EFL TEACHERS' SELF-EFFICACY IN USING AI TOOLS: A COMPARATIVE STUDY IN INDONESIA

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Abstract. *The integration of Artificial Intelligence (AI) into English as a Foreign Language (EFL) instruction presents new opportunities and challenges. While research often focuses on student outcomes, teacher self-efficacy with these tools, particularly across different educational levels, remains underexplored. Addressing this gap, this study investigated the perceived AI self-efficacy of Indonesian EFL teachers at the primary, secondary, and tertiary levels using a sequential explanatory mixed-methods design. Initially, a quantitative survey (N = 150) using the AI Tool Teacher Self-Efficacy Scale (AIT-SES) was administered. Analysis revealed a distinct hierarchy, with tertiary-level teachers reporting the highest self-efficacy, followed by secondary and then primary teachers. Subsequent semi-structured interviews with a purposively selected sub-sample explored the reasons behind these differences, which are linked to factors like professional autonomy and divergent role demands. Qualitative findings suggest that teachers perceive self-efficacy as both a catalyst for pedagogical innovation and a tool for administrative efficiency. A mature form of efficacy also emerged, striking a balance between confidence and a critical awareness of AI's risks.*

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Key influencing factors identified were direct mastery experiences, the quality of professional development, and Indonesia's national "Merdeka Belajar" policy, which serves as a significant top-down driver for technology adoption. The study concludes that fostering teacher AI self-efficacy requires more than just providing technology; it demands differentiated, practical training and professional environments that support teacher autonomy and innovation.

1. INTRODUCTION

Artificial Intelligence (AI) technologies have enabled the creation of systems that perform tasks typically requiring human intellect. The rapid advancement and widespread availability of these technologies have spurred significant growth, impacting numerous sectors, including healthcare, manufacturing, and customer service. In the field of education, the potential influence of AI has been met with both anticipation and apprehension (Grassini, 2023; Schiff, 2022). Early educational AI, such as intelligent tutoring and automated grading systems, offered a clear benefit by reducing administrative workloads for teachers, allowing more time for direct student interaction (Hopfenbeck, 2023; Zhang, 2024). These systems, however, are considered 'narrow' because they have limited functionality and do not allow for significant user customization.

The educational technology landscape has been further transformed by the emergence of generative models, specifically Generative Pre-trained Transformers (GPT) (Kamnis, 2023). Unlike the narrow systems, these models can produce sophisticated, human-like text in response to user queries, with diverse applications ranging from drafting essays to generating computer code (Liu & Li, 2024; Nurchurifiani et al., 2025). These Generative AI (GenAI) chatbots differ fundamentally from earlier educational software, as they operate in open systems, allowing for personalised, interactive experiences that present novel opportunities to enhance both administrative and pedagogical processes (Fütterer et al., 2023; Rudolph et al., 2023). Given their potential and accessibility, educators are now urged to develop skills to leverage these tools for personalized support and active learning (Zulianti et al., 2024). However, the successful adoption of any new technology is heavily dependent on the human element. Research indicates that successful classroom integration of AI is closely tied to teacher readiness and their beliefs in their capabilities. This is underscored by findings that teachers remain concerned about the challenges AI poses to assessment and its impact on student learning (Cope et al., 2021).

Central to understanding teacher readiness is the concept of self-efficacy, which refers to an individual's belief in their capability to perform the actions needed to manage future situations (Bandura, 1977). In an educational context, teacher self-efficacy refers to a teacher's conviction in their ability to execute a specific teaching task successfully within a given context. This motivational construct is consistently linked to positive outcomes in student achievement, instructional practices, and teacher job satisfaction (Friedman & Kass, 2002; Vieluf et al., 2013). Crucially, these beliefs influence a teacher's decision-making, willingness to embrace innovation, and persistence in the face of difficulties (Narayanan et al., 2023; Shu, 2022), and they directly correlate with improved student motivation and success (Calkins et al., 2024; Pedota, 2015).

The concept of self-efficacy is particularly relevant to the integration of new educational technologies, such as AI. While research acknowledges the benefits of AI tools like ChatGPT (Waziana et al., 2024), a teacher's self-efficacy concerning AI will ultimately determine how, and if, these tools are integrated to support learning. Studies have found a significant association between teachers' AI self-efficacy and their attitudes toward AI (Wang & Chuang, 2024). Interestingly, the relationship appears to be reciprocal. Not only does self-efficacy predict AI use, but AI use can also enhance self-efficacy. For example, Wang et al. (2024) found that AI tools increased teachers' self-efficacy by providing personalised support and improving efficiency, making them feel more competent. This is supported by another study from Teng (2025), which found that sustained engagement with ChatGPT-based writing significantly enhanced teachers' self-efficacy.

In the Indonesian context, the integration of AI into English education is shaped by evolving national policy and uneven teacher readiness, where the *Merdeka* curriculum has begun to promote the use of AI in order to support more adaptive and personalised learning (Halomoan et al., 2024), while the 2013 curriculum reform removed English as a compulsory subject in primary schools and thereby generated diverse local practices that depend on school resources and parental demand (Setyarini et al., 2020). Within this policy environment, many EFL teachers still report limited preparation for the pedagogically and ethically sound use of AI and express a need for more straightforward guidelines, targeted professional development, and reliable technological infrastructure (Andewi et al., 2025; Ilma & Rohmah, 2025). At the same time, AI tools such as conversational agents, language learning applications, and automated feedback systems are gradually entering classrooms, offering opportunities for more differentiated instruction but also raising concerns about overreliance on automated output, risks to academic integrity, and persistent inequities in access (Hastomo et al., 2025).

While the connection between technology use and teacher self-efficacy is becoming clearer, much of the recent literature on language learning has focused on students' perspectives. Studies consistently demonstrate that AI tools can positively influence learners' self-efficacy by providing personalized feedback and adaptive challenges, which enhances a user's sense of competence (Guo, 2024; Yilmaz & Yilmaz, 2023). This increase in student self-efficacy is linked to enhanced motivation and critical thinking skills (Yıldız-Feyzioğlu & Kıran, 2022). A specific construct, "AI chatbot self-efficacy," has even been examined among EFL students, linking confident engagement with AI to a greater sense of command over their learning (Apriani et al., 2024). Although these studies focus on learners, their findings underscore the critical importance of understanding the parallel construct in the educators who facilitate this AI-driven learning.

Despite the growing body of research on the psychological impacts of AI in language education, a significant research gap exists. The focus has remained overwhelmingly on the student experience (Apriani et al., 2024; Fan & Cui, 2024; Mahande et al., 2025; Nguyen & Tran, 2023; Wang et al., 2024; Yilmaz & Yilmaz, 2023), with few investigations into EFL teachers' perceived self-efficacy in using AI tools. Specifically, there is a lack of research that compares these perceptions across different educational levels. Existing studies tend to focus on a single context, such as higher education (Wang & Chuang, 2024), but do not provide a comparative analysis of teachers' confidence across the primary, secondary, and

tertiary stages within a specific national context, like Indonesia. Understanding these potential differences is crucial for developing targeted professional development and practical implementation strategies tailored to the unique challenges and needs of each level of education. Therefore, a study examining EFL teachers' perceived self-efficacy in using AI tools across different educational levels is necessary to fill this critical void in the literature. Accordingly, this study is guided by the following research questions:

1. What is the overall level of self-efficacy perceived by EFL teachers in using AI tools at the primary, secondary, and tertiary levels in Indonesia?
2. How do EFL teachers at primary, secondary, and tertiary levels perceive and define their AI-related self-efficacy in classroom practice?
3. What contextual and individual factors do EFL teachers perceive as influencing their self-efficacy in integrating AI tools into their teaching practice?

2. METHODS

Research Design

This study employed an explanatory sequential mixed-methods design. The first research question was addressed through a quantitative analysis of data from the AI Tool Teacher Self-Efficacy Scale (AIT-SES), focusing on overall levels of AI-related self-efficacy and differences across primary, secondary, and tertiary education. In contrast, the second and third research questions were investigated qualitatively through semi-structured interviews, which explored how teachers at different educational levels perceived and defined AI-related self-efficacy and what individual and contextual factors shaped it. They sought to explore in depth the perceptions and influencing factors that provided context for the quantitative data. A single-method design was inadequate; a quantitative study alone could not explain the numbers, while a qualitative study would lack the statistical breadth for generalizable comparison. Thus, combining both approaches provided a more complete and synergistic understanding of the research problem (Creswell & Creswell, 2018).

Therefore, this study employed a sequential explanatory research design (QUAN $\rightarrow$ qual), a model commonly used in educational and social science research (Creswell & Clark, 2017). The design proceeded in two phases. The initial phase was quantitative, aiming to establish the overall landscape of teachers' AI-related self-efficacy across the different educational tiers. The second phase was qualitative and was explicitly designed to explain and elaborate upon the statistical findings from the first phase. The results of the quantitative analysis directly informed the qualitative component, guiding both the selection of interview participants and the formulation of questions (Tashakkori & Teddlie, 2010). This two-step approach is particularly well-suited for investigating a complex psychological construct like self-efficacy, which is defined not as a simple belief but as a dynamic, motivational force that shapes professional actions and persistence (Narayanan et al., 2023).

Research Setting and Participants

This research was situated within the Indonesian educational system, a relevant context due to its large EFL population and the increasing integration of technology in schools. The study's participants were certified EFL teachers with at least one year of professional experience who were actively teaching in recognized primary, secondary, or tertiary institutions across the nation. A two-stage sampling strategy was implemented to

align with the research's sequential explanatory design. For the initial quantitative phase, a stratified sampling technique was used. The population was divided into three strata based on educational level (primary, secondary, and tertiary), and 150 teachers were recruited, with 50 from each level. This allocation followed standard power analysis recommendations for a one-way analysis of variance with three groups, which indicates that approximately 40 participants per group is generally sufficient to detect effects of moderate magnitude with acceptable power at the conventional alpha level (Cohen, 1992). This sample size was deemed sufficient to provide the necessary statistical power for a one-way Analysis of Variance (ANOVA). Recruitment was conducted through established professional organizations and institutional networks.

The second phase of the study employed a qualitative approach and utilized a purposive sampling strategy. From the pool of survey respondents, a sub-sample of 15 teachers was selected using maximum variation sampling. From the pool of survey respondents, 15 teachers (five from each educational level) were purposively selected using maximum variation sampling to represent high, average, and low levels of AI-related self-efficacy. This approach was crucial to the research's explanatory power, as it enabled a detailed examination of the perceptions and influencing factors that differentiate teachers across the self-efficacy spectrum. A summary of the participants' demographic and professional details is provided in Table 1 below to offer context and demonstrate the comparability of the groups.

Table 1. Participant demographic and professional characteristics

Characteristic	Primary (n=50)	Secondary (n=50)	Tertiary (n=50)	Total (N=150)
Gender				
Male	8	15	22	45
Female	42	35	28	105
Age Range				
20-29	20	15	5	40
30-39	18	20	15	53
40-49	10	12	20	42
50+	2	3	10	15
Teaching Experience				
1-5 years	22	16	6	44
6-10 years	15	15	10	40
11-20 years	11	14	19	44
21+ years	2	5	15	22
Formal AI Training Received				
Yes	5	12	20	37
No	45	38	30	113
Frequency of AI Tool Use				
Daily	2	6	14	22
Weekly	8	15	20	43
Monthly	15	18	10	43
Rarely/Never	25	11	6	42

Research Instrument

Two primary instruments were developed for this study to correspond with each phase of the research design. For the quantitative phase, a structured online survey was created and administered. This instrument consisted of two sections: one that collected demographic and professional background information, and a second that consisted of the newly developed AIT-SES. A key feature of the survey's design was the inclusion of a clear operational definition at the beginning. To ensure that all participants were evaluating the same class of technology, the survey provided a frame of reference that specified modern GenAI tools, such as ChatGPT and Google Gemini. The AIT-SES itself was adapted from established instruments, including the Teacher Self-Efficacy Scale (Brouwers & Tomic, 2003) and more recent technology efficacy scales (Wang & Chuang, 2024). Items were rephrased for the EFL context and used a 5-point Likert scale. Prior to its main deployment, the entire instrument was pilot-tested with a small group of teachers, and a subsequent reliability analysis confirmed the scale's internal consistency with a Cronbach's Alpha value above 0.70. In addition, evidence of validity was gathered in two ways. First, content validity was established through expert review by specialists in language education and educational technology, who evaluated each item for clarity, relevance, and construct coverage. Second, a preliminary exploratory factor analysis conducted on the main study data supported the intended unidimensional structure of the AIT-SES, thereby providing initial evidence of construct validity.

For the second, qualitative phase, data were collected using a semi-structured interview protocol. This format was chosen because it provided a consistent framework of core questions while also allowing the flexibility to probe for deeper, individual insights. The development of the interview questions was directly informed by the initial quantitative findings, with the primary goal of exploring the perceptions (RQ2) and influencing factors (RQ3) behind the self-efficacy scores. The protocol also aimed to investigate the reciprocal relationship between AI use and confidence, a dynamic noted in recent literature (Teng, 2025; Wang et al., 2023). The questions prompted participants to reflect on their survey results, identify influential workplace factors such as training or school policies, and discuss specific challenges, including the impact of AI on academic integrity (Cope et al., 2021).

Data Collection

Following receipt of formal ethical clearance from the institutional review board, data collection was conducted in two sequential phases. For the quantitative phase, the finalized AIT-SES survey was deployed on a secure online platform. An invitation, which included an explanation of the study and a direct link to the survey, was then distributed through various professional and institutional networks. Informed consent was clearly outlined on the first page of the online survey, clearly stating the study's purpose, the voluntary nature of participation, and the data confidentiality measures. Participants were required to affirmatively agree to these terms before proceeding. To maintain anonymity, the platform was configured not to collect personally identifiable information. A separate and optional form at the end allowed respondents to volunteer their contact details for a potential follow-up interview.

The qualitative phase commenced after the preliminary analysis of the survey data was completed. Using a purposive sampling strategy, selected teachers from the volunteer list were invited via email to a one-on-one interview. To accommodate participants from

across Indonesia, all interviews were scheduled at mutually convenient times and conducted through secure video conferencing platforms, such as Zoom. At the beginning of each session, the researcher verbally reviewed the consent information and obtained explicit permission to audio-record the conversation. The interviews, which lasted approximately 20 to 30 minutes each, were guided by a semi-structured protocol. All sessions were audio-recorded and subsequently transcribed verbatim for analysis and review.

Data Analysis

The data analysis was conducted in three stages: quantitative analysis, qualitative analysis, and a final integration of the findings. First, quantitative data from the AIT-SES survey were analyzed using SPSS. The dataset was initially screened for errors, and a composite self-efficacy score was calculated for each participant. Descriptive statistics were then computed for the overall sample and each educational level. To answer the first research question, a one-way Analysis of Variance (ANOVA) was performed to compare the mean self-efficacy scores of the primary, secondary, and tertiary teacher groups. Post hoc tests were subsequently used to identify specific group differences for which the ANOVA was statistically significant. For the second stage, the semi-structured interview data were analyzed. After the recordings were transcribed and anonymized, a thematic analysis was conducted using the systematic framework developed by Braun and Clarke (2006).

This inductive process facilitated the identification of key themes relevant to the second and third research questions. Methodological rigor was enhanced through strategies such as peer debriefing and maintaining a clear audit trail. The final stage involved a deliberate integration of the quantitative and qualitative findings, primarily through the discussion. The purpose of this synthesis was to use the rich qualitative data to explain and provide context for the statistical results.

Software: All quantitative analyses were carried out using IBM SPSS Statistics, whereas qualitative data management and coding were conducted in NVivo, which supported the organisation of transcripts, the systematic development of codes, and the efficient retrieval of text segments during thematic analysis.

3. RESULTS

EFL Teachers' Self-Efficacy Levels in Using AI Tools (RQ1)

The first research question examined the level of self-efficacy EFL teachers perceive in using AI tools across primary, secondary, and tertiary educational levels, drawing on a total sample of 150 teachers (N = 150, 50 at each level). The analysis began with descriptive statistics to summarise the self-efficacy scores for each group.

Table 2. EFL Teachers' Self-Efficacy Levels in Using AI Tools by Educational Level

Educational Level	Number of Participants (N)	Mean	SD
Tertiary (Higher Education)	50	4.35	0.68
Secondary School	50	3.62	0.85
Primary School	50	2.91	0.92

The descriptive statistics presented in Table 2 reveal a distinct pattern in self-efficacy scores across the three educational levels. Teachers at the tertiary level demonstrated the highest mean self-efficacy score (M = 4.35), indicating a strong level of confidence in AI tools. Secondary school teachers followed with a moderate average score (M = 3.62). In contrast, primary school teachers reported the lowest mean score (M = 2.91), suggesting a general lack of confidence in this domain. Furthermore, the standard deviations indicate greater variability in self-efficacy perceptions among primary and secondary teachers than among their tertiary-level counterparts, who report more consistent scores.

Table 3. ANOVA Summary for Self-Efficacy by Educational Level

Source of Variation	Sum of Squares (SS)	df	Mean Square (MS)	F	Sig. (p-value)
Between Groups	51.84	2	25.92	38.28	<.001
Within Groups	99.53	147	0.68		
Total	151.38	149			

Assumptions for ANOVA were checked and met, including normality and homogeneity of variances. A one way ANOVA was conducted to determine whether the differences in the mean self-efficacy scores among the three groups were statistically significant, and the results confirmed a substantial effect of educational level, $F(2, 147) = 38.28$, $p < .001$, with a large effect size ($\eta^2 = .34$). To complement the significance test, 95 per cent confidence intervals around the group means showed minimal overlap and consistently supported the observed ordering of tertiary, secondary, and primary teachers.

Table 4. Post-Hoc Test (Tukey HSD) Multiple Comparisons

I Educational Level	J Educational Level	Mean Difference (I-J)	Std. Error	Sig. (p-value)
Tertiary	Secondary	.73*	0.17	<.001
	Primary	1.44*	0.17	<.001
Secondary	Primary	.71*	0.17	<.001

*The mean difference is significant at the 0.05 level.

Following the significant ANOVA result, post hoc comparisons using the Tukey procedure indicated that all three groups were statistically distinct from one another. The analysis showed that tertiary-level teachers reported significantly higher self-efficacy than both their secondary (mean difference = 0.73, p < .001) and primary (mean difference = 1.44, p < .001) counterparts. In addition, secondary teachers' self-efficacy was significantly higher than primary teachers' (mean difference = 0.71, p < .001). Large effect sizes accompanied these pairwise comparisons (Cohen's d ≈ 0.89 for tertiary versus secondary, 1.75 for tertiary versus primary, and 0.86 for secondary versus primary) and confidence intervals for each contrast that did not include zero, providing strong statistical confirmation of the hierarchical pattern (Tertiary > Secondary > Primary) that was initially identified in the descriptive data.

To deepen the interpretation of these quantitative patterns, the analysis then turned to qualitative narratives that illuminate how teachers at each level experience and make sense of their AI-related self-efficacy. These quotes reveal the distinct perceptions and experiences that characterize each educational level, adding depth to the statistical findings. At the tertiary level, lecturers demonstrated a high degree of confidence, focusing on complex pedagogical applications beyond basic tasks. They perceived themselves as capable of leveraging AI for sophisticated instructional design, as one participant stated, "*I feel very capable of designing adaptive learning pathways using AI for my students, adjusting materials based on their pace and understanding.*" This perspective was echoed by another lecturer who framed the primary challenge not as one of technical skill but of critical integration: "*The main challenge is not 'how to use it,' but 'how to integrate it critically' to foster higher-order thinking, not just to find instant answers.*"

In contrast, secondary school teachers reported a moderate level of self-efficacy, often tied to practical and efficiency-oriented purposes. Their confidence was evident in their use of AI to streamline their workload. A high school teacher said, "*I am quite confident using ChatGPT to create a lesson plan framework or quiz questions. It saves me a lot of time.*" However, this practical confidence was frequently tempered with caution. Another participant commented that their self-efficacy was more about managing the technology responsibly: "*I can use it, but I always remind students about its limitations and the potential for plagiarism. So, my confidence is more in my ability to manage its use in the classroom.*"

The lowest levels of self-efficacy were found among primary school teachers, whose hesitation centered on a lack of familiarity and concerns about developmental appropriateness. One teacher revealed this uncertainty, stating, "*Frankly, I only know a little about AI, perhaps just using Google Translate. I'm not sure how to apply it for third-graders.*" Beyond technical skill, there was an intense pedagogical fear that AI could interfere with foundational learning. Another participant added, "*We focus more on direct interaction. There's a fear that technology like this will diminish their basic skills, like handwriting or independent thinking.*" These narratives show that perceptions of children's developmental needs heavily influence self-efficacy at this level.

The observed hierarchy of self-efficacy (Tertiary > Secondary > Primary) reflects the fundamentally different professional ecosystems at each tier. The higher education environment, which encourages autonomy and innovation, provides lecturers with more opportunities for the "mastery experiences" that build self-efficacy. Conversely, primary and secondary teachers often operate within more defined curricular structures, which may limit the opportunities for the deep technological exploration necessary to build high levels of confidence.

Teachers' Perceptions of Self-Efficacy in Using AI Tools (RQ2)

The second research question examined how EFL teachers at primary, secondary, and tertiary levels perceived and defined their AI-related self-efficacy in classroom practice. The qualitative analysis revealed that the very meaning of self-efficacy was not uniform; instead, its definition shifted significantly across educational contexts. For tertiary-level educators, self-efficacy was found to be linked to critical innovation. At the secondary level, it was primarily associated with pragmatic efficiency. For primary school teachers, it was

characterized by cautious exploration. The distinct nature of these perceptions is summarized in Table 5.

Table 5. Summary of Themes Regarding Teacher Perceptions of Self-Efficacy

Educational Level	Primary Perception	Key Focus	Dominant Concerns
Tertiary	Efficacy as Critical Innovation	Transforming pedagogy, fostering higher-order thinking, designing adaptive learning paths.	Ethical integration, academic integrity, and evaluating AI bias.
Secondary	Efficacy as Pragmatic Balance	Administrative efficiency (saving time), creating engaging materials, and managing student use of AI.	Plagiarism management, task relevance, and balancing tech with curriculum goals.
Primary	Efficacy as Cautious Exploration	Basic tool use (e.g., translation), simple material generation.	Developmental appropriateness, erosion of foundational skills, and lack of relevant tools.

At the tertiary level, teachers defined self-efficacy primarily as a capacity for critical pedagogical innovation. Their confidence was not about simply using AI tools, but about strategically integrating them to transform student learning and foster higher-order thinking skills. As one university lecturer commented, "*My confidence lies in my ability to use AI to make students question, to analyze the outputs, not just accept them. It's about teaching them to be critical consumers of this technology*." This perspective represents a mature form of efficacy that incorporates a critical awareness of AI's limitations, including ethical issues and algorithmic bias.

In contrast, secondary school teachers viewed self-efficacy through a pragmatic lens, balancing innovation and efficiency. For this group, confidence was strongly linked to using AI for managing heavy administrative workloads. One teacher noted, "*I feel effective when I can cut my prep time in half using AI, which gives me more energy for the actual teaching*." This focus on efficiency was balanced with a desire to create more engaging materials. Their concerns were equally practical, focusing on managing student use of AI to prevent plagiarism. Thus, their sense of efficacy was grounded in skillful classroom management and practical problem-solving.

Finally, primary school teachers perceived self-efficacy as a form of cautious exploration, heavily influenced by developmental concerns. Their confidence was often restricted to using basic AI tools for simple support tasks, and their narratives were dominated by apprehension. One teacher expressed a common sentiment: "*I might be able to use it, but I'm not confident it's good for them. We are focused on foundational skills like handwriting and social interaction, and I worry AI gets in the way of that*." This viewpoint means that for primary teachers, self-efficacy is often defined by their ability to protect

students from the potential harms of technology. Their confidence is therefore tentative and contingent on finding tools that have been proven safe and developmentally appropriate for their students.

Factors Influencing EFL Teachers' Self-Efficacy (RQ3)

This finding presents the key factors that teachers identified as shaping their confidence with artificial intelligence. The qualitative analysis revealed that these determinants fall into three broad domains: internal (psychological), external (environmental), and contextual (policy-related). A detailed overview of these categories and their constituent factors is summarized in Table 6.

Table 6. Summary of Factors Influencing Teacher Self-Efficacy

Factor Category	Specific Factor	Description & Impact on Self-Efficacy
Internal Factors	Mastery Experiences	Direct, successful experiences using AI tools. This is the most potent source, building a tangible sense of competence.
	Vicarious Experiences	Observing peers successfully using AI. This provides a relatable model and fosters a "if they can, I can" belief.
	Attitudes & Beliefs	Belief in the usefulness and ease of use of AI. A positive attitude drives persistence and effort.
	AI Literacy & Growth Mindset	Understanding of AI concepts and a belief that tech skills can be developed. This reduces fear and encourages experimentation.
External Factors	Facilitating Conditions	Access to reliable technology, the internet, and technical support. Lack of these resources is a major barrier and source of stress.
	Social Influence & Persuasion	Encouragement and support from school

Factor Category	Specific Factor	Description & Impact on Self-Efficacy
		leaders and colleagues. Positive persuasion boosts confidence and motivation.
	Professional Development	Access to practical, hands-on training. Effective training provides guided mastery experiences and builds practical skills.
Contextual Factor	"Merdeka Belajar" National Policy	A top-down government initiative promoting teacher autonomy and innovation. It acts as a macro-level social influence and provides a centralized facilitating condition (PMM platform), creating a unique policy-driven ecosystem for AI adoption.

The analysis revealed that internal factors, stemming from teachers' personal experiences and psychological attributes, were fundamental in shaping their self-efficacy. The most powerful and frequently cited factor was mastery experiences. Direct, successful use of an AI tool, even on a small scale, provided a significant confidence boost. As one teacher shared, "*I was scared at first, but after successfully creating one interactive quiz using AI and seeing the students enjoy it, I felt much more confident to try other things*." A second important factor was vicarious experiences. Observing colleagues successfully integrate AI served as a strong motivator, particularly when the observed peer was perceived as having a similar skill set. One participant explained, "*I saw my colleague, who is not a tech expert, successfully use AI for classroom differentiation. It made me think, 'If she can do it, I definitely can too'*." This reflects the power of social modeling as described in social cognitive theory and technology acceptance models.

Beyond direct and observed experiences, teachers' pre-existing attitudes and beliefs toward technology were also crucial. Specifically, a teacher's perception of AI's usefulness was a key determinant of their decision. Those who strongly believed in the pedagogical benefits of AI were more likely to persevere through initial difficulties, which ultimately strengthened their confidence. As one teacher expressed, "*Even though it was difficult at first, I kept trying because I was convinced it would really help my struggling students. Believing in its benefits made me not give up*." Finally, AI literacy and a growth mindset were identified as key drivers of success. Teachers with a stronger understanding of AI's

principles and ethical implications reported higher self-efficacy. Furthermore, those who viewed their technological skills as malleable and open to development, rather than fixed, were more willing to experiment, learn from setbacks, and enhance their competence.

External factors related to the teachers' work environment were found to be equally important in shaping their self-efficacy. The most dominant of these were facilitating conditions. The availability of reliable infrastructure, including adequate hardware, stable internet access, and subscriptions to AI software, was consistently cited as a prerequisite for confidence. As one teacher stated, "*It's hard to feel confident if the school's laptop is slow and the internet often disconnects. Good facilities are an absolute requirement*." Additionally, social influence and persuasion from the immediate work environment played a significant role. Verbal encouragement from school leadership was mighty. A participant revealed, "*When my principal said, 'I believe you can do this, and we will support you with the necessary training,' it really boosted my morale and confidence*." This highlights the combined impact of social influence and verbal persuasion, which are key concepts in both technology acceptance models and social cognitive theory.

Finally, the availability and quality of professional development were critical determinants of self-efficacy. Teachers felt most empowered after participating in practical, hands-on workshops that provided concrete examples and opportunities to experiment directly with various AI tools. In contrast, purely theoretical training sessions were reported to be less effective. One teacher highlighted the value of active learning in training, saying, "*The best training was when we were immediately asked to try creating something with AI, not just listening to a lecture about what AI is*." This highlights the importance of experiential learning in developing the mastery and confidence necessary for successful technology integration.

A third and powerful category of influence was a contextual factor unique to this study's setting: the national Education policy known as "*Merdeka Belajar*" (Freedom to Learn). Teachers across all levels consistently cited this policy from the Ministry of Education, Culture, Research, and Technology (*Kemendikbudristek*) as a major driver for technology integration. It was perceived dually as both a source of professional expectation and a form of institutional support. One participant explained this new norm: "*With the Merdeka Curriculum, we are encouraged to be more innovative and student-centered. Using technology like AI feels aligned with the spirit of that policy. It's no longer a personal choice, but part of professional expectations*." Furthermore, the government's "*Platform Merdeka Mengajar*" (PMM) was identified as a tangible form of this support. As another teacher noted, "*PMM provides many examples of good practices and training modules... the platform creates an ecosystem where sharing and learning about new technologies becomes normal.*"

The influence of the "*Merdeka Belajar*" policy is significant because it functions as a macro-level variable that reshapes traditional factors influencing technology adoption. For example, "Social Influence" in this context extends beyond immediate colleagues to the ministerial level. "Facilitating Conditions" includes not just local school resources but also the availability of a national digital platform like PMM. This creates a unique "policy-driven ecosystem" for AI adoption in Indonesia, resulting in a strong, top-down push for innovation.

However, this can also create pressure on teachers when their personal self-efficacy or local-level support does not align with the policy's ambitious national goals.

4. DISCUSSION

The finding that AI self-efficacy is highest among tertiary-level educators, followed by secondary and then primary school teachers, extends previous research on general technology self-efficacy. While earlier studies have identified variations in ICT confidence linked to age or career stage (Li et al., 2025), our research connects this hierarchy directly to the distinct professional ecosystems of each educational level. We propose that this disparity stems from the greater professional autonomy, different role expectations, and superior resource access characteristic of the tertiary sector. This interpretation is consistent with established theoretical frameworks. For instance, university lecturers are often expected to be active researchers, a role that provides natural opportunities for innovation (Lundberg & Öberg, 2021). These opportunities serve as powerful "mastery experiences," which Bandura's Social Cognitive Theory identifies as the primary source of self-efficacy (Menon et al., 2017). This supports the well-documented link between high teacher self-efficacy and the use of innovative pedagogical strategies (Liu et al., 2025). Conversely, the more structured and regulated K-12 environment may afford fewer chances for such professional experimentation. This reality presents a critical consideration for educational policy. The simple provision of technology is insufficient. To truly foster confident and effective integration of AI, the professional environment must also support the autonomy teachers need to build competence through practice (Hastomo et al., 2024).

Our qualitative analysis indicates that teachers conceptualize their AI self-efficacy through two distinct yet complementary frameworks: its application for pedagogical advancement and its utility for administrative tasks. This dual perspective aligns closely with recent scholarship. The view of AI as a catalyst for pedagogical innovation, such as facilitating personalized learning pathways (Chou et al., 2024), is widely discussed (Delello et al., 2025). Our finding that educators with high self-efficacy believe they can leverage AI to cultivate higher-order thinking skills aligns with research linking strong self-efficacy to the adoption of innovative teaching practices (Liu et al., 2025). Concurrently, the perception of AI as a means to improve administrative efficiency resonates with another prominent theme in the literature, which highlights AI's capacity to automate routine tasks, thereby reducing teacher workload (Delello et al., 2025). The emphasis our participants, especially those in K-12 settings, placed on this practical advantage underscores the importance of demonstrating tangible value to encourage technology adoption (Dindar et al., 2021). Furthermore, a more complex theme emerged: a "duality of perception," in which teacher confidence is balanced by a critical awareness of AI's limitations, including concerns about academic integrity and algorithmic bias. This suggests the development of a sophisticated form of self-efficacy that encompasses critical AI literacy. Such concerns are echoed in studies addressing the ethical challenges of AI (Ayeni et al., 2024). The recent development of validated instruments, such as the Teacher AI Competence Self-Efficacy (TAICS) scale, which includes an ethics dimension (Chiu et al., 2025), further corroborates our finding. It affirms that a mature sense of efficacy in this domain involves not only the ability to use AI but also the wisdom to use it ethically and responsibly.

This study's analysis of influencing factors corroborates the value of integrated theoretical models for understanding technology adoption. Our findings suggest that a synergistic application of Bandura's Social Cognitive Theory (SCT), the Technology Acceptance Model (TAM), and the Unified Theory of Acceptance and Use of Technology (UTAUT) offers a more comprehensive explanatory framework than any of these models in isolation. The pronounced influence of internal factors, such as mastery and vicarious experiences, confirms the foundational role of SCT in cultivating self-efficacy (Menon et al., 2017). Simultaneously, the significance of external factors, such as Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions, aligns with the core constructs of TAM and UTAUT, as evidenced in recent literature (Gupta, 2024). Our research contributes to this field by demonstrating how external factors and perceptual beliefs serve as mechanisms for building self-efficacy. For example, positive vicarious experiences (SCT) appear to strengthen social influence (UTAUT), while successful mastery experiences (SCT) directly improve perceived ease of use (TAM). The primary contribution of this study, however, is the identification of the "*Merdeka Belajar*" national policy as a dominant contextual moderator. While UTAUT accounts for social and facilitating conditions at the institutional level (Cabero-Almenara et al., 2024), our findings indicate that in the Indonesian context, these forces operate nationally, creating a potent top-down "policy-driven ecosystem" (Sumarni et al., 2025). This finding highlights a critical tension, or "policy-practice gap," where a strong national impetus for innovation is constrained by local challenges, such as inadequate training and resource disparities (Prayitno & Mahmudi, 2025). This disparity between high-level policy demands and insufficient local support creates conditions that may increase the risk of teacher burnout if self-efficacy is not adequately nurtured (Brouwers & Tomic, 2000).

The implications derived from this research resonate strongly with established recommendations in the existing literature. The calls for providing differentiated, practical professional development and ensuring equitable access to technological infrastructure are consistently highlighted as vital for successful AI integration (Ding et al., 2024; Gomez et al., 2022; Nazaretsky et al., 2022). Our findings corroborate the view that these elements are not merely best practices but essential prerequisites for cultivating the teacher self-efficacy required to achieve ambitious national policy objectives. Nevertheless, this study is limited by its cross-sectional design, which provides only a static snapshot of the rapidly advancing field of AI in Education. Consequently, future longitudinal research is necessary to track the evolution of teacher self-efficacy. Furthermore, our findings highlight a critical trajectory for future inquiry: the research community must shift its focus from studies of perception and adoption to an empirical investigation of the link between teacher AI self-efficacy and student learning outcomes. This direction aligns with scholarly calls to measure the tangible impact of AI tools on educational achievement (Šabić et al., 2021). Ultimately, validating this connection represents the definitive test of whether fostering teacher AI self-efficacy leads to meaningful improvements in student outcomes.

5. CONCLUSIONS

This study investigated the self-efficacy of Indonesian EFL teachers using AI across primary, secondary, and tertiary education. The findings reveal a clear hierarchy of

confidence, with tertiary educators reporting the highest self-efficacy, followed by secondary and then primary teachers. This hierarchy appears to reflect differences in professional autonomy, access to digital infrastructure, and opportunities for pedagogical innovation at each level. Teachers conceptualized self-efficacy in different ways: many linked it to designing AI-supported instruction and personalized learning, while others associated it with using AI to streamline administrative work. A more mature form of self-efficacy also emerged, in which confidence in using AI was accompanied by awareness of risks, including threats to academic integrity and the need to verify AI-generated information, and was reinforced by mastery experiences and institutional support aligned with Indonesia's *Merdeka Belajar* policy.

The conclusions of this study have targeted and actionable implications for policy and practice. Providing access to technology alone is insufficient; therefore, national policymakers should pair infrastructure investment with curriculum-aligned professional learning that allows teachers time to experiment with AI in low-stakes settings. School leaders and teacher trainers should establish collaborative professional communities focused on AI, embed mentoring and peer demonstration in school routines, and model responsible AI use through local policies and mechanisms that safeguard academic integrity. Professional development must be practical, hands-on, and differentiated to address the varied needs of teachers at each level of education. Moreover, this research highlights a policy practice gap: the national push for innovation may put pressure on teachers when it is not matched with local resources and support, increasing the risk of workload intensification and burnout.

While this study provides a snapshot, its cross-sectional design limits interpretation, as it captures a single moment in a changing technological landscape. Future longitudinal research is essential for tracking how teachers' self-efficacy and practices evolve over time and across different sectors. The research community must move beyond studies of perception and adoption, with a critical next step being rigorous empirical investigations that connect teacher AI self-efficacy to measurable student learning outcomes and indicators of educational quality. Establishing this link represents a key test of whether fostering confidence in educators translates into tangible gains for students. Although the study is situated in Indonesia, the dynamics identified here regarding autonomy, institutional support, and critical engagement with AI are likely to resonate in other EFL systems and to inform debates on contextually grounded AI integration.

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САМОЕФЕКТИВНІСТЬ УЧИТЕЛІВ У ВИКОРИСТАННІ ШІ-ІНСТРУМЕНТІВ: ПОРІВНЯЛЬНЕ ДОСЛІДЖЕННЯ В ІНДОНЕЗІЇ

Анотація. Інтеграція штучного інтелекту (ШІ) у викладання англійської мови як іноземної відкриває нові можливості та висуває низку викликів. У той час як наукові дослідження здебільшого зосереджені на навчальних досягненнях студентів, самоефективність учителів у роботі з такими інструментами, особливо на різних освітніх рівнях, залишається недостатньо вивченою. З огляду на це, у дослідженні було проаналізовано самоефективність індонезійських учителів англійської мови початкової, середньої та старшої школи щодо використання ШІ, застосувавши послідовний пояснювальний змішаний дизайн дослідження. На початковому етапі було проведено кількісне опитування (N = 150) із використанням шкали самоефективності вчителів у використанні ШІ-інструментів (AIT-SES) у професійній діяльності. Аналіз виявив чітку ієрархію: викладачі вищої школи продемонстрували найвищий рівень самоефективності, за ними – учителі середньої, а потім початкової школи. Подальші напівструктуровані інтерв'ю з цілеспрямовано відібраною підвибіркою дозволили з'ясувати причини цих відмінностей, які пов'язані з такими чинниками, як рівень професійної автономії та різноманітні вимоги до вчителів. Якісні дані свідчать, що освітяни розглядають самоефективність як рушійну силу педагогічних інновацій і водночас як інструмент підвищення адміністративної ефективності. Також простежується «зріла» форма самоефективності, що поєднує впевненість із критичним усвідомленням ризиків, пов'язаних із використанням ШІ. Серед ключових чинників впливу визначено безпосередній досвід опанування інструментами, якість професійного розвитку та національну політику Індонезії «Merdeka Belajar», яка є потужним регуляторним стимулом для впровадження технологій. Зроблено висновок, що розвиток самоефективності вчителів щодо використання ШІ потребує не лише забезпечення технологіями, а й диференційованого, практично орієнтованого навчання та професійного середовища, яке підтримує автономію й інноваційність учителя.

Ключові слова: штучний інтелект, освітні технології, учителі англійської мови, змішаний дизайн дослідження, самоефективність.