachers in the future) has the highest number of standard deviations compared to the other items. In this aspect of the survey, the range of standard deviation differences is higher compared to the previous aspect, meaning that the responses from teachers are more distributed than other items.

From Table 4, we can read observable trends in the data, that is, strongly positive general belief in AI's role in education, balanced views on AI's impact on teachers and skills, and curricular integration still emerging. Strongly positive general belief in AI's role in education can be seen from the items with the highest means, items 10, 13, and 11, showing high agreement that AI will help them develop materials and support English language teaching in the classroom (3.37), AI tools are useful for developing English teaching materials across language skills (grammar, vocabulary, listening, reading, speaking, writing (3.34), and AI will reduce workload and support repetitive or administrative teaching tasks (3.25). The data show that there exists fertile ground for AI-based deep learning innovations; AI is considered a co-facilitator—not a replacement; systemic and policy support is lagging, and AI for multimodal and metacognitive skill development is highly expected. The quantitative data are supported by the data collected from the FGD as follows:

AI can ease teachers in preparing teaching activities, even teaching materials and also creating tests. (T2)

AI can improve English language teaching by personalizing learning materials to individual student needs, automating content creation to save teachers' time, and providing language practice tools through chatbots for fluency development. (T24)

Easy to find something to overcome our problems. (T29)

Using AI (CANVA for Education) makes me easy to share knowledge to the students. (T34)

Teachers should be skillful in using technology and have adequate knowledge about AI in order not to be left behind in this trend. (T37)

AI can help me in producing the material for teaching learning process. (T38)

The high agreement on AI's ability to develop teaching materials, support multiple language domains, and reduce administrative load means that teachers are ready to integrate AI-driven tools. AI can also be leveraged to foster student metacognition, reflective practice, and collaborative inquiry. This supports the application of AI for personalized learning, formative assessment, and differentiated instruction, which are key pillars of deep learning, since these all promote more mindful, meaningful, and joyful learning.

The balanced views on AI's impact on teachers and skills can be seen from items 17 and 18. Item 17 (Mean = 3.15) suggests that some teachers believe AI may challenge the role of human EFL teachers, while item 18 (Mean = 3.20) shows that teachers acknowledge the need for caution regarding *skill loss and overreliance on AI*. These items suggest an emerging critical awareness that tempers the general optimism. While many teachers believe in AI's future role, the recognition of its limitations points to an opportunity to promote critical AI literacy—enabling teachers to use AI ethically and reflectively without undermining human pedagogy.

AI helps me in finding ESP teaching materials; however, I have to select it carefully before delivering it to my students. (T14)

Teachers should verify all information before using it or communicating it to the students. (T16)

For teacher, AI can be helpful if we want to create material or exercises for the students without spending so much time, but we must know the limitations of using AI. (T1)

Deep learning in ELT requires teacher judgment and creative guidance, which AI should augment, not replace.

With regard to integration of AI into ELT curriculum, item 12 (Mean = 3.07), although still positive, is the lowest score, indicating that AI inclusion in curriculum is less established or prioritized. Lower agreement on curriculum inclusion (Item 12) indicates that while teacher readiness is growing, curriculum and policy frameworks are not yet aligned. This reflects a possible institutional or systemic gap, even when teachers are individually enthusiastic. For deep learning to succeed through AI in ELT, institutions must provide top-down support: curriculum redesign, digital infrastructure, and teacher training programs.

Classroom Integration and Practices

Another aspect of the survey includes classroom integration and practices with 10 items inside the survey. The result of teachers' perception of classroom integration and practices can be seen in the following table.

Table 5. Teachers' Perception on Classroom Integration and Practices

Items	1 (Strongly Disagree)	2 (Disagree)	3 (Agree)	4 (Strongly Agree)	Mean	SD
20. I am often in contact with AI in my ordinary life.	36	213	311	115	2.75	0.80
21. I have been using AI tools to develop English teaching materials	45	165	341	124	2.81	0.81
22. I have satisfying experiences with AI-powered applications for EFL learning/teaching	37	184	349	105	2.77	0.77
23. I often use AI tools to develop or teach English materials.	43	196	328	108	2.74	0.80
24. AI tools save me enough time when preparing lessons or teaching materials.	22	105	375	173	3.04	0.74
25. I use AI tools to help design lesson activities that promote mindful learning by encouraging focused and purposeful student engagement.	26	184	363	102	2.80	0.73
26. I believe AI supports the development of meaningful learning experiences that connect with students' prior knowledge and real-life contexts.	12	97	435	131	3.01	0.64
27. I use AI to design joyful and engaging lessons that foster creativity and active participation.	26	132	396	121	2.91	0.72

Items	1 (Strongly Disagree)	2 (Disagree)	3 (Agree)	4 (Strongly Agree)	Mean	SD
28. I feel confident using AI to design lessons that include stages of understanding, applying, and reflecting.	23	177	359	116	2.84	0.74
29. I would benefit from more training on using AI to support deep learning principles in my classroom practice.	8	42	332	293	3.35	0.65

In this aspect of the survey, teachers' response average ranges between 2.74 and 3.35. Item 23 (I often use AI tools to develop or teach English materials) became the item with the lowest mean. However, item 29 (I would benefit from more training on using AI to support deep learning principles in my classroom practice) turned out to be the item with the highest mean. Even so, it is important to note that item 29's standard deviation is lower compared to the other items, indicating that the results did not spread as widely as the other items, if compared to the averages. On top of that, the standard deviation of the survey items ranges between 0.64 and 0.81. The item with the lowest standard deviation is item 26 (I believe AI supports the development of meaningful learning experiences that connect with students' prior knowledge and real-life contexts). On the contrary, item 21 (I have been using AI tools to develop English teaching materials) is the item with the highest standard deviation, indicating a wide spread of responses in comparison to the average.

Table 5 presents interesting trends in teachers' integration and practices of AI in the classroom, for example, limited everyday contact but growing use in teaching, time-saving and contextual support as perceived practical benefits, moderate use in AI-supported lesson design, and high demand for professional development. Item 24 (mean = 3.04) and item 26 (mean = 3.01) suggest teachers value AI most for efficiency and connecting learning to real-life contexts, which are vital for deep learning. However, item 20 (mean = 2.75) and items 21–23 (means = 2.74–2.81) show that AI is not yet deeply embedded in teachers' professional routines, even though they recognize its potential. In this case, the teachers acknowledge AI's usefulness for saving time and enhancing meaningful learning, but it is not fully integrated into daily teaching practices. A teacher says, "For me, AI helps me a lot in developing English material and quizzes as well. Actually, there are a lot of AI that can be applied in English learning and teaching. However, many teachers avoid applying it due to some unreasonable issues" (T5). Another one reports, "I really like AI but I don't really use AI seriously. I often use manual ways to develop English Material. It's only sometimes I use AI for official activities but just for references" (T6). This gap means that professional development should focus on practical classroom scenarios and lesson design frameworks using AI.

Furthermore, item 25 on AI to promote mindful learning (Mean = 2.80), item 28 on AI to design lesson stages in deep learning (Mean = 2.84), and item 27 on AI to design joyful and engaging lessons (Mean = 2.91) disclose that teachers are experimenting with AI but are still cautious and need guidance on pedagogy-driven integration. Combined with item 26 focusing

on meaningful learning, which has a slightly higher mean of 3.01, the teachers' use of AI to promote deep learning is still low. A teacher reported, "...So far, I have been using AI for other needs such as composing documents and planning P5 projects. Maybe I would be interested if there is AI that can be implemented to my students; most of their English is low, they have very limited access to the internet" (T13). While teachers see AI's value for engagement and creativity, the relatively low confidence in designing structured, reflective lessons indicates that pedagogical integration is the bottleneck. To move towards better use of AI to promote deep learning, training should show teachers how to align AI use with Bloom's taxonomy (understanding, applying, reflecting), and mindful-meaningful-joyful aspects of learning, as well as 21st-century skills.

Therefore, professional development is in high demand. Item 29 shows the highest mean in the table (3.35), which expresses strong agreement that the teachers need more training on using AI to support deep learning principles. They want structured, targeted professional training to maximize AI's potential in practice.

I do not know much about AI, that's the challenge. There should be more training on AI given to the teachers at school (T9)

I need to know more about different apps or AI that can be used effectively to develop teaching materials (T26)

I want to learn AI that I never got it before. Hope there will be any workshop about it (T28).

AI in teaching is interesting issue for teachers recently. We need more training for understanding and applying AI for our classes (T30).

Any AI integration strategy should include hands-on workshops, collaborative lesson design labs, and best-practice case studies. While the current practices are tilted towards efficiency (saving time) rather than transformative pedagogy, professional training must shift teachers' focus from using AI as a shortcut to using AI as a cognitive partner that fosters critical thinking, creativity, and authentic problem-solving.

Taken together, the findings from teachers' knowledge and familiarity (Table 3), attitudes and beliefs (Table 4), and classroom integration and practices (Table 5) reveal a consistent pattern. Teachers generally demonstrate limited familiarity with the technical and pedagogical aspects of AI, yet they hold positive beliefs about its potential to enhance English language teaching and express a strong willingness to integrate it into their practice. However, classroom applications remain fragmented, with AI use being more efficiency-driven than transformative. Importantly, the high demand for further training highlights teachers' readiness to move toward more meaningful pedagogical engagement with AI. These intersecting results suggest that a holistic understanding is needed to capture how knowledge, attitudes, and practices collectively shape the potential of AI to foster deep learning in ELT.

Discussion

The findings of this study reveal a complex interplay between teachers' internal beliefs and their external pedagogical actions, which are systematically captured in the proposed Holistic Implication Model. By applying the KAP framework (Pokrivcakova, 2023), this discussion

addresses the research questions by illustrating how high pedagogical Attitudes ($M=3.37$) are currently bottlenecked by a ‘knowledge-practice gap. Specifically, while teachers hold positive views toward AI as a co-facilitator, their limited technical Knowledge ($M=2.72$) restricts their Practices to superficial efficiency gains, such as rapid lesson preparation, rather than the transformative ‘deep learning’ pedagogy envisioned by the national policy. The following sections interpret these dimensions to show how the proposed model bridges these gaps through targeted professional development and ethical integration. Figure 1 synthesizes teachers’ knowledge, attitudes, and practices and outlines their implications for pedagogy, professional development, and policy.

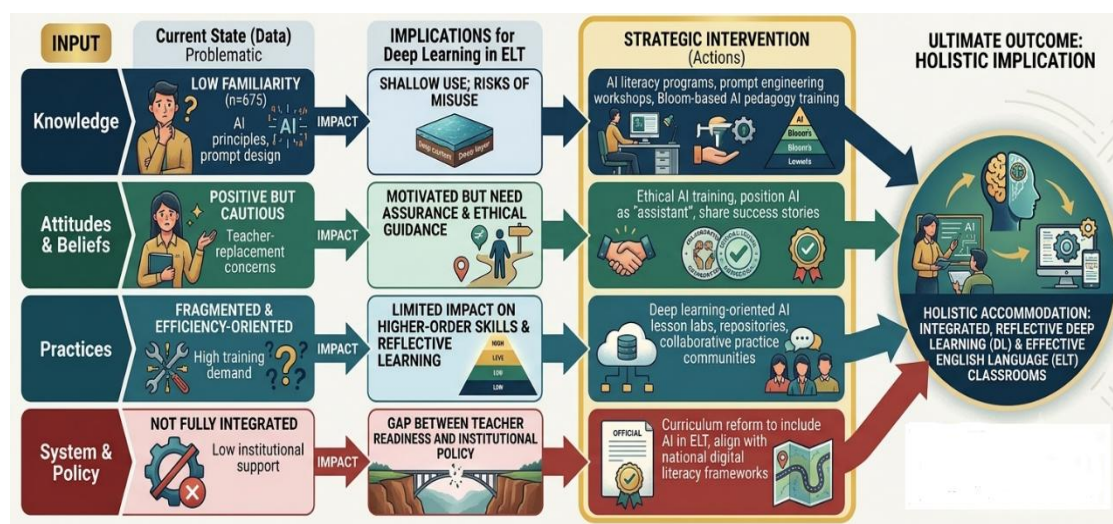


Figure 1. Holistic Implication Model (created using Gemini.ai)

Figure 1 synthesizes the convergence of KAP dimensions into a holistic framework for AI integration. Within this model, AI is positioned not merely as a productivity tool but as a catalyst for Deep Learning, characterized by three core pillars: mindful, meaningful, and joyful learning (Ricita et al., 2025). AI supports the process of mindful learning by acting as a ‘cognitive partner,’ providing prompts that encourage students to reflect critically on AI-generated content rather than accepting it passively (Dai & Liu, 2024).

Regarding meaningful learning, the model illustrates how AI facilitates personalization and adaptiveness (Nurmala & Dewanti, 2024), allowing language tasks to be tailored to students’ real-world contexts and individual proficiency levels, thereby making learning relevant. Such integration helps meet individual student needs more effectively than traditional methods (Alruwaili et al., 2025). Finally, with joyful learning, AI integration fosters an engaging environment through interactive simulations and immediate feedback, which reduces learner anxiety and increases ‘flow’ (Oraif, 2023).

By addressing the identified gaps in teacher knowledge and fragmented practices, the implications, ranging from curriculum and policy reform to creative pedagogy (Drajati et al., 2025), provide a roadmap for moving AI usage toward these deep learning characteristics. This

ensures that technology serves pedagogical transformation rather than just surface-level efficiency.

Knowledge as the Foundation

Teachers in this study reported limited familiarity with AI principles, computational concepts, and prompt design. This mirrors findings from a previous study in Indonesia, where novice and experienced teachers alike demonstrated gaps in AI literacy (Drajati et al., 2025). Without such grounding, teachers risk reducing AI to a time-saving device rather than a catalyst for deep learning. As Dai and Liu (2024) argue, teacher preparedness is decisive for transforming AI into a pedagogical asset rather than a superficial tool. Thus, AI literacy programs and scaffolded professional training are foundational to enable teachers to design AI-enhanced lessons that stimulate higher-order thinking.

Attitudes as the Driver

Despite knowledge gaps, teachers expressed positive beliefs about AI's ability to support multiple language skills, reduce workload, and transform teaching. This optimism resonates with findings that AI can nurture creativity rather than stifle it when properly guided (Alzubi et al., 2025) and that teachers see AI as expanding, not replacing, their professional role (Mohamed, 2023). However, caution persists regarding ethical use and teacher replacement, reflecting wider debates on whether AI is "friend or foe" in ELT (Sumakul et al., 2022). For deep learning, these attitudes suggest fertile ground in which teachers are open to AI adoption provided that ethical guidance and safeguards are clear (Alberth, 2023).

Practices as the Application

Classroom integration remains moderate and efficiency-oriented, with teachers valuing AI for saving time in lesson planning rather than for transformative pedagogy. Similar patterns are observed elsewhere, in which EFL teachers tend to use generative AI to produce reading materials (Xin, 2024) or assessments (Zhou & Hou, 2025), but less often to scaffold reflective or collaborative learning. Yet, studies show that AI can enhance learners' enjoyment (Lee et al., 2023), motivation (Yılmaz & Aydın, 2025), and willingness to write (Lu, 2025) that are central to deep learning (Jiang, 2022a; Ricita et al, 2025). The implication is clear: teachers require training that shifts AI use from efficiency toward creativity, reflection, and contextual problem-solving.

Variability of Teacher Responses

While the KAP framework provides a structured baseline for understanding teacher readiness, the observed Variability of Teacher Responses reflects a layer of 'contextual friction' that exists beyond individual competence. As documented in recent research on the Indonesian EFL context, even when teachers possess positive attitudes, their actual practices are often fragmented by external 'roadblocks' such as inadequate infrastructure, financial constraints, and a lack of systematic institutional support (Ilma & Rohmah, 2025). In this study, variability does

not represent a new KAP dimension; rather, it identifies the mediating factors—such as school type (public vs. private) and geographical location—that dictate whether a teacher’s knowledge can be successfully translated into practice. By addressing this variability, the proposed Holistic Implication Model acknowledges that AI integration is not a linear process, but one heavily influenced by the diverse socio-technical realities of secondary schools in Indonesia.

Beyond the mean scores, the standard deviation analysis across knowledge, attitudes, and practices reveals important nuances in how teachers perceive and apply AI in ELT. In the knowledge and familiarity dimension, the relatively narrow SD range (0.73–0.78) indicates a shared recognition of limited knowledge. However, items 6 (*knowledge of AI tools*) and 7 (*prompt creation*) displayed the widest spread of responses, suggesting uneven levels of AI literacy among teachers. While some are beginning to experiment with tool use and prompt engineering, others remain unfamiliar, reflecting earlier findings that novice and experienced teachers in Indonesia differ considerably in their AI awareness (Drajati et al., 2025).

In contrast, the attitudes and beliefs dimension showed a wider SD range (0.57–0.73), pointing to more diverse perspectives. The highest variability was found in Item 17 (*AI may challenge the role of human teachers*), indicating that some teachers fear potential replacement while others view AI more positively as a supportive tool. This divergence echoes global debates on whether AI serves as a pedagogical partner or a threat (Alberth, 2023; Sumakul et al., 2022). On the other hand, Item 10 (*AI helps develop materials*) showed both the highest mean and the lowest variability, confirming broad consensus that AI is beneficial for practical aspects of teaching.

The classroom integration and practices dimension exhibited the widest SD range overall (0.64–0.81). Item 21 (*using AI tools to develop teaching materials*) reflected the greatest variability, revealing inconsistent adoption—some teachers already use AI actively, while others do not at all. Such unevenness is consistent with evidence that AI integration depends strongly on individual teacher readiness and institutional support (Zhou & Hou, 2025). By contrast, Item 26 (*AI supports meaningful and contextual learning*) had the lowest variability, demonstrating a stronger shared belief in AI’s pedagogical potential, even if classroom practices lag.

Taken together, these findings indicate that while there is stronger consensus on attitudes—particularly regarding AI’s benefits—teachers’ knowledge and classroom practices remain unevenly distributed. This suggests that professional development initiatives must be differentiated: some teachers require foundational AI literacy training, while others need advanced pedagogical guidance to align AI use with deep learning. Addressing these divergences is essential if the positive beliefs identified in this study are to translate into consistent, transformative practices in Indonesian ELT classrooms.

Systemic and Policy Implications: Linking Deep Learning and PISA

The strongest signal from this study was teachers’ demand for professional development. This finding resonates with Metwally and Bin-Hady (2025), who demonstrate the necessity of systematic AI training for EFL educators. Moreover, institutional support remains uneven, as AI integration into curricula is still limited. Deep learning in ELT requires not only individual teacher readiness but also policy frameworks, curriculum reforms, and institutional backing

(Ministry of Primary and Secondary Education of the Republic of Indonesia, 2025; Ren & Wu, 2025)

The findings of this study, while centered on the KAP framework, have significant implications for Indonesia's national educational trajectory, particularly concerning the PISA (Programme for International Student Assessment) benchmarks. Currently, Indonesia's PISA scores in reading literacy and scientific inquiry highlight a critical need for pedagogical shifts toward higher-order thinking. Indonesian students have historically performed below the OECD average, with weaknesses in reading, mathematics, and scientific literacy attributed to surface-level learning habits and reliance on rote memorization (OECD, 2023; PISA Scores by Country 2026). These limitations highlight the urgent need for pedagogical reforms that promote deep learning—critical thinking, creativity, collaboration, and problem-solving—as emphasized in the *Kurikulum Merdeka* and reinforced through Ministerial Regulation No. 13 of 2025.

In this regard, AI integration in ELT should not be viewed merely as a technical innovation but as a pedagogical strategy to cultivate higher-order skills that align with PISA competencies. AI-powered tools can support personalized learning, authentic tasks, and reflective practices, thereby strengthening students' ability to apply knowledge in novel contexts (Jiang, 2022a; Ricita et al., 2025). By equipping teachers with the knowledge, attitudes, and practices outlined here, AI adoption can contribute not only to classroom innovation but also to Indonesia's long-term efforts to enhance global competitiveness through improved PISA outcomes.

CONCLUSION

This study has examined teachers' knowledge, attitudes, and practices toward AI integration in English language teaching, highlighting both opportunities and challenges. The findings show that while teachers possess limited technical knowledge and classroom experience, they hold largely positive beliefs about AI's potential and express strong demand for professional development. Their current practices remain efficiency-oriented, yet point toward readiness for deeper pedagogical engagement. The study contributes to the growing scholarship on AI in EFL contexts by offering a Holistic Implication Model, which conceptualizes how knowledge, attitudes, and practices interact to shape AI adoption for deep learning. This framework underscores the importance of moving beyond superficial tool use toward fostering creativity, critical reflection, and mindful pedagogy. The Holistic Implication Model presented in this study is an original framework formulated through the synthesis of the quantitative survey trends and qualitative insights from the FGDs. Validated by the triangulation of these data streams as detailed in the Discussion, the model provides a structured roadmap for stakeholders to implement AI-driven deep learning by aligning teacher literacy, ethical pedagogy, and systemic policy reform.

Future research should examine longitudinal impacts of AI training programs, explore learner perspectives alongside teachers, and investigate institutional strategies that can align curriculum, policy, and teacher capacity to maximize AI's transformative potential in ELT. Furthermore, it is essential to explore learner perspectives in tandem with teacher experiences to determine if AI-driven 'deep learning'—specifically its mindful and joyful aspects—actually correlates with improved student proficiency and higher-order thinking skills. Finally, future

studies should investigate comparative institutional strategies, identifying specific policy models that successfully synchronize curriculum standards with technological infrastructure to minimize the 'contextual roadblocks' identified in this study.

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