

## Teachers' AI literacy: Perspectives from the technical, pedagogical, ethical, and critical dimensions

<sup>1</sup>Ratih Laily Nurjanah and <sup>2</sup>Sri Waluyo

<sup>1</sup>Universitas Ngudi Waluyo, Ungaran, Indonesia

<sup>1</sup>ratihlaily@unw.ac.id

<sup>2</sup>STMIK Bina Patria, Magelang, Indonesia

<sup>2</sup>sriwaluyo@stmikbinapatria.ac.id

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**Abstract.** This study investigates the AI literacy of lecturers of English as a Foreign Language (EFL) at Indonesian higher education institutions across four analytically distinct dimensions: technical, pedagogical, ethical, and critical. Employing a descriptive-exploratory qualitative design, data were collected through semi-structured Zoom interviews with 20 EFL lecturers aged 25–35 who had at least 2 years of teaching experience. Interviews were audio-recorded, transcribed, and analyzed through reflexive thematic analysis. The findings reveal a recurring pattern of uneven AI literacy development across all four dimensions. Technically, participants demonstrated functional familiarity with AI tools without a foundational understanding of the generative mechanisms underlying these systems. Pedagogically, AI use was largely confined to lesson preparation and task automation rather than the intentional redesign of instructional strategies. Ethically, participants' awareness was concentrated on academic integrity, while data privacy and algorithmic bias remained substantially underexplored. Critically, evaluation practices for AI-generated content varied considerably, with only a minority of participants applying systematic screening protocols. These findings collectively indicate that the EFL lecturers in this study possessed AI literacy at a formative stage—adequate for surface-level tool engagement but insufficient to support reflective, ethical, and pedagogically transformative AI integration. The study calls for professional development programs that address all four dimensions of AI literacy, with particular attention to conceptual understanding, critical evaluation, and ethical awareness in the Indonesian EFL higher education context.

**Keywords:** AI literacy; EFL lecturers; generative AI; higher education; qualitative

**Abstrak.** Penelitian ini mengkaji literasi kecerdasan buatan (AI) dosen Bahasa Inggris sebagai Bahasa Asing (EFL) di perguruan tinggi Indonesia melalui empat dimensi yang dapat dibedakan secara analitis: teknis, pedagogis, etis, dan kritis. Dengan menggunakan desain kualitatif deskriptif-eksploratif, data dikumpulkan melalui wawancara semi-terstruktur yang dilaksanakan melalui Zoom bersama 20 dosen EFL berusia 25–35 tahun dengan pengalaman mengajar minimal dua tahun. Wawancara direkam, ditranskripsikan, dan dianalisis menggunakan analisis tematik reflektif. Temuan penelitian menunjukkan pola pengembangan literasi AI yang tidak merata di keempat dimensi. Secara teknis, para partisipan memiliki keakraban fungsional dengan alat-alat AI tanpa pemahaman mendasar tentang mekanisme generatif di balik sistem tersebut. Secara pedagogis, penggunaan AI sebagian besar terbatas pada persiapan pembelajaran dan otomasi tugas, bukan pada perancangan ulang strategi pembelajaran yang disengaja. Secara etis, kesadaran partisipan terpusat pada integritas akademik, sementara privasi data dan bias algoritma belum banyak diperhatikan. Secara kritis, praktik evaluasi terhadap konten yang dihasilkan AI bervariasi, dengan hanya sebagian kecil partisipan yang menerapkan protokol penyaringan secara sistematis. Temuan-temuan ini menunjukkan bahwa literasi AI dosen EFL dalam penelitian ini berada pada tahap awal—memadai untuk keterlibatan tingkat permukaan dengan alat AI tetapi belum cukup untuk mendukung integrasi AI yang reflektif, etis, dan transformatif secara pedagogis. Penelitian ini mendorong perlunya program pengembangan

*profesional yang mencakup keempat dimensi literasi AI, dengan perhatian khusus pada pemahaman konseptual, evaluasi kritis, dan kesadaran etis dalam konteks pendidikan tinggi EFL di Indonesia.*

**Kata kunci:** dosen EFL; kecerdasan buatan; literasi AI; pendidikan tinggi; Indonesia; kualitatif

## INTRODUCTION

Over the past decade, the concept of AI literacy has matured from a niche technical concern into a core competency for educators. Ng et al. (2021) consolidated this emerging construct around four interrelated aspects, including knowing and understanding AI, using and applying it, evaluating and creating with it, and engaging with its ethical issues; while Long & Magerko (2020) defined AI literacy as the set of competencies that enable individuals to critically evaluate, communicate, and collaborate with AI. Deshen et al. (2026) similarly frame AI literacy as the capacity to understand, use, monitor, and critically reflect on AI applications, and Suh (2025) extends this to the competencies required to use, evaluate, and communicate with generative AI in both domestic and professional settings. Technically, the field rests on machine learning and deep learning, the latter employing artificial neural networks that loosely simulate the architecture of the human brain (Jose & Jose, 2024). The arrival of accessible generative systems such as ChatGPT has accelerated this trajectory, presenting educators with substantial opportunities alongside well-documented risks of inaccuracy, bias, and over-reliance (Kasneci et al., 2023).

These developments have reshaped the educational landscape, including the teaching of English as a Foreign Language (EFL). AI-enabled platforms now support immersive, personalized, and increasingly interactive language learning (Ayu et al., 2025; Fritzner et al., 2025), and language learning consistently emerges as one of the most common application domains in higher education research on AI (Crompton & Burke, 2023; Pitychoutis, 2024). Rather than displacing teachers, AI is most productively positioned as a complementary tool that can enhance both teacher and student productivity (Cespedes, 2025). Realizing this potential, however, depends on intensive educator training and curriculum adaptation (Alam, 2025; Daher, 2025), and recent integrations indicate that the pace of generative AI adoption in higher education has outstripped the development of the very competencies needed to use it well (Wu et al., 2025). Despite this phenomenon, a persistent problem runs through the literature: a significant gap between the availability of AI technologies and teachers' actual competence and confidence in integrating them. As Zawacki-Richter et al. (2019) observed, research on AI in higher education has tended to foreground systems and students while leaving the lecturers under-examined. The majority of studies concentrate on students' perspectives, learning outcomes, or the general benefits of AI integration (Sari et al., 2025; Ma & Ky, 2026), so that teacher AI literacy continues to be discussed in broad terms. Where teacher-focused EFL studies do exist, they suggest that competence is uneven: pre-service and in-service EFL teachers report enthusiasm and basic familiarity but limited conceptual, ethical, and evaluative depth (Karaduman, 2025; Nazim & Alzubi, 2025). In Indonesia specifically, the digital transition has proceeded without systematic support in infrastructure, policy, or professional development; rural EFL lecturers value AI for streamlining lesson preparation, yet they are constrained by unstable connectivity and digital-literacy gaps (Dinata et al., 2025), which are amplified in low- and middle-income contexts (Landa-Blanco, 2026). Ilma & Rohmah (2025), in a study of 78 secondary-school EFL teachers in Malang, found that basic tool familiarity coexisted with significant deficits in computational understanding, prompt engineering, and the critical evaluation of AI output, as proposed by Arefnejad et al. (2024)

identifying teacher unfamiliarity as a structural barrier that extends well beyond technical skill. The result is a clear empirical gap: the AI literacy of EFL lecturers in Indonesian higher education, examined across their technical, pedagogical, ethical, and critical dimensions, remains virtually unexplored by systematic inquiry, even though lecturers are the primary agents determining the quality of AI integration in their classrooms.

To address this gap, the present study organizes teacher AI literacy around four analytically distinct but interrelated dimensions. The technical dimension concerns knowledge of AI systems and operational competence; the pedagogical dimension concerns the capacity to design and implement AI-integrated teaching and learning; the ethical dimension concerns awareness of and responsibility toward the social and moral implications of AI in education; and the critical dimension concerns the capacity to evaluate, question, and contextualize AI outputs, algorithms, and systems. This four-part structure draws on and extends the AI-literacy aspects proposed by Ng et al. (2021) and the competencies articulated by (Long & Magerko, 2020); the competency framework of Chee et al. (2025) and the challenges taxonomy of Arefnejad et al. (2024); and the Technological Pedagogical Content Knowledge (TPACK) tradition (Koehler et al., 2013) as applied to language teachers by Ren and Li (2026). The ethical and critical dimensions are further informed by the broader discourse on the ethics of AI in education (Holmes et al., 2021; Sharples, 2023) and by competency frameworks for educators that foreground responsible, reflective practice (Redecker, 2017).

This study is significant because its findings provide an empirical profile of EFL lecturers' AI literacy that is urgently needed by policymakers, program administrators, and professional-development bodies. For lecturers, a dimension-specific account clarifies where their competence is strongest and where it is most in need of development; for institutions, it offers an evidence base for designing contextually appropriate, relevant, and equitable AI training rather than generic digital-skills workshops. The study's contribution is therefore both diagnostic, mapping the current state of AI literacy across four dimensions, and prescriptive, identifying the specific conceptual, ethical, and evaluative capacities that future professional development in the Indonesian EFL context should target.

Grounded in the foregoing background, and adopting a qualitative interview-based approach, this study formulates the following research question:

**RQ1.** What is the level of AI literacy among EFL lecturers at Indonesian higher education institutions, as examined across the technical, pedagogical, ethical, and critical dimensions?

## **METHOD**

### **Research Design**

This study employed a descriptive-exploratory qualitative design. The design was chosen because the research question seeks to describe and interpret a phenomenon that is still poorly understood; the AI literacy of EFL lecturers, rather than to test predefined hypotheses or measure a fixed construct. A qualitative interview-based approach allowed participants to articulate their understandings, practices, and concerns in their own words, giving the depth of insight required to characterize each of the four dimensions of AI literacy. The study prioritized analytical depth and contextual richness over statistical data.

## **Participants**

Twenty EFL lecturers at Indonesian higher education institutions participated in the study. Participants were recruited through purposive sampling against three inclusion criteria: (a) currently teaching English at a higher education institution in Indonesia, (b) aged between 25 and 35 years, and (c) a minimum of two years of teaching experience. This age band was selected deliberately to capture the practices of early-career lecturers, who form a substantial and growing segment of the EFL teaching workforce; the implications of this restriction are addressed in the limitations. To protect anonymity, participants were assigned codes from P1 to P20, which are used throughout the presentation of findings.

## **Instruments**

Data were collected using a semi-structured interview guide developed by the researchers. The guide comprised 23 open-ended questions, coded as Q1- Q23, supplemented by probing prompts, organized to elicit evidence across the four dimensions of AI literacy: technical (conceptual understanding and tool familiarity), pedagogical (AI integration in teaching practice), ethical (awareness and responsibility), and critical (evaluation and contextualization of AI outputs). The guide also included items addressing institutional support, sources of AI learning, and future expectations. Because it was semi-structured, the guide functioned as a flexible framework: the interviewer followed up on participants' responses as appropriate while ensuring that all four dimensions were addressed. The complete interview guide is provided in Appendix A.

## **Data Collection Procedure**

Interviews were conducted individually via Zoom, with each session lasting approximately 30–45 minutes. All interviews were carried out in English, the participants' language of instruction. Before each interview, participants were briefed on the purpose of the study and provided informed consent for audio recording. With consent, the interviews were audio-recorded and subsequently transcribed verbatim to produce the textual data set used for analysis.

## **Data Analysis**

The transcribed data were analyzed using the six-phase reflexive thematic analysis framework of Braun and Clarke (2006). The analysis proceeded through familiarization with the transcripts, generation of initial codes, searching for themes, reviewing themes against the coded extracts and the full data set, defining and naming themes, and producing the final account. Coding was both deductive, guided by the four predefined dimensions of AI literacy, and inductive, allowing patterns within each dimension to emerge from the participants' own accounts. To enhance the trustworthiness of the analysis, coding decisions were reviewed iteratively, and representative excerpts were retained to ground each theme in the data.

## **RESULTS**

The thematic analysis presented four overarching themes corresponding to the four dimensions of AI literacy examined in this study: (1) technical, (2) pedagogical, (3) ethical, and (4) critical. Across all four, the analysis identified a recurring pattern of uneven development. This section presents the findings of the analysis for each dimension, illustrated with representative excerpts; the interpretation of these findings in relation to the existing literature is presented in the Discussion.

## **Technical Dimension: Conceptual Understanding and Tool Familiarity**

Findings in the technical dimension ranged from surface-level familiarity with popular AI tools to a more functionally oriented grasp of how these systems are used. When asked to describe AI in their own words, most participants defined it in terms of practical capability rather than technical architecture.

### **Excerpt 1**

"AI is like a smart assistant; it understands what you ask and helps you do things faster. I know it uses data somehow, but I don't really understand the technical side of how it actually works." (P3)

### **Excerpt 2**

"For me, AI is basically any program that can do things that normally require human thinking ; like translating, writing, or answering questions automatically." (P7)

These responses indicate that participants hold intuitive yet functionally oriented understandings of AI. When probed about the distinction between generative AI and conventional tools such as Google Translate (Q3), a pattern of conceptual ambiguity emerged. While participants could identify ChatGPT as categorically different from Grammarly or Google Translate, few could articulate the generative mechanisms that distinguish them.

### **Excerpt 3**

"I know ChatGPT is different from Google Translate, but I'm not sure exactly how. I think ChatGPT 'creates' its answer, while Google Translate just converts the language, but I'm not totally sure." (P5)

### **Excerpt 4**

"I've heard of machine learning but I wouldn't be able to explain it. I just know these tools are getting smarter and they seem to understand context better than older tools." (P2)

No respondents demonstrated awareness of machine learning or deep learning beyond incidental references. The technical dimension was thus characterized not by a complete absence of AI awareness but by a shallow conceptual foundation underlying broad practical familiarity.

## **Pedagogical Dimension: AI Integration in EFL Teaching Practice**

The pedagogical dimension elicited the richest and most varied responses across participants. In response to questions about current AI use in teaching (Q5–Q7), the majority of participants reported active integration of AI tools, most commonly ChatGPT, Grammarly, and Google Gemini, primarily in preparatory activities such as generating lesson plans, designing reading comprehension exercises, producing grammar drills, and creating writing prompts.

### **Excerpt 5**

"I use ChatGPT a lot for making lesson plans. I give it the topic and the level of my students, and it gives me a draft I can adapt. It saves a lot of preparation time." (P20)

### **Excerpt 6**

"I've asked my students to use AI to get feedback on their writing drafts before they submit to me. I think it helps them see their own mistakes without always depending on my feedback." (P16)

However, when probed about the deeper integration of AI into teaching strategies and lesson design (Q7), most participants acknowledged that their use remained predominantly at the level of task automation rather than pedagogical redesign.

### **Excerpt 7**

"I haven't really changed how I teach because of AI. I still use the same methods – AI just helps me prepare materials faster, but my classroom is basically the same." (P11)

### **Excerpt 8**

"I've tried to guide students to use AI for vocabulary building, but some of them just copy whatever the AI gives them. Teaching them to use it critically has been harder than I expected." (P14)

Participants also reported infrastructural barriers, including unstable internet access and insufficient institutional devices, as impediments to fuller integration.

### **Ethical Dimension: Awareness and Responsibility in AI Use**

The ethical dimension yielded responses that revealed both genuine awareness and significant uncertainty. Participants demonstrated general familiarity with broad ethical concerns, particularly academic integrity, but exhibited limited depth when addressing data privacy and algorithmic bias. When asked to identify ethical issues relevant to AI use in EFL teaching (Q13), responses consistently foregrounded academic dishonesty as the primary concern.

### **Excerpt 9**

"My biggest worry is that students use AI to write their assignments and submit it as their own work. That is academic dishonesty, and we need clear rules about it." (P3)

### **Excerpt 10**

"I think the main ethical issue is honesty and transparency; students and teachers both need to be clear about when and how they are using AI." (P8)

Regarding data privacy, most participants expressed moderate concern but limited practical knowledge about how AI platforms process user data.

### **Excerpt 11**

"I know there might be privacy issues with these tools, but I don't really know the details. I just assume that if a tool is widely used, it's probably safe enough." (P2)

On the question of AI bias, responses revealed the lowest level of awareness across all ethical sub-themes.

### **Excerpt 12**

"I hadn't really thought about bias in AI before. I suppose ChatGPT might favor certain varieties of English, like American English, over others, but I have never actually analyzed that." (P6)

### **Excerpt 13**

"Bias in the materials AI produces, I honestly never considered that. Now that you mention it, I think about the cultural assumptions in some of the texts it gives me." (P5)

No participant reported that their institution had communicated a comprehensive, operational AI policy to faculty.

## **Critical Dimension: Evaluation and Contextualization of AI Outputs**

The critical dimension assessed participants' capacity to interrogate, evaluate, and contextualize AI-generated content before deploying it in EFL instruction. In response to Q10–Q12, most participants reported that they do scrutinize AI outputs before classroom use, though the depth and systematicity of this scrutiny varied considerably across the sample.

### **Excerpt 14**

"When ChatGPT gives me a reading text, I read through it carefully. If something sounds unnatural for my students' level or doesn't fit the Indonesian context, I change it. I also check factual accuracy if real-world content is involved." (P15)

### **Excerpt 15**

"I once had AI give me a grammar exercise where the 'correct' answer was actually wrong. Now I always verify grammar rules independently before using anything AI gives me." (P17)

### **Excerpt 16**

"Honestly, if it looks right and sounds right, I use it. I don't have a formal checklist or a system. I just use my judgment." (P11)

### **Excerpt 17**

"I think the most important thing is checking whether the content is appropriate for my students' cultural background. ChatGPT sometimes gives examples that are very Western and not relatable for Indonesian students." (P4)

## **DISCUSSION**

### **Interpreting the Technical Dimension**

These findings align with those of Ilma & Rohmah (2025), who documented significant deficits in computational understanding among secondary school EFL teachers in Indonesia despite their basic tool familiarity. The technical gap identified in the present study is similarly characterized not by a complete absence of AI awareness but by a shallow conceptual foundation that lacks understanding of underlying processes. This pattern corroborates Arefnejad et al.'s (2024) observation that teacher unfamiliarity with AI extends beyond technical skills to encompass limited understanding of how AI systems function and how to evaluate their outputs critically. In definitional terms, participants' functional framing broadly corresponds to the characterization proposed by Deshen et al. (2026), who emphasize not only conceptual comprehension but also practical application; however, the present data suggest that most participants have achieved the practical dimension without the conceptual foundation that would sustain it across varied and unfamiliar AI contexts. The technical dimension as theorized by (Jose & Jose, 2024) encompasses machine learning and deep learning as primary sub-components, yet no participant demonstrated awareness of these sub-components beyond incidental references, pointing to a structural gap in foundational AI literacy that formal professional development has yet to address.

### **Interpreting the Pedagogical Dimension**

These findings corroborate the pattern observed by Fritzner et al. (2025) and Ayu et al. (2025), who documented that AI adoption among educators accelerates behavioral changes in preparatory activities more readily than in core instructional practice. The largely instrumental rather than transformative use of AI documented in the present study resonates with Cespedes (2025) positioning of AI as a complementary rather than competing tool, though the present data suggest that in practice, complementarity tends to default to administrative efficiency rather than intentional pedagogical innovation. Notably, when participants reported guiding students to use AI productively (Q8), responses revealed limited systematic scaffolding. This echoes the concerns raised by Alam (2025) and Daher (2025) regarding the urgency of comprehensive educator training and curriculum adaptation as preconditions for meaningful AI integration. The barriers reported by participants, including unstable internet access and insufficient institutional devices, are consistent with findings by Dinata et al. (2025), who identified infrastructural limitations as primary impediments to optimal AI implementation in EFL contexts. Ayyoub et al. (2025) further situate such barriers within a broader network of interacting factors mediating teacher AI literacy, a multi-layered dynamic clearly visible in the present participants' accounts.

### **Interpreting the Ethical Dimension**

These findings indicate that while participants possess introductory ethical awareness, their understanding remains selectively concentrated on academic integrity and underexplored in the areas of privacy and bias. This pattern is consistent with Arefnejad et al. (2024) multi-layered framework, which identifies ethical responsiveness as a dimension requiring targeted, context-specific development rather than generic exposure. The observed gap in data privacy and bias awareness is particularly significant given that, as reported in responses to Q14, no participant's institution had communicated a comprehensive, operational AI policy to its faculty. Sari et al. (2025) similarly observe that institutional frameworks for AI use in Indonesian educational settings remain

substantially underdeveloped, a condition that directly constrains the ethical dimension of lecturers' AI literacy by depriving them of institutional guidance and shared professional norms.

### **Interpreting the Critical Dimension**

The variation in critical evaluation practices documented here supports the framework advanced by Chee et al. (2025), which positions the critical dimension as a distinct and developable component of teacher AI literacy that cannot be assumed to emerge automatically from general AI familiarity or pedagogical experience. The finding that a minority of participants apply systematic evaluation while the majority rely on impressionistic judgment reflects the uneven development of this competency, which Arefnejad et al. (2024) attribute to structural conditions in which the rapid proliferation of AI tools has outpaced the development of teacher preparation programs. Of particular relevance to the EFL context is the risk that uncritically adopted AI-generated content may introduce culturally inappropriate material or normalize non-target-language features for Indonesian learners, as linked to TPACK-informed perspectives of Ren and Li (2026), who argue that effective AI integration requires domain-specific pedagogical-technological frameworks rather than generic digital literacy. The critical dimension thus emerges as the most internally differentiated area of AI literacy in the present sample, with a small subset of participants exhibiting systematic and reflective evaluation practices while the majority default to intuitive assessment without structured protocols.

### **CONCLUSION**

This study set out to examine the AI literacy of EFL lecturers at Indonesian higher education institutions across four analytically distinct dimensions; technical, pedagogical, ethical, and critical, and to answer the question of where, across these dimensions, their literacy currently stands. Synthesizing the findings, the study reveals a recurring pattern of uneven development. Technically, lecturers demonstrate functional awareness of AI tools without a foundational understanding of the mechanisms underlying generative systems. Pedagogically, AI integration is largely confined to pre-instructional task support rather than informed redesign of teaching strategies, and guidance for student use remains limited. Ethically, academic integrity dominates while data privacy and algorithmic bias receive markedly less attention, a gap compounded by the absence of clear institutional policies. Critically, evaluation practices remain varied and largely impressionistic, with systematic screening applied by only a minority. Collectively, these findings indicate that the AI literacy of the lecturers in this study is at a formative stage: broad enough to sustain productive surface-level engagement but insufficiently developed across the conceptual, ethical, and critical dimensions to support reflective, responsible, and pedagogically transformative integration.

These findings carry direct implications for practice. Professional development programs should extend beyond tool operation to address conceptual AI understanding, systematic critical-evaluation skills, and contextually relevant ethical awareness, especially regarding data privacy and culturally embedded algorithmic bias. Curriculum-adaptation efforts should likewise be designed to move AI use beyond task automation toward intentional, pedagogically grounded practice, and institutions should establish clear, operational AI policies to provide the shared norms that participants currently lack.

Several limitations should be acknowledged. The sample was restricted to 20 lecturers, aged 25–35 with at least two years' experience, and may not represent the diversity of AI literacy across the broader EFL lecturer population, including more senior faculty who may exhibit distinct profiles of

competency, skepticism, or resistance. The qualitative, exploratory design prioritizes depth over statistical applicability. Future research could expand the demographic and geographic scope, employ larger or mixed-method samples to enhance the practical use, and conduct longitudinal studies tracking the development of AI literacy following targeted professional-development interventions, which would substantially strengthen the evidence base for AI-integrated EFL teacher education in Indonesia.

## REFERENCES

- Alam, M. M. (2025). Artificial Intelligence : Paradigm shift in teaching and learning. *International Journal of Creative Research Thoughts*, 13(10), 219–229.
- Arefnejad, S., Khadivi, A., & Alipour, F. (2024). Challenges and applications of artificial intelligence in education: A systematic review. *Journal of Knowledge- Research Studies*, 3(4), 53–76. <https://doi.org/10.22034/jkrs.2024.63182.1106>
- Ayu, I. D., Purba, E., & Tari, D. (2025). Behavioral changes in education triggered by ai use. *Advances in Psychological Sciences and Applications*, 1(1), 32–39. <https://doi.org/10.56741/apsa.v1i01.990>
- Ayyoub, A. M., Khlaif, Z., Shamali, M., Eideh, B. A., Assali, A., Hattab, M., Barham, K., & Bsharat, T. (2025). Advancing higher education with GenAI : factors influencing educator AI literacy. *Frontiers in Education*. <https://doi.org/doi: 10.3389/feduc.2025.1530721>
- Cespedes, A. A. (2025). *Pedagogical shifts in the age of genAI: Faculty perspectives from a higher education context*. 7(3).
- Chee, H., Ahn, S., & Lee, J. (2025). A competency framework for ai literacy: Variations by different learner groups and an implied learning pathway. *British Journal of Educational Technology*, December 2024, 2146–2182. <https://doi.org/10.1111/bjet.13556>
- Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: The state of the field. *International Journal of Educational Technology in Higher Education*, 20(22). <https://doi.org/10.1186/s41239-023-00392-8>
- Daher, R. (2025). Integrating AI literacy into teacher education: A critical perspective paper. *Discover Artificial Intelligence*, 5(217).
- Deshen, M., Harari, R., & Aharony, N. (2026). Teachers' artificial intelligence (AI) literacy: An exploratory study. *Smart Learning Environments*, 13(7).
- Dinata, R. P., Suryati, N., Jailani, M. K., Keli, Y. P., Rovikasari, M., & Hasymi, M. (2025). Exploring rural efl lecturers' perspectives on the integration of artificial intelligence (ai) in foreign language pedagogy. *LEARN Journal: Language Education and Acquisition Research Network*, 18(2), 633–654.
- Fritzner, J., Vergara, G. I. S., & Campos, N. D. C. (2025). The evolution of English language teaching:

How artificial intelligence is reshaping learning and pedagogy. *Ciencia Latina Revista Científica Multidisciplinar*, 9(3). [https://doi.org/https://doi.org/10.37811/cl\\_rcm.v9i3.18329](https://doi.org/https://doi.org/10.37811/cl_rcm.v9i3.18329)

Holmes, W., Porayska-pomsta, K., Holstein, K., Santos, O. C., Rodrigo, M. T., & Cukurova, M. (2021). Ethics of AI in education: Towards a community-wide framework. *International Journal of Artificial Intelligence in Education*, 32. <https://doi.org/https://doi.org/10.1007/s40593-021-00239-1>

Ilma, A., & Rohmah, Z. (2025). AI in EFL education: Teachers' competence and the roadblocks to teaching material development. *Cogent Education*, 12(1). <https://doi.org/10.1080/2331186X.2025.2588471>

Jose, J., & Jose, B. J. (2024). Educators' academic insights on Artificial Intelligence: Challenges and opportunities. *The Electronic Journal of E-Learning*, 22(2), 59–77.

Karaduman, C. (2025). Pre-service EFL teachers' perceived AI literacy and competency: The integration of chatgpt into English language teacher education. *SAGE Open*, September, 1–16. <https://doi.org/10.1177/21582440251379712>

Kasneci, E., Sessler, K., Stefan, K., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Stephan, G., Hullermeier, E., Krusche, S., Kutynok, G., Michaeli, T., Nerdel, C., Pfeffer, J., Poquet, O., Sailer, M., Schmidt, A., Seidel, T., ... Kasneci, G. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103, 1–13. <https://doi.org/https://doi.org/10.1016/j.lindif.2023.102274>

Koehler, M. J., Mishra, P., Akcaoglu, M., & Rosenberg, J. M. (2013). The technological pedagogical content knowledge framework for teachers and teacher educators. In *ICT Integrated Teacher Education: A Resource Book* (pp. 1–8). Michigan State University.

Landa-blanco, M. (2026). *Artificial intelligence in education: applications and limitations for teachers in low- and middle-income countries*. January, 1–6. <https://doi.org/10.3389/feduc.2025.1681836>

Long, D., & Magerko, B. (2020). What is AI literacy? Competencies and design considerations. *CHI Conference on Human Factors in Computing Systems*, 1–16. <https://doi.org/https://doi.org/10.1145/3313831.3376727>

Ma, S., & Ky, V. (2026). Impact of Artificial Intelligence on English language teaching for commerce students: Pedagogical shifts and future prospects. *International Journal of Literacy and Education*, 6(1), 81–85. <https://doi.org/https://www.doi.org/10.22271/27891607.2026.v6.i1b.387>

Nazim, M., & Alzubi, A. A. F. (2025). Empowering EFL teachers' perceptions of generative AI-mediated self-professionalism. *PLoS One*, 20(6), 1–26. <https://doi.org/10.1371/journal.pone.0326735>

Ng, C. T. K., Leung, J. K. L., Chu, S. K. W. C., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. *Computers and Education: Artificial Intelligence*, 2.

<https://doi.org/10.1016/j.caeai.2021.100041>

- Pitychoutis, K. M. (2024). Harnessing ai chatbots for EFL essay writing: A paradigm shift in language pedagogy. *Arab World English Journal (AWEJ) Special, April*, 197–209. <https://doi.org/https://dx.doi.org/10.24093/awej/ChatGPT.13>
- Redecker, C. (2017). *European Framework for the Digital Competence of Educators* (Y. Punie (ed.)). Publications Office of the European Union.
- Ren, T., & Li, Q. (2026). *Assessing artificial intelligence literacy in foreign language teachers : a TPACK-based perspective. February*, 1–8. <https://doi.org/10.3389/feduc.2026.1706559>
- Sari, D. K., Supahar, S., Rosana, D., Dinata, P. A. C., & Istiqlal, M. (2025). *Measuring artificial intelligence literacy : The perspective of Indonesian higher education students. 9(2)*, 143–157.
- Sharples, M. (2023). Towards social generative AI for education: Theory, practices and ethics and ethics. *Learning: Research and Practice, 9(2)*, 159–167. <https://doi.org/10.1080/23735082.2023.2261131>
- Suh, W. (2025). Generative AI integration in higher education shifts students ' attitudes from tool use to innovation. *Discover Education, 4(508)*.
- Wu, F., Dang, Y., & Li, M. (2025). A systematic review of responses, attitudes, and utilization behaviors on generative AI for teaching and learning in higher education. *Behavioral Sciences, 25(467)*, 1–25. <https://doi.org/https://doi.org/10.3390/bs15040467>
- Zawacki-richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education, 16(39)*.

## APPENDIX

### Interview Questions

**Table 1** Instruments of Interview Questions

Interview Questions
<b>Q1.</b> When you hear the term "artificial intelligence" ( <i>artificial intelligence</i> ), what is the first thing that comes to mind? Could you please explain it in your own words?
<b>Q2.</b> What AI tools are you aware of, particularly those relevant to English language education?
<b>Q3.</b> In your view, what is the difference between generative AI such as ChatGPT and conventional digital tools such as Google Translate or Grammarly? [Probing] Do you have a general understanding of how ChatGPT generates responses? Where did you acquire that knowledge?
<b>Q5.</b> Are you currently using AI tools in your EFL teaching activities? If so, which tools and for what purposes?

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### Interview Questions

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- Q6.** Could you describe a concrete example of how you have used AI in a teaching session or in lesson preparation?
- Q7.** How do you integrate AI into the TEFL teaching strategies you have previously employed? Has AI changed the way you design your lessons?
- Q8.** Have you ever encouraged or guided students to use AI productively in learning English? If so, how?  
*[Probing]* What challenges have you encountered when attempting to do so?
- Q9.** If you have never used AI in your teaching, what is the main reason?
- Q10.** When you use AI to generate teaching materials or learning content, how do you evaluate the quality and accuracy of the output?
- Q11.** Have you ever found that AI-generated content contained incorrect, inaccurate, or contextually inappropriate information for the EFL classroom? How did you address it?
- Q12.** How critically do you evaluate AI outputs before using them in class? Could you describe your screening process?
- Q13.** In your view, what ethical issues need to be considered when using AI in EFL teaching at the higher education level?
- Q14.** What is your stance on students using AI tools such as ChatGPT to complete English assignments, such as essay writing? Does your institution have a clear policy regarding this matter?
- Q15.** Have you considered data privacy issues when using AI tools in your teaching? What is your perspective on this?
- Q16.** In your view, is there a risk that AI may reinforce certain biases — for instance, related to culture, gender, or varieties of English — in learning materials? Could you elaborate?
- Q17.** What are the most significant barriers you face in integrating AI into EFL teaching? (*technical, infrastructure, knowledge, policy, time, etc.*)
- Q18.** Does your institution provide specific training or support related to the use of AI in teaching? How adequate do you consider this support to be?
- Q19.** Where do you typically learn about AI and its developments? (*self-directed learning, webinars, lecturer communities, social media, academic journals, etc.*)
- Q20.** In your view, what factors most motivate EFL lecturers to begin adopting AI in their teaching?
- Q21.** What AI-related skills or knowledge would you most like to develop in the near future?
- Q22.** What type of AI training do you consider most effective and relevant for EFL lecturers in Indonesia? (*format, content, duration, organizer*)
- Q23.** What are your expectations regarding how AI might transform or enhance the quality of English language teaching at Indonesian higher education institutions over the next five years?
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