

# JEPAL

## Journal of English Pedagogy and Applied Linguistics

<https://www.jurnal.masoemiversity.ac.id/index.php/englishpedagogy>

Submitted: 20 December 2025 Revised: 29 January 2026 Accepted: 29 January 2026 Available Online:  
31 January 2026

### INTEGRATING AI AND GENERATIVE AI LITERACY IN ENGLISH TEACHER EDUCATION FOR YOUNG LEARNERS

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**Abstract:** AI and Generative AI (GAI) technologies are increasingly shaping education, making their integration into English teacher education essential for preparing pre-service teachers to engage effectively with young learners in digital contexts. This qualitative study examines the integration of AI and GAI literacy inside English teacher education programs at Islamic higher education institutions in Indonesia, specifically on the teaching of English to young learners. Two research questions guide this research: (1) How is AI and Generative AI literacy being integrated into English teacher education programs for young learners in the digital age? and (2) What pedagogical strategies and digital tools are currently used to incorporate AI and GAI into pre-service English teacher education? Data were collected through questionnaires and interviews involving one lecturer and twenty-five pre-service English teachers (PSTs) and were analysed thematically using the Technological Pedagogical Content Knowledge (TPACK) framework. The findings show that AI and GAI literacy is present but implicitly integrated, with AI use driven mainly by student initiative rather than explicit curricular design. Project-based learning served as the main strategy enabling AI use. Pre-service teachers used ChatGPT for lesson planning, Canva for material design, and Quizizz for assessment, while lecturers mainly used assistive tools such as Grammarly and Canva. These practices indicate emerging technological competence but limited pedagogical and ethical structuring of AI use. The study highlights the need for curriculum-level integration of AI literacy to support ethical, pedagogically grounded, and developmentally appropriate TEYL practices.

**Keywords:** AI literacy, English teacher education, generative AI, TPACK, young learners

## INTRODUCTION

The rapid advancement of AI (Artificial Intelligence) and GAI (Generative AI) technology has transformed our pedagogical approaches, particularly in the instruction

of English. These technologies offer new possibilities for personalized learning, automated feedback, and creative instructional design, revolutionizing the planning, implementation, and evaluation of language learning activities by educators (Holmes et al., 2019; Kasneci et al., 2023). Proficiency in AI and GAI is becoming essential in English teacher preparation, particularly for programs preparing future English teachers to engage with young learners. It will give advantages both for teachers and students since AI can enhance task engagement, provide rapid feedback, and facilitate diverse instructional methods tailored to accommodate the needs of all students if it is employed pedagogically (Luckin & Holmes, 2016; Shin & Crandall, 2021).

Taken together, these developments position AI and GAI not merely as technological tools but as emerging pedagogical resources that reshape how teachers conceptualize instruction. Recent research indicates that AI-supported instruction can boost teacher creativity, alleviate cognitive workload, and broaden opportunities for formative evaluation, contingent upon its use being rooted in strong pedagogical principles (Lee, 2025; Li & Xu, 2025). The incorporation of technology in education in Indonesia is intricately linked to national initiatives aimed at fostering a deep learning paradigm that emphasizes higher-order thinking, meaningful learning, cooperation, and learner autonomy (Kemendikbudristek, 2022; UNESCO, 2023). Deep learning methodology requires students to engage in analysis, reflection, and knowledge building, rather than only fulfilling tasks. Digital technologies, including AI and GAI, are recognized as crucial enablers of these goals by fostering interactive, student-centered learning environments that encourage reflection and metacognitive participation (Holmes et al., 2019; Weng & Fu, 2025). Within this national agenda, the relevance of AI becomes especially pronounced in Teaching English to Young Learners (TEYL). In TEYL situations, such techniques are particularly relevant, since young learners benefit from multimodal, interactive, and scaffolded educational experiences that promote both linguistic and cognitive development (Cameron, 2001; Pinter, 2017).

Despite these pedagogical promises, important challenges remain regarding how AI and GAI literacy are addressed in teacher preparation. Looking at the increasement of global focus on AI in education, there is a paucity of empirical evidence about the instruction of AI and GAI literacy for English teachers, particularly within Islamic higher education institutions in Indonesia. Recent studies indicate that the integration of AI in teacher education sometimes transpires in an informal, disjointed fashion, or is driven by personal initiative rather than a unified curricular structure (Weng & Fu, 2025; Zawacki-Richter et al., 2019). Moreover, many programs lack systematic approaches for incorporating AI technologies into TEYL-oriented pedagogy and fail to sufficiently address ethical concerns such as authorship, bias, and data privacy, or to ensure that AI implementation aligns with established learning outcomes (Long & Magerko, 2020; UNESCO, 2021). Thus, the application of AI in teacher education may prioritize technologies above pedagogical principles, ultimately limiting its ability to promote deep learning and the cultivation of professional identity.

This gap highlights the need for a framework that connects technology use with pedagogical reasoning and subject-specific goals. Literature on teacher education emphasizes that proficiency in technology alone is insufficient to ensure its meaningful application in the classroom. Teachers must critically evaluate technology, justify their pedagogical decisions, and adapt technologies to address the developmental requirements of their students (Angeli & Valanides, 2009; Mishra & Koehler, 2009). This

concern is particularly significant in Teaching English to Young Learners (TEYL), where pedagogical approaches must be ethically sound, developmentally suitable, and conducive to language acquisition. In the absence of such preparation, individuals may perceive AI only as a means to expedite tasks rather than as an educational instrument that fosters student-centred thinking and learning.

Accordingly, this study adopts the Technological Pedagogical Content Knowledge (TPACK) framework as an analytic lens to examine the integration of AI and GAI literacy in English teacher education programs for young learners. TPACK conceptualizes effective technology integration as the intersection of technological, pedagogical, and content knowledge, making it particularly suitable for analyzing AI use in TEYL contexts where developmental appropriateness and instructional design are critical (Mishra & Koehler, 2009; Willermark, 2025). Recent studies further confirm that TPACK-based approaches enhance pre-service teachers' ability to design, justify, and evaluate technology-integrated instruction more effectively than tool-centered training alone (Bai & Wei, 2023; Shrestha & Yi, 2025). Guided by this framework, the present study investigates how AI and GAI are introduced, implemented, and perceived by lecturers and pre-service teachers, as well as the pedagogical strategies and digital tools employed in TEYL-oriented teacher education. The study is directed by the following research questions: (1) How is AI and Generative AI literacy being integrated into English teacher education programs for young learners in the digital age? and (2) What pedagogical strategies and digital tools are currently used to incorporate AI and GAI into pre-service English teacher education?

Despite increasing scholarly attention to AI in education, important research gaps remain. Empirical studies focusing specifically on AI and GAI literacy in pre-service English teacher education for young learners are still limited. Much of the existing literature remains tool-centered, context-general, and concentrated in Western educational settings, with insufficient attention to curriculum-level integration or culturally situated contexts such as Islamic higher education institutions in Asia (Weng & Fu, 2025; Zawacki-Richter et al., 2019). Moreover, few studies examine how AI literacy is systematically introduced, scaffolded, and assessed in alignment with deep learning principles and TEYL pedagogy. Addressing these gaps, this study seeks to provide practical insights for educators, curriculum developers, and institutions striving to prepare technologically competent and pedagogically grounded English teachers for the 21st-century classroom, particularly in young learner contexts. In line with international guidance, the study also emphasizes the importance of ethical, responsible, and developmentally appropriate AI use in increasingly digital learning environments (Pinter, 2017; UNESCO, 2021, 2023).

## LITERATURE REVIEW

Artificial intelligence has long been present in education through adaptive learning systems, learning analytics, and automated feedback mechanisms. The emergence of Generative AI (GAI) has further expanded these affordances by enabling rapid generation of texts, visuals, and instructional prompts that support idea development, genre modeling, and formative feedback (Holmes et al., 2019; Kasneci et al., 2023; Zawacki-Richter et al., 2019). In language education, these capabilities provide opportunities to scaffold learners' thinking, accelerate drafting processes, and support iterative language development (Lee, 2025; Li & Xu, 2025). However, scholars

consistently caution that the pedagogical value of AI and GAI lies not in the tools themselves, but in how they are integrated into instruction. Unguided or uncritical use of AI raises concerns related to bias, assessment validity, learner dependency, and academic integrity (UNESCO, 2021, 2023; Weng & Fu, 2025). These concerns highlight the need to examine not only what AI can do, but how it should be pedagogically enacted.

Building on this issue, recent research in language education demonstrates that GAI tools can effectively support brainstorming, drafting, and feedback cycles when accompanied by deliberate teacher mediation and thoughtful assessment design (Chen et al., 2025; Kohnke et al., 2025; Lee, 2025). Without clear pedagogical framing, such as explicit task purposes, reflective justification, and evaluation criteria, AI use may promote surface-level task completion rather than meaningful language learning. This perspective aligns with sociocultural views of mediated learning, which emphasize that tools become educationally meaningful only through guided interaction and scaffolding (Vygotsky, 1978). Consequently, the role of teachers becomes central in transforming AI from a productivity aid into a pedagogical resource, suggesting that teacher education programs must prioritize pedagogical judgment alongside technological competence.

This pedagogical requirement is particularly salient in Teaching English to Young Learners (TEYL), where instructional decisions must be developmentally appropriate and ethically grounded. TEYL pedagogy emphasizes rich language input, meaningful interaction, play-based learning, and multimodal engagement to support children's cognitive and linguistic development (Cameron, 2001; Pinter, 2017; Shin & Crandall, 2021). AI and GAI tools can support these principles by generating stories, visuals, songs, and role-play scenarios; however, their effectiveness depends on teachers' ability to mediate learning activities and re-center children's language use. Empirical studies indicate that AI-seeded materials are most effective when embedded within communicative and dialogic tasks that prioritize interaction and collaboration, rather than passive consumption of AI-generated content (Chen, 2025; Lee, 2025; Weng & Fu, 2025). Evidence from technology-based English learning in Indonesia further suggests that digitally mediated interaction can effectively support young learners' communicative development when aligned with pedagogical goals and learner autonomy (Sakina et al., 2025). This suggests that AI integration in TEYL must be guided by pedagogy rather than driven solely by technological novelty.

Translating these pedagogical principles into classroom practice requires appropriate instructional frameworks and teacher education preparation. The literature identifies task-based learning, project-based learning, and flipped instruction as suitable pedagogical approaches for AI integration because they encourage learner agency, reflection, and iterative learning (Kasneci et al., 2023; Luckin & Holmes, 2016; Shrestha & Yi, 2025). In GAI-enhanced environments, recommended practices include scaffolded prompt design, constrained creation to support form-meaning mapping, and process-oriented assessment to maintain academic integrity and learning depth (Li & Xu, 2025; UNESCO, 2023). Program-level studies further show that design-oriented and reflective activities enable pre-service teachers to articulate pedagogical rationales, critically evaluate AI outputs, and develop ethical awareness in AI-supported instruction (Bai & Wei, 2023; Willermark, 2025). These findings underscore the importance of preparing pre-service teachers not only to use AI tools but to justify their instructional choices pedagogically.

A coherent theoretical lens for understanding this preparation is provided by the Technological Pedagogical Content Knowledge (TPACK) framework (Koehler & Mishra, 2006; Mishra & Koehler, 2009). TPACK conceptualizes effective technology integration as the intersection of technological, pedagogical, and content knowledge. In the context of AI and GAI, this framework emphasizes teachers' capacity to align AI affordances with learning objectives and learner characteristics, particularly for young learners who require careful mediation and ethical safeguards. Recent studies confirm that TPACK-based interventions strengthen pre-service teachers' instructional design reasoning and ethical awareness in AI integration (Angeli & Valanides, 2009; Shrestha & Yi, 2025; Willermark, 2025). This suggests that TPACK offers a productive analytic framework for examining how AI literacy is enacted in teacher education programs.

## METHODOLOGY

This study employed a qualitative case study design to investigate how Artificial Intelligence (AI) and Generative AI (GAI) literacy were integrated into English teacher education programs for Teaching English to Young Learners (TEYL) in Islamic higher education institutions in Indonesia. A case study approach was selected because it enabled an in-depth and contextualized exploration of a bounded system, including curricula, instructional practices, and participants' experiences (Creswell & Poth, 2018; Yin, 2018). This design was appropriate for addressing the two research questions, which required a detailed understanding of both integration processes and pedagogical practices within their real educational context.

The participants consisted of one lecturer responsible for TEYL-related courses and twenty-five pre-service teachers (PSTs) enrolled in the TEYL course, serving as a compulsory course in the Islamic university. Purposive sampling was applied to ensure that all participants had prior exposure to AI or GAI-related tools or learning activities. This sampling strategy was consistent with qualitative research principles, emphasizing information-rich cases (Patton, 2015). The lecturer provided insights into curriculum planning and pedagogical decision-making, while PSTs contributed perspectives on learning experiences, tool use, and ethical considerations.

Data were collected through semi-structured questionnaires and in-depth interviews. The questionnaire consisted of both closed and open-ended items developed based on the Technological Pedagogical Content Knowledge (TPACK) framework. It explored participants' technological knowledge (TK), pedagogical knowledge (PK), content knowledge (CK), and their intersections, with particular attention to pedagogical strategies and digital tool use in TEYL contexts. The questionnaire addressed both research questions by examining how AI/GAI literacy was integrated and how pedagogical strategies and tools were applied. The questionnaire were administer trough google form to have accessible access. In-depth interviews were conducted to obtain deeper insights into participants' experiences, pedagogical justifications, perceived benefits, and challenges in using AI and GAI. The interview protocol was aligned with the research questions to ensure consistency between the data collection instruments and the analytical focus. The interview session was conducted through the WhatsApp application.

Data analysis followed a thematic analysis procedure guided by Braun and Clarke's (2006) framework. All questionnaire responses and interview transcripts were first read repeatedly for familiarization. Initial codes were generated deductively using

the TPACK domains, followed by inductive coding to capture emerging patterns. The codes were then organized into themes related to (1) AI/GAI literacy integration, (2) pedagogical strategies, (3) digital tools, and (4) ethical considerations. This analytical process allowed the findings to directly address both research questions while remaining grounded in participants' perspectives. To ensure trustworthiness, triangulation was applied across questionnaire and interview data. Peer debriefing and careful documentation of analytical decisions were also conducted in line with Lincoln & Guba (1985) criteria for credibility and dependability. Ethical approval was obtained from the institution. All participants provided informed consent, their identities were anonymized using pseudonyms, and data were securely stored. Participation was voluntary, and participants were informed of their right to withdraw at any stage of the study.

## FINDINGS AND DISCUSSION

### The integration of AI and Generative AI (GAI) literacy into English Teacher Education Programs for teaching English to young learners in the digital age

This section integrates the findings and discussion to present a coherent interpretation of how AI and Generative AI (GAI) literacy are enacted within TEYL-oriented English teacher education. Four overarching patterns emerged from the thematic analysis: (1) AI and GAI literacy are present but implicitly integrated, (2) integration is concentrated at the level of material development rather than pedagogical enactment, (3) pre-service teachers demonstrate emerging technological competence but fragmented pedagogical and ethical understanding, and (4) curricular misalignment and infrastructural constraints limit the development of fully integrated TPACK. These patterns are interpreted below through the TPACK framework and related theories of deep learning and TEYL pedagogy. The table below shows the analysis of TPACK Integration from the questionnaire and the interview.

**Table 1. The analysis of TPACK intersection**

TPACK Intersection	Students (N=25)	Lecturer (N=1)	Illustrative quotes
TCK	AI tools are suitable for teaching children, but they need to be selected carefully with supervision and proper guidance	Applying to two courses, Introduction to TEYL and TEYL Materials Design	<i>Yes, I think AI tools are suitable for teaching English to children because they can make learning more interactive and personalized. AI can provide games, instant feedback, and engaging content that match the child's level and learning style.</i>
TPK	There is guidance in using and selecting AI in teaching, but not specifically in TEYL. The students	AI tools were not explicitly integrated	<i>Some guidance exists, but it's still general.</i>

TPACK Intersection	Students (N=25)	Lecturer (N=1)	Illustrative quotes
	also understand the ethical implication but they still need confirmation from the lecturer		
TPACK	Challenges were found, mostly related to the supporting devices, limited access, and the accuracy of the provided information.	AI is not explicitly encouraged to be used. However, several projects used AI to support it.	<i>Limited internet access, lack of training, and uncertainty about appropriate tools for young learners.</i>
CK & TK	AI was mostly used to find the materials needed for teaching. Meanwhile, ChatGPT, Canva, and Quizizz were the most used AI tools.	Pre-service teachers need to be able to choose the right AI tools and make an appropriate and relevant prompt	<i>Yes, it helps us to create teaching materials</i>
TPCK	In terms of the curriculum, it does not entirely support how to use AI in teaching	Not explicitly applied	<i>Not entirely. The current curriculum has begun to address the use of technology, but AI literacy hasn't been a primary focus. I believe there needs to be more structured learning about how AI works, its potential benefits and risks, and how to use it ethically and effectively in English teaching.</i>

Based on the table, looking from the perspective of Technological Content Knowledge (TCK), most pre-service teachers perceived AI tools as potentially suitable for teaching English to young learners, provided that tool selection is accompanied by supervision and pedagogical guidance. AI use was identified mainly in Introduction to TEYL and TEYL Materials Design, where it supported lesson planning and material preparation rather than classroom interaction. This finding reflects emerging technological awareness at the content level but limited pedagogical mediation. Similar patterns have been reported by Bai and Wei (2023) and Kasneci et al. (2023), who found that pre-service teachers often value AI for efficiency and creativity but lack clear pedagogical rationales for its instructional use. In TEYL contexts, this limitation is particularly critical, as young learners require developmentally appropriate mediation

and carefully scaffolded learning experiences (Cameron, 2001; Pinter, 2017). Without structured pedagogical framing, AI risks being reduced to productivity tool rather than serving as a medium for meaningful language learning.

At the level of Technological Pedagogical Knowledge (TPK), students reported limited guidance on ethical and pedagogical AI use within TEYL courses, with most instruction occurring in a separate AI-focused course. This perception aligns with lecturers' statements that AI was not explicitly embedded in TEYL course design. Such separation reflects what UNESCO (2021) identifies as a common disconnect between ethical AI discourse and subject-specific pedagogy. From a deep learning perspective, this gap weakens learning quality, as deep learning requires reflective judgment, critical evaluation, and metacognitive engagement rather than mere task completion (Kemendikbudristek, 2022; UNESCO, 2023). Holmes et al. (2019) emphasize that ethical AI in education must be enacted through pedagogical design, not merely through abstract awareness. In this study, the absence of guided reflection within TEYL instruction constrained opportunities for students to justify, critique, and refine AI-supported instructional decisions. This finding also shows that the Generative AI literacy was not implemented directly.

Regarding the intersection of Content Knowledge (CK) and Technological Knowledge (TK), pre-service teachers frequently used ChatGPT, Canva, and Quizizz. ChatGPT supported idea generation and lesson planning, Canva facilitated visual and multimodal material design, and Quizizz was used for assessment, particularly with older young learners. These practices demonstrate developing technological agency; however, effective integration depends on aligning tool choice and prompt design with pedagogical intent. This aligns with Willermark's (2025) assertion that meaningful AI use requires teachers to understand not only what tools can do, but why and when they should be used for specific learning purposes. The shared use of Canva by both lecturers and students indicates convergence around its suitability for visual and age-appropriate material design, consistent with TEYL principles emphasizing multimodality and engagement (Shin & Crandall, 2021). However, differences in usage emerge; lecturers mostly use it for presentation and organization, while students use it for creative content. This finding highlights the need for alignment between technological affordances and pedagogical goals. Both the lecturer and pre-service English teacher need to have a clear pedagogical goal before using particular AI tools in order to reach the learning goal.

Several challenges also emerged at the level of Technological Pedagogical Content Knowledge (TPACK), including limited device access, unstable connectivity, and concerns about the accuracy of AI-generated outputs. Although lecturers did not explicitly require AI use, the project-based nature of assignments allowed students to employ AI independently. This pattern illustrates implicit integration: it supports exploration but restricts deeper pedagogical learning due to the absence of structured scaffolding. Mishra and Koehler (2009) argue that TPACK development depends on intentional instructional design rather than incidental tool use. Similarly, Willermark (2025) contends that in the era of Generative AI, pedagogical reasoning must guide technology adoption to prevent superficial integration. In this study, the lack of formal scaffolding limited students' opportunities to connect AI use with instructional goals for young learners.

At the curriculum level, both lecturers and students perceived that AI and GAI integration is not yet systematically articulated in TEYL learning outcomes or assessment criteria. AI use remains dependent on individual initiative rather than curricular design. This finding reinforces Angeli and Valanides' (2009) argument that meaningful technology integration must be curriculum-driven rather than isolated. Without explicit curricular alignment, the development of integrated TPACK is constrained, particularly at the intersection where pedagogy, content, and technology converge. Long and Magerko's (2020) conception of AI literacy further suggests that current practices privilege tool use over critical judgment and ethical reasoning, indicating an incomplete form of literacy development.

Taken together, these findings indicate that AI and GAI literacy exist within TEYL-oriented English teacher education but are pedagogically under-structured. While pre-service teachers actively employ AI to support project-based learning, ethical guidance and pedagogical mediation remain fragmented and externally situated. In the Indonesian context, this limitation is especially consequential given the national emphasis on deep learning, which prioritizes higher-order thinking, reflection, and learner autonomy (Kemendikbudristek, 2022; UNESCO, 2023). The absence of explicit AI integration in TEYL courses risks positioning AI primarily as an efficiency tool rather than as a catalyst for deeper pedagogical transformation. This condition suggests that AI and GAI are currently used at a surface level to motivate learners or prepare materials without strong pedagogical foundations. Strengthening curricular integration and pedagogical support is therefore essential to ensure that AI use promotes deep, reflective, and developmentally appropriate learning for future teachers of young learners.

### **Pedagogical strategies and digital tools currently used to incorporate AI and GAI literacy into pre-service English teacher education**

**Table 2. AI tools used by participants**

AI Tool	Pedagogical Purpose	TEYL Relevance
ChatGPT	Lesson planning, idea generation	Needs teacher mediation
Canva AI	Visual material design	Highly suitable
Quizizz	Formative assessment	Suitable for older YLs

The table above presents the AI and GAI tools reported by participants and their pedagogical purposes in TEYL courses. The data in Table 2 were generated from both questionnaire responses and follow-up interview data. Questionnaire items asked participants to identify which AI tools they used and for what instructional purposes, while interviews were used to clarify how these tools were applied in TEYL-related tasks. The tools were then categorized thematically according to their dominant pedagogical functions: lesson planning and idea generation, visual and material design, and formative assessment.

#### ***AI and GAI literacy for lesson planning and idea generation***

ChatGPT was primarily used by pre-service teacher students to support lesson planning and idea generation. They reported using ChatGPT to generate teaching ideas,

sample dialogues, vocabulary lists, and activity suggestions for teaching young learners. This practice reflects the use of AI as a cognitive support tool in early instructional design stages. However, AI and GAI were not explicitly integrated into TEYL classroom instruction; instead, lecturers allowed AI use mainly for project-based assignments, making AI literacy development largely student-initiated rather than pedagogically structured.

From a TPACK perspective, this pattern indicates emerging Technological Content Knowledge (TCK), as students used AI to generate language-related materials, but limited Technological Pedagogical Knowledge (TPK), since they lacked guided reflection on how these AI-generated ideas should be adapted to young learners' developmental needs (Koehler & Mishra, 2006). This finding supports Angeli and Valanides' (2009) argument that fragmented integration undermines pedagogical coherence and restricts the transformative potential of technology. Previous studies similarly show that novice teachers often treat generative AI as a cognitive collaborator rather than a pedagogical resource, increasing the risk of uncritical reliance on AI outputs (Kasneci et al., 2023; Kohnke et al., 2025).

### *AI and GAI literacy for visual and material design*

In terms of visual and material design, Canva emerged as the most commonly used tool by both lecturers and pre-service teachers. Students used Canva to create flashcards, posters, worksheets, and presentation slides for TEYL projects, while lecturers mainly used it to structure instructional presentations. This convergence suggests shared recognition of Canva's suitability for TEYL due to its visual and multimodal affordances, which align with principles of young learner pedagogy emphasizing imagery, playfulness, and engagement (Shin & Crandall, 2021).

Nevertheless, the pedagogical purposes differed. Lecturers used Canva primarily as an assistive tool for content delivery, whereas students used it as a creative design platform. This divergence illustrates uneven TPACK development: lecturers demonstrated stronger Technological Pedagogical Knowledge (TPK), while students displayed exploratory Technological Content Knowledge (TCK). Holmes et al. (2019) caution that when technology use focuses mainly on production rather than pedagogical reasoning, learning risks becoming efficiency-driven rather than meaning-oriented. Without explicit instructional framing, even developmentally appropriate tools such as Canva may fail to support deep learning.

### *AI and GAI literacy for formative assessment*

Quizizz was mainly used by pre-service teachers to conduct formative assessment, particularly for older young learners. Students used it to design quizzes for vocabulary and comprehension checks, reflecting an attempt to integrate AI-enhanced tools into assessment practices. This aligns with previous findings that gamified digital platforms can enhance motivation and provide immediate feedback when pedagogically mediated (Shin & Crandall, 2021; Chen, 2025). In terms of lectures, there was no data mentioned that it was used. However, the absence of structured guidance from the lecturer on assessment design limited the pedagogical depth of this practice. From a deep learning perspective, formative assessment should promote reflection and conceptual understanding rather than only performance outcomes (Kemendikbudristek, 2022;

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UNESCO, 2023). Without explicit scaffolding, Quizizz functioned primarily as a technical tool rather than as part of a reflective assessment strategy.

Both lecturers and pre-service teachers agreed that the curriculum does not yet systematically support AI and GAI literacy integration in TEYL courses. This confirms Angeli and Valanides' (2009) argument that meaningful technology integration requires curriculum-level coherence rather than isolated instructional practices. Within the TPACK framework, the lack of explicit curricular alignment constrains development at the full TPACK intersection, where pedagogy, content, and technology should converge.

Nevertheless, students' proactive use of AI indicates institutional readiness that can be pedagogically harnessed. As Mishra and Koehler (2009) argue, TPACK development is iterative and design-based. Embedding AI literacy explicitly into TEYL courses through guided prompt design, reflective justification of AI use, and ethical discussion has the potential to strengthen pedagogical reasoning, professional identity, and developmentally appropriate instructional practices for future English teachers of young learners.

## CONCLUSION

Based on the findings, it can be concluded that AI and Generative AI (GAI) literacy in English teacher education programs for young learners is present but remains implicitly integrated within TEYL courses. Although pre-service teachers frequently used AI tools for lesson planning, material design, and assessment, these practices were not supported by explicit curricular objectives or structured pedagogical guidance. From a TPACK perspective, this condition indicates emerging Technological Knowledge (TK) and Technological Content Knowledge (TCK), while Technological Pedagogical Knowledge (TPK) and integrated TPACK remain limited. Project-based learning served as the primary pedagogical strategy enabling AI use, with tools such as ChatGPT for idea generation, Canva for visual material design, and Quizizz for formative assessment. However, differences in tool use between lecturers and pre-service teachers and the absence of explicit instructional design reveal fragmented integration.

This misalignment is particularly significant in relation to Indonesia's deep learning agenda, which emphasizes reflective judgment and meaningful learning. The findings underscore the importance of integrating AI literacy at the curriculum level within TEYL courses through scaffolded tasks, reflective AI use, and ethical discussions, thereby supporting developmentally appropriate and pedagogically grounded teaching practices.

## REFERENCES

- Angeli, C., & Valanides, N. (2009). Epistemological and methodological issues for the conceptualization, development, and assessment of ICT-TPCK. *Computers & Education*, 52(1), 154–168. <https://doi.org/10.1016/j.compedu.2008.07.006>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Cameron, L. (2001). *Teaching languages to young learners*. Cambridge University Press.
- Chen, Z., Wei, W., & Zou, D. (2025). Generative AI technology and language learning: global language learners' responses to ChatGPT videos in social media. *Interactive Learning Environments*, 1–14. <https://doi.org/10.1080/10494820.2025.2511248>

- Mulyaningsih, D. U., & Rohadi, T. (2025). Integrating AI and Generative AI Literacy in English Teacher Education For Young Learners. *Journal of English Pedagogy and Applied Linguistics (JEPAL)*, 6(2), pp.276-288. <https://doi.org/10.32627/jepal.v6i2.1838>
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Sage.
- Holmes, W., Bialik, M., & Fadel, C. (2019). Artificial intelligence in education: Promises and implications for teaching and learning. *Center for Curriculum Redesign*.
- Kasneji, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., Gasser, U., Groh, G., Günemann, S., & Hüllermeier, E. (2023). ChatGPT for good? On opportunities and challenges of large language models for education. *Learning and Individual Differences*, 103. <https://doi.org/https://doi.org/10.1016/j.lindif.2023.102274>
- Kemendikbudristek. (2022). *Kurikulum Merdeka dan pembelajaran mendalam*. Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia.
- Koehler, M. J., & Mishra, P. (2006). What happens when teachers design educational technology? The development of technological pedagogical content knowledge. *Teachers College Record*, 108(6), 1017-1054. <https://doi.org/https://doi.org/10.1111/j.1467-9620.2006.00684.x>
- Kohnke, L., Zou, D., & Xie, H. (2025). Microlearning and generative AI for pre-service teacher education: a qualitative case study. *Education and Information Technologies*, 1-28. <https://doi.org/https://doi.org/10.1007/s10639-025-13606-5>
- Lee, S. (2025). Generative AI in the language classroom: A systematic review. *Interactive Learning Environments*. <https://doi.org/https://doi.org/10.1080/10494820.2025.2498537>
- Li, B., & Xu, X. (2025). A systematic review of empirical generative AI research in language learning and teaching (2023-2024). *Computers and Education: Artificial Intelligence*, 6. <https://doi.org/https://doi.org/10.1016/j.caeai.2025.100208>
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Sage.
- Long, D., & Magerko, B. (2020). *What is AI literacy? Competencies and design considerations BT - Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. 1-16. <https://doi.org/10.1145/3313831.3376727>
- Luckin, R., & Holmes, W. (2016). *Intelligence unleashed: An argument for AI in education*.
- Mishra, P., & Koehler, M. J. (2009). What is technological pedagogical content knowledge (TPACK)? *Contemporary Issues in Technology and Teacher Education*, 9(1), 60-70.
- Patton, M. Q. (2015). *Qualitative research and evaluation methods* (4th ed.). Sage.
- Pinter, A. (2017). *Teaching young language learners* (2nd ed.). Oxford University Press.
- Shin, J. K., & Crandall, J. (2021). *Teaching young learners English: From theory to practice*. National Geographic Learning.
- Sakina, R., Mareta, F., Ridwan, R. N., & Nugraha, M. A. (2025). The role of HelloTalk in English education students' autonomous speaking. *Biormatika: Jurnal Ilmiah Fakultas Keguruan dan Ilmu Pendidikan*, 11(2), 95-108.
- Shrestha, S., & Yi, J. J. (2025). *Pre-service teachers' perceptions of adopting generative AI tools in instruction: Insights from a TPACK-based workshop BT - Proceedings of SITE 2025*.
- UNESCO. (2021). *AI and education: Guidance for policy-makers*. UNESCO Publishing.
- UNESCO. (2023). *Guidance for generative AI in education and research*. UNESCO Publishing.
- Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Harvard University Press.
- Weng, Y., & Fu, Y. (2025). Generative AI in language education: Bridging divides and

Mulyaningsih, D. U., & Rohadi, T. (2025). Integrating AI and Generative AI Literacy in English Teacher Education For Young Learners. *Journal of English Pedagogy and Applied Linguistics (JEPAL)*, 6(2), pp.276-288. <https://doi.org/10.32627/jepal.v6i2.1838>

fostering inclusivity. *International Journal of Technology in Education*, 8(2), 395-420. <https://doi.org/https://doi.org/10.46328/ijte.1056>

Willermark, S. (2025). Why TPACK matters in the era of generative AI. *Education and Information Technologies*. <https://doi.org/https://doi.org/10.1016/j.ssaho.2025.101893>

Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education. *International Journal of Educational Technology in Higher Education*, 16, 39. <https://doi.org/10.1186/s41239-019-0171-0>