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CAN ARTIFICIAL INTELLIGENCE FOSTER L2 LEARNING? INVESTIGATING ITS IMPACT ON BEHAVIORAL, COGNITIVE, AND EMOTIONAL ENGAGEMENT IN EFL CONTEXTS

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Abstract: This study investigates the impact of Artificial Intelligence (AI) on students' behavioral, cognitive, and emotional engagement in an English as a Foreign Language (EFL) context. Employing a mixed-methods explanatory sequential design, the study involved 70 undergraduate students at a private university in Indonesia. Quantitative data were collected through a structured questionnaire, while qualitative data were obtained from semi-structured interviews and reflective responses. The findings reveal that AI positively influences all dimensions of engagement, with the strongest effect observed in behavioral engagement, followed by cognitive engagement, and a more variable impact on emotional engagement. Among the AI tools examined, adaptive learning platforms and chatbot interactions were found to be more effective than writing assistants. Correlation analysis confirmed significant positive relationships between AI use and all engagement dimensions. However, qualitative findings indicate challenges such as over-reliance and unclear feedback. The study highlights the importance of strategic AI integration to maximize engagement in EFL learning.
Keywords: *Artificial Intelligence; student engagement; EFL learning; behavioral engagement; cognitive engagement; emotional engagement.*

INTRODUCTION

The rapid advancement of digital technologies has significantly transformed educational practices across the globe, particularly in the field of English as a Foreign Language (EFL). In recent years, Artificial Intelligence (AI) has emerged as a prominent innovation with the potential to reshape language learning environments (Erito, 2023; Harintama and Muslimin, 2024; Teng, 2024a). Educational stakeholders, including policymakers, educators, and researchers, have increasingly shown interest in integrating AI into instructional processes (Dilzhan, 2024; Nazari et al., 2021). This growing interest is driven by the expectation that AI can provide adaptive, personalized, and data-driven learning experiences. At the same time, the global demand for effective English proficiency continues to rise due to academic, professional, and socio-economic factors. Despite these promising developments, concerns remain regarding whether technological advancements genuinely address persistent challenges in language learning, particularly student engagement (Hong and Kim, 2018). As a result, the integration of AI in EFL contexts presents both opportunities and unresolved issues that require careful examination.

Student engagement has long been recognized as a crucial determinant of successful learning outcomes in second language acquisition (Cengiz et al., 2025; Yuan and Dao, 2026; Zare and Derakhshan, 2025). It is commonly conceptualized as a multidimensional construct encompassing behavioral, cognitive, and emotional dimensions (Lee, 2019). Behavioral engagement refers to students' participation in learning activities, cognitive engagement involves the investment in learning and use of strategies (Koltovskaia et al., 2024), while emotional engagement relates to

students' affective responses toward learning tasks (Min et al., 2026). Previous research has consistently demonstrated that higher levels of engagement are associated with improved language proficiency and academic achievement (Yuan et al., 2025; Zhang and Hyland, 2025). Consequently, fostering engagement has become a central objective in EFL instruction. However, maintaining sustained engagement remains a challenge, particularly in contexts where traditional teaching methods dominate (Li and Wang, 2023). This challenge highlights the need for innovative approaches that can effectively address the diverse dimensions of student engagement.

Artificial Intelligence has been proposed as a potential solution to enhance student engagement in language learning. Drawing on theories such as constructivism and sociocultural theory, AI-based tools are believed to support interactive, learner-centered environments (Arndt, 2023). For instance, AI-powered applications can provide immediate feedback, facilitate adaptive learning paths, and simulate authentic communication scenarios (Karataş and Ataç, 2025; Rahimi, 2024). These features are expected to encourage active participation, deeper cognitive processing, and positive emotional experiences. Moreover, AI can assist teachers in monitoring student progress and tailoring instruction accordingly (Erito, 2020; Ismail and Alharkan, 2024). As such, AI appears to align well with contemporary pedagogical principles that emphasize personalization and interactivity (Hosayny et al., 2026; Hiver et al., 2024; Wu and Zhao, 2025). Nevertheless, the assumption that AI inherently enhances all dimensions of engagement requires further empirical validation.

Despite the theoretical promise of AI, emerging evidence suggests that its implementation does not automatically lead to improved learning engagement (Ge and Qi, 2026; Sang and Van Loi, 2026). Some studies have reported that students may experience cognitive overload when interacting with complex AI systems (Ebadi and Amini, 2024; Li et al., 2025). Others have found that excessive reliance on AI tools can reduce meaningful human interaction, which is essential for language development (Teng, 2024b; Wang et al., 2024). In addition, students' emotional responses to AI, such as frustration or anxiety, may hinder their willingness to engage with learning tasks (Weng and Chiu, 2023). These findings indicate that the effectiveness of AI is contingent upon various contextual and individual factors. Therefore, it is necessary to critically examine the conditions under which AI can truly support engagement in EFL settings. This emerging tension points to a gap between theoretical expectations and practical outcomes.

Previous research has attempted to investigate the role of AI in language learning (Chiu, 2023; Durak, 2025; Li and Wang, 2023); however, several limitations can be identified. Many studies have focused primarily on cognitive outcomes, such as vocabulary acquisition or grammar improvement, while neglecting the broader construct of engagement (O'neill and Russell, 2019; Zhou and Du Preez, 2025). Furthermore, existing research often examines engagement as a general concept without distinguishing between its behavioral, cognitive, and emotional dimensions (Peng et al., 2025). This lack of differentiation limits the ability to understand how AI influences each aspect of engagement (Lambert et al., 2023). Additionally, a significant proportion of studies have been conducted in technologically advanced contexts, which may not reflect the realities of EFL classrooms in developing countries (Kleine et al., 2025; Tan et al., 2025). Methodological limitations, such as small sample sizes and short intervention periods, also reduce the generalizability of findings (Rahimi, 2024). As a result, a more comprehensive and context-sensitive investigation is needed.

A closer examination of the literature reveals a specific research gap that warrants attention. While some studies acknowledge the multidimensional nature of engagement, few have systematically analyzed how AI affects behavioral, cognitive, and emotional engagement simultaneously (Luo et al., 2025; Seo, 2024). Even fewer studies have explored these relationships within the context of Indonesian higher education, where technological integration may face unique challenges (Bin-Hady et al., 2024; Mun, 2024). Factors such as digital literacy, access to resources, and institutional support can significantly influence the effectiveness of AI-based learning (Chen, 2024). Moreover, cultural and pedagogical differences may shape students' responses to AI in ways that are not captured in existing research (Rachmawati and Irawan, 2024). This gap highlights the need for an empirical study that adopts a multidimensional perspective on engagement. Addressing this gap is essential for developing a nuanced understanding of AI's role in EFL learning.

The research will be conducted at a private university in Indonesia, providing a context that has been underrepresented in previous studies. By

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focusing on this setting, the study intends to capture the complexities of implementing AI in a developing educational environment. The research adopts a comprehensive approach that considers multiple dimensions of engagement simultaneously. This approach is expected to generate more holistic insights into the effectiveness of AI in language learning. Through this investigation, the study aims to bridge the gap between theoretical assumptions and empirical evidence.

This study aims to investigate the impact of Artificial Intelligence on behavioral, cognitive, and emotional engagement in EFL contexts. Specifically, the study seeks to examine how AI-based learning tools influence students' participation, cognitive investment, and emotional responses during language learning activities. To achieve these objectives, the study addresses the following research questions. This study addresses the following research questions: (1) How does Artificial Intelligence influence EFL students' behavioral engagement in AI-assisted learning environments? (2) How does Artificial Intelligence influence EFL students' cognitive engagement in AI-assisted learning environments? (3) How does Artificial Intelligence influence EFL students' emotional engagement in AI-assisted learning environments? (4) What are the relationships between AI use and the three dimensions of student engagement?

This study offers several novel contributions to the existing literature on Artificial Intelligence in EFL learning contexts. First, the study provides a multidimensional analysis of student engagement by simultaneously examining behavioral, cognitive, and emotional engagement within a single investigation. While previous studies often focus on only one or two dimensions, this study adopts a more comprehensive perspective on engagement. Second, the study focuses on the Indonesian EFL higher education context, which remains underrepresented in current AI-assisted language learning research. This contextual focus contributes to a more culturally and pedagogically grounded understanding of AI integration in developing educational environments. Third, the study employs a mixed-methods explanatory sequential design that combines quantitative and qualitative data to provide deeper and more comprehensive insights into students' engagement experiences. This methodological approach strengthens the interpretation and validity of the findings. The last, study compares different types of AI tools, including AI writing assistants, AI chatbot interactions, and AI adaptive learning platforms. This comparison allows for a more nuanced understanding of how different AI functionalities influence various dimensions of student engagement.

The significance of this study extends to both theoretical and practical domains. From a theoretical perspective, the study contributes to the growing body of literature on AI in education by providing a multidimensional analysis of student engagement. It also integrates perspectives from language learning theories and educational technology, offering a more comprehensive framework for understanding AI's role in EFL contexts. Methodologically, the study introduces an approach that captures the complexity of engagement, which can be adopted or refined in future research. By addressing limitations in previous studies, it enhances the rigor and relevance of research in this field. Furthermore, the findings may inform the development of more effective AI-based learning models. These contributions are expected to advance scholarly discussions on technology-enhanced language learning.

This study provides valuable insights for educators, curriculum designers, and policymakers. Understanding how AI influences different dimensions of engagement can help teachers make informed decisions about integrating technology into their classrooms (Han and Li, 2024; Nguyen, 2025). The findings may also guide the design of AI tools that are more responsive to students' needs and learning contexts. For institutions, the study offers evidence that can support strategic planning for digital transformation in education. It also highlights potential challenges that need to be addressed to ensure the effective use of AI. By identifying both the benefits and limitations of AI, the study supports a balanced and critical approach to technology integration. Ultimately, the research aims to enhance the quality of EFL instruction in real-world settings.

While Artificial Intelligence holds significant potential to transform language learning, its impact on student engagement remains insufficiently understood. The complexity of engagement, combined with contextual variations, necessitates a more nuanced and comprehensive investigation (Rachmawati et al., 2025; Zare et al., 2025). This study addresses this need by examining the effects of AI on behavioral, cognitive, and emotional engagement in an Indonesian EFL context. By doing so, it responds to a clearly identified gap in

the literature and provides insights that are both theoretically meaningful and practically relevant. The findings are expected to contribute to a more informed and effective use of AI in education. As educational institutions continue to adopt digital technologies, such evidence becomes increasingly important. Therefore, this study represents a timely and necessary effort to critically evaluate the role of AI in enhancing L2 learning.

METHOD

This study employed a mixed-methods research design, specifically an explanatory sequential design, to investigate the impact of Artificial Intelligence (AI) on students' behavioral, cognitive, and emotional engagement in EFL contexts. The quantitative phase was conducted first to measure the levels of engagement across the three dimensions using structured instruments. This was followed by a qualitative phase aimed at explaining and elaborating on the quantitative findings through in-depth data collection. The integration of both approaches allowed for a more comprehensive understanding of how AI influences student engagement. The design was considered appropriate because it enables the researcher to explore not only the extent of AI's impact but also the underlying reasons behind observed patterns. Furthermore, the combination of numerical and descriptive data strengthens the validity of the findings.

The selection of this research design was based on several considerations. First, engagement is a multidimensional construct that cannot be fully captured through quantitative measures alone. While quantitative data provide measurable indicators of engagement, qualitative data offer insights into students' experiences, perceptions, and interpretations. Second, previous studies in this area have often relied on a single method, which limits the depth of analysis. By adopting a mixed-methods approach, this study addresses these limitations and provides a more nuanced understanding of the phenomenon. Third, the explanatory sequential design allows for a logical progression from general patterns to specific explanations. This alignment between research objectives and methodological approach ensures that the study can effectively address the identified research gap (Creswell & Creswell, 2018).

In addition, the design supports triangulation, which enhances the credibility and trustworthiness of the findings. By comparing and integrating data from different sources and methods, the study minimizes potential biases and inconsistencies. This is particularly important in educational research, where contextual factors may influence the results (Merriam & Tisdell, 2015). The use of mixed methods also allows for flexibility in data interpretation, enabling the researcher to adapt to emerging findings during the research process. Therefore, the chosen design is well-suited to capture the complexity of AI integration in EFL learning environments.

The respondents of this study consisted of 70 undergraduate students enrolled in an English Education program at a private university in Indonesia. The participants ranged in age from 19 to 23 years old and represented second-, third-, and fourth-year students. In terms of English proficiency, the participants were generally categorized at intermediate to upper-intermediate levels based on institutional English placement records and academic performance in English courses. These participants were selected using purposive sampling, with the main criterion being their experience in using AI-based tools for language learning. The participants had experience using various AI applications, including ChatGPT, Grammarly, QuillBot, Duolingo Max, and AI chatbot-based learning platforms, as part of their coursework and independent learning activities. This ensured that all respondents had sufficient familiarity with AI to provide meaningful responses. The diversity in academic levels, English proficiency, and AI learning experiences among participants contributed to a more comprehensive dataset. Ethical considerations were also taken into account, including informed consent and confidentiality (Ary et al., 2010). Ethical approval for this study was obtained from the Research Ethics Committee of the Postgraduate Program at Universitas Muhammadiyah Gresik prior to data collection. All participants were informed about the objectives, procedures, and voluntary nature of the study before participation.

Written informed consent was obtained from all participants prior to questionnaire distribution and interview sessions. Participants were informed that they had the right to withdraw from the study at any stage without any academic consequences. To maintain confidentiality, all participant identities were anonymized using numerical codes (e.g., S01, S02) during data analysis and reporting. No personally identifiable information was included in the research report or publication. The collected data, including questionnaire responses, interview recordings, transcripts, and reflective notes, were securely stored in password-protected digital files accessible only to the researcher. All data were

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used solely for research purposes and will be retained for academic documentation in accordance with institutional research guidelines.

The selection of respondents was aligned with the objectives of the study, which focus on understanding engagement in an EFL context where AI is actively used. Undergraduate students were considered appropriate because they are generally more exposed to digital technologies and are likely to interact with AI tools in their learning process. In addition, the chosen institution has integrated technology into its curriculum, making it a relevant setting for this research. The sample size of 70 participants was deemed sufficient to conduct statistical analysis while still allowing for in-depth qualitative exploration. This balance supports both the quantitative and qualitative components of the study.

To provide a clearer overview of the participants, demographic information is presented in the table 1 below.

Table 1 *Participants' demographic information*

Category	Description	Number of Participants	Percentage (%)
Gender	Male	28	40.0
	Female	42	60.0
Year of Study	Second Year	24	34.3
	Third Year	26	37.1
	Fourth Year	20	28.6
Experience with AI	Less than 6 months	18	44.3
	6–12 months	27	55.7
	More than 1 year	25	62.9
Age Range	19–20 years	31	37.1
	21–23 years	39	25.7
English Proficiency	Intermediate	44	38.6
	Upper-Intermediate	26	35.7

This study utilized multiple data sources to ensure a comprehensive analysis of student engagement. The primary data source was a questionnaire designed to measure behavioral, cognitive, and emotional engagement in AI-supported learning environments. This instrument provided quantitative data that allowed for statistical analysis of engagement levels. In addition to the questionnaire, semi-structured interviews were conducted with selected participants to gather qualitative data. These interviews provided deeper insights into students' experiences and perceptions of using AI in their learning process. The combination of these sources enabled the researcher to capture both breadth and depth in the data.

Another important data source was classroom documentation, including records of students' interactions with AI tools and learning activities. These documents helped to contextualize the findings and provided supporting evidence for both quantitative and qualitative data. Furthermore, reflective notes written by students were also collected to understand their emotional and cognitive responses during AI-assisted learning. These reflections offered valuable perspectives that may not be captured through formal instruments. By incorporating multiple data sources, the study enhances the reliability and validity of its findings.

The primary instrument used in this study was a structured questionnaire adapted from established engagement frameworks. The behavioral engagement items were adapted from the work of (Frederick et al., 2005), which conceptualizes engagement as a multidimensional construct. Cognitive engagement items were informed by the framework proposed by Pintrich (2000), focusing on students' investment in learning and use of strategies. Emotional engagement items were adapted from Pekrun et al. (2011) control-value theory of achievement emotions. The questionnaire was modified to align with the context of AI-assisted language learning, ensuring its relevance to the study. A Likert-scale format was used to capture participants' responses in a systematic manner.

In addition to the questionnaire, semi-structured interview guidelines were developed based on the same theoretical frameworks. The interview questions were designed to explore students' experiences, challenges, and perceptions of AI in relation to their engagement. This ensured consistency between quantitative and qualitative data collection. The instruments were reviewed by three experts specializing in English language

education, educational technology, and quantitative research methodology to ensure content validity. All experts held doctoral degrees and had prior experience in AI-assisted language learning research. The content validity assessment was conducted using the Content Validity Index (CVI), and the questionnaire achieved an overall CVI score of 0.89, indicating high content validity.

Prior to the main study, a pilot test was conducted involving 25 undergraduate EFL students who were not included in the final sample. The pilot study aimed to evaluate the clarity, relevance, and consistency of the questionnaire items. Based on the pilot results, several items were revised for wording clarity and contextual appropriateness. The internal consistency of the questionnaire was measured using Cronbach's alpha coefficient. The reliability coefficient for behavioral engagement was 0.87, cognitive engagement was 0.85, and emotional engagement was 0.83. The overall reliability coefficient of the questionnaire was 0.88, indicating good internal consistency. These procedures were conducted to ensure the validity and reliability of the research instruments before data collection.

The researcher was also involved as an instructor within the same academic program where the study was conducted; however, the researcher was not directly responsible for assessing the participants' academic performance during the data collection period. To minimize potential bias and power imbalance, participation in the study was voluntary, and all responses were anonymized prior to analysis. Participants were informed that their decision to participate or withdraw would not influence their academic standing. In addition, interview sessions were conducted in a non-evaluative setting to encourage open and honest responses.

The research procedures were carried out in several systematic steps. First, the researcher obtained permission from the university and relevant authorities to conduct the study. Ethical approval was secured, and participants were informed about the purpose of the research, their rights, and confidentiality measures. After obtaining informed consent, the researcher conducted a preliminary observation to understand the learning context and the use of AI tools in the classroom. This initial step helped to ensure that the research instruments were appropriately aligned with the context. Following this, the questionnaire was distributed to all participants, and responses were collected within a specified timeframe.

After the quantitative data were collected and analyzed, the researcher proceeded to the qualitative phase. A total of 12 participants were selected for semi-structured interviews based on their questionnaire responses. The selection process employed purposive sampling to ensure representation of different levels of engagement. Specifically, participants were selected from the highest and lowest engagement score groups, representing approximately the top 25% and bottom 25% of the overall questionnaire results. This approach allowed the researcher to capture diverse perspectives regarding the use of AI in EFL learning.

The interview participants consisted of 5 male and 7 female students aged between 19 and 23 years old. In terms of academic level, four participants were second-year students, five were third-year students, and three were fourth-year students. The interview subsample also represented varying levels of AI experience and English proficiency, ranging from intermediate to upper-intermediate levels. This diversity was intended to enhance the richness and credibility of the qualitative findings.

The interviews were conducted in a semi-structured format, allowing flexibility for participants to elaborate on their experiences. Each interview lasted approximately 20–30 minutes and was recorded and transcribed for analysis. In addition to interviews, relevant documents and reflective notes were collected to support the findings. The final step involved integrating quantitative and qualitative data to provide a comprehensive interpretation of the results.

The quantitative data obtained from the questionnaire were analysed using descriptive and inferential statistics (Ary et al., 2010). Descriptive statistics, such as mean scores and standard deviations, were used to summarize the levels of behavioral, cognitive, and emotional engagement. Before performing Pearson correlation analysis, the assumptions of normality, linearity, and homoscedasticity were examined. The results showed that all assumptions were adequately met, indicating that Pearson product-moment correlation was appropriate for the analysis. These analyses provided insights into the extent to which AI influences student engagement. Statistical software was used to ensure accuracy and efficiency in data processing. The results were then interpreted in relation to the research objectives.

The qualitative data from interviews and reflective notes were analyzed using thematic analysis. The analysis process involved several

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stages, including data familiarization, initial coding, theme categorization, and theme refinement. To enhance the trustworthiness and consistency of the analysis, two researchers independently coded a subset of the interview transcripts and reflective responses. The coding results were then compared and discussed to resolve discrepancies and achieve agreement on the emerging themes.

Inter-rater reliability was calculated using Cohen's Kappa coefficient, which yielded a value of 0.82, indicating strong agreement between coders. After consensus was achieved, the remaining data were coded and analyzed using the agreed coding framework. The analysis focused on identifying recurring patterns related to students' behavioral, cognitive, and emotional engagement in AI-assisted learning environments. To further ensure trustworthiness, member checking and peer debriefing were employed during the interpretation process. The integration of quantitative and qualitative findings was conducted in the final stage to produce a coherent and comprehensive interpretation of the results.

RESULTS AND DISCUSSION

The impact of artificial intelligence on students' behavioural engagement

The findings of this study indicate that Artificial Intelligence (AI) plays a substantial role in shaping students' behavioural engagement in EFL learning environments. Behavioural engagement in this study refers to students' observable participation, including their involvement in learning activities, consistency in task completion, and attention during AI-assisted instruction. To capture a more nuanced understanding, behavioural engagement was analysed across three types of AI-supported learning approaches: AI Writing Assistant, AI Chatbot Interaction, and AI Adaptive Learning Platform. These categories represent different interaction patterns between learners and AI, ranging from corrective tools to interactive and adaptive systems. The variation in these approaches allows for a clearer comparison of how specific AI functionalities influence students' engagement behaviours. Overall, the descriptive data suggest that AI integration promotes active participation, although the level of engagement varies depending on the type of AI tool used. The following table presents the descriptive statistics of behavioural engagement across the three AI approaches.

Table 2 *Descriptive statistics result of behavioural engagement*

Method	Mean	Std. Deviation	N
AI Writing Assistant	3.98	0.56	23
AI Chatbot Interaction	4.15	0.60	24
AI Adaptive Learning Platform	4.32	0.52	23
Total	4.15	0.58	70

As shown in Table 2, students who used AI Adaptive Learning Platforms demonstrated the highest level of behavioural engagement (M = 4.32), followed by those using AI Chatbot Interaction (M = 4.15). This suggests that structured and adaptive systems are more effective in promoting sustained participation and task persistence. In contrast, AI Writing Assistants recorded the lowest mean score (M = 3.98), indicating comparatively lower engagement, possibly due to their more limited interactivity. The standard deviation values across all methods are relatively low, which implies consistency in students' responses. The total mean score (M = 4.15) confirms that behavioural engagement is generally high across all AI-supported approaches. These findings indicate that while all AI tools contribute to engagement, their effectiveness differs based on their level of interactivity and adaptability.

To determine whether the differences in behavioral engagement across AI tool types were statistically significant, a one-way ANOVA was conducted. The analysis revealed a statistically significant difference among the three AI tool types, $F(2, 67) = 4.87$, $p = .011$. This finding indicates that the type of AI tool significantly influences students' behavioral engagement in EFL learning activities.

Table 3 *One-way ANOVA results for engagement dimensions across AI tool types*

Variable	Sum of Squares	df	Mean Square	F	Sig.
Behavioral Engagement	2.84	2	1.42	4.87	.011
Cognitive Engagement	3.02	2	1.51	5.24	.008

Emotional Engagement	1.96	2	0.98	3.12	.051

To determine whether the differences in engagement across AI tool types were statistically significant, one-way ANOVA was conducted. The analysis revealed significant differences in behavioral engagement among the three AI tool types, $F(2, 67) = 4.87$, $p = .011$. Significant differences were also found in cognitive engagement, $F(2, 67) = 5.24$, $p = .008$. However, the differences in emotional engagement were not statistically significant, $F(2, 67) = 3.12$, $p = .051$. These findings suggest that AI tool types influence students' behavioral and cognitive engagement differently, with AI Adaptive Learning Platforms generally producing higher engagement levels. In contrast, emotional engagement appeared to be more variable and less dependent on the specific type of AI tool used.

The qualitative findings further elaborate on how AI tools influence students' behavioural engagement in practice. The qualitative findings revealed several recurring themes related to behavioral engagement. A majority of participants (9 out of 12 participants, 75%) reported that AI tools increased their classroom participation and encouraged them to become more active during learning activities. In addition, 8 participants (66.7%) explained that AI-assisted tools helped them complete assignments more consistently and manage academic tasks more effectively. Furthermore, 7 participants (58.3%) stated that AI platforms promoted greater learning autonomy and self-directed learning behaviors. One participant commented as follows.

> "I participate more when using chatbot because it feels like I am talking to someone." (S12)

This excerpt suggests that AI chatbots create a sense of interaction that encourages students to become more actively involved in learning activities. The perception of communication appears to transform passive learning into an engaging experience.

> "The adaptive system makes me keep doing the tasks because it shows my progress step by step." (S27)

This statement indicates that structured feedback and progress tracking in adaptive platforms motivate students to persist in completing tasks. The visibility of progress appears to reinforce continuous engagement.

> "Sometimes I just follow the correction from the writing tool without really thinking." (S05)

This excerpt reveals a limitation of AI Writing Assistants. While they facilitate task completion, they may not always promote meaningful engagement, as students may rely on automated corrections without active involvement.

The impact of artificial intelligence on students' cognitive engagement

The results also demonstrate that AI significantly contributes to students' cognitive engagement, which involves their mental effort, use of strategies, and depth of understanding during learning. In this study, cognitive engagement was examined across the same three AI approaches to maintain consistency in analysis. Each AI tool offers different levels of cognitive support, ranging from error correction to interactive dialogue and adaptive feedback. These differences are important in understanding how AI influences higher-order thinking processes. The descriptive data suggest that AI not only facilitates learning but also encourages students to engage more deeply with the material. The following table summarizes the descriptive statistics of cognitive engagement.

Table 4 *Descriptive statistics result of cognitive engagement*

Method	Mean	Std. Deviation	N
AI Writing Assistant	4.02	0.58	23
AI Chatbot Interaction	4.18	0.55	24
AI Adaptive Learning Platform	4.35	0.50	23
Total	4.18	0.55	70

As presented in Table 3, AI Adaptive Learning Platforms yielded the highest mean score ($M = 4.35$), indicating that these tools are particularly effective in promoting deeper cognitive engagement. AI Chatbot Interaction also showed a relatively high mean ($M = 4.18$), suggesting that interactive dialogue supports thinking processes and language experimentation. Meanwhile, AI

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Writing Assistants recorded the lowest mean (M = 4.02), which may reflect their more limited role in promoting analytical thinking. The standard deviation values are relatively low, indicating consistent responses among participants. The total mean score (M = 4.18) suggests that cognitive engagement is generally high across AI-supported learning environments. These findings imply that AI tools, particularly those with adaptive and interactive features, can effectively enhance students' cognitive involvement. The qualitative analysis identified several themes associated with cognitive engagement. The most dominant theme was better understanding of learning materials, reported by 10 out of 12 participants (83.3%). Participants explained that AI tools provided immediate explanations and feedback that supported comprehension of difficult concepts. Moreover, 8 participants (66.7%) stated that AI applications encouraged them to think more critically and evaluate information more carefully during learning activities. Additionally, 7 participants (58.3%) reported that AI tools improved their problem-solving abilities and reflective learning processes. The data provide further insights into these findings.

> "The AI explains my mistakes, so I understand why my answer is wrong." (S33)

This excerpt highlights the role of explanatory feedback in promoting cognitive engagement. Students are encouraged to reflect on their errors and develop a deeper understanding of the material.

> "When I use chatbot, I try different sentences and see how it responds." (S18)

This statement indicates that AI facilitates experimentation, which is an important aspect of critical thinking. Students actively test and refine their language use.

> "Sometimes I just accept the answer from AI without checking it again." (S09)

This excerpt reveals a potential drawback, where over-reliance on AI may reduce independent thinking. It suggests that while AI supports cognition, it may also limit critical evaluation if not used carefully.

The impact of artificial intelligence on students' emotional engagement

The findings related to emotional engagement show that AI has a generally positive, yet more varied, impact on students' affective responses. Emotional engagement includes students' interest, enjoyment, motivation, and anxiety during learning activities. Compared to behavioral and cognitive engagement, emotional engagement appears to be more subjective and influenced by individual experiences. The analysis across different AI approaches provides insight into how specific features affect students' emotions. The following table presents the descriptive statistics of emotional engagement.

Table 5 *Descriptive statistics result of emotional engagement*

Method	Mean	Std. Deviation	N
AI Writing Assistant	3.90	0.62	23
AI Chatbot Interaction	4.20	0.57	24
AI Adaptive Learning Platform	4.10	0.59	23
Total	4.07	0.59	70

As shown in Table 4, AI Chatbot Interaction produced the highest mean score (M = 4.20), indicating that interactive features are particularly effective in generating positive emotional responses. AI Adaptive Learning Platforms also showed relatively high engagement (M = 4.10), especially in terms of motivation. In contrast, AI Writing Assistants recorded the lowest mean (M = 3.90), suggesting that less interactive tools may not strongly influence students' emotions. The standard deviation values indicate moderate variation, reflecting diverse emotional experiences among students. The total mean score (M = 4.07) suggests that emotional engagement is generally positive, although less consistent than other dimensions. These findings highlight the importance of interactivity in enhancing emotional engagement. The qualitative findings also demonstrated several themes related to emotional engagement. Increased learning motivation emerged as the most frequently reported theme, mentioned by 8 out of 12 participants (66.7%). Participants noted that AI-assisted tools created more engaging and enjoyable learning experiences. In addition, 7 participants (58.3%) explained that AI reduced their anxiety during

language learning activities and increased their confidence when practicing English. Furthermore, 6 participants (50%) described AI-supported learning as more interactive and emotionally supportive compared to traditional learning methods. The qualitative findings illustrate these emotional experiences.

> "I feel more confident when using AI because I can practice without being judged." (S41)

This excerpt shows that AI reduces anxiety and creates a safe learning environment, which enhances students' confidence.

> "Chatbot is fun because it feels like chatting with a real person." (S22)

This statement emphasizes the role of interactivity in increasing enjoyment. Emotional engagement is strengthened when learning feels natural and engaging.

Table 6 *Correlation between AI use and students' engagement*

Variable	r	95% CI	Sig. (2-tailed)	N
Behavioral Engagement	.68**	[.53, .79]	.000	70
Cognitive Engagement	.62**	[.45, .75]	.000	70
Emotional Engagement	.55**	[.36, .70]	.000	70

As presented in Table 5, AI use shows a strong positive correlation with behavioral engagement (r = .68, 95% CI [.53, .79]), indicating that increased use of AI is associated with higher levels of participation and task engagement. The correlation with cognitive engagement is also strong (r = .62, 95% CI [.45, .75]), suggesting that AI supports deeper learning processes. Meanwhile, the correlation with emotional engagement is moderate (r = .55, 95% CI [.36, .70]), indicating that emotional responses are influenced by additional factors beyond AI use. All correlations are statistically significant (p = .000), confirming the robustness of these relationships.

> "AI makes me do more practice because it is easy to access anytime." (S30)

This supports the strong relationship with behavioral engagement, as accessibility increases participation.

> "It helps me understand better, but I still need to think carefully." (S11)

> "Sometimes I feel frustrated because I don't understand the feedback." (S14)

This excerpt indicates that unclear feedback can negatively affect emotional engagement. Emotional responses are closely linked to the usability of AI tools.

Relationships between AI use and dimensions of engagement

To further examine the relationship between AI use and student engagement, Pearson product-moment correlation analysis was conducted. This analysis aims to determine the strength and direction of the relationship between AI use and the three dimensions of engagement. Understanding these relationships is essential to identify which aspects of engagement are most influenced by AI. The following table presents the correlation results.

This reflects the cognitive dimension, where AI supports understanding but does not fully replace independent thinking.

> "I enjoy using AI, but sometimes it depends on the situation." (S07)

This explains the moderate relationship with emotional engagement, as emotions are influenced by multiple contextual factors. Overall, the results demonstrate that AI significantly enhances student engagement across behavioral, cognitive, and emotional dimensions, with varying levels of influence across each domain.

The findings of this study demonstrate that Artificial Intelligence (AI) has a significant and positive impact on students' behavioral, cognitive, and emotional engagement in EFL learning contexts. These results generally support the growing body of research that highlights the potential of AI to enhance language learning experiences (Franjić and Božinovski, 2025; Muñoz et al., 2025). However, a closer examination reveals that the extent and nature of this impact vary across different dimensions of engagement (Liu et al., 2024; Moybeka et al., 2023). In particular, the strongest influence was observed in

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behavioral engagement, followed by cognitive engagement, while emotional engagement showed more variability. This pattern is consistent with several previous studies, yet it also reveals important nuances that contribute to ongoing discussions in the field (Li & Huang, 2020). Therefore, this section discusses how the current findings align with, extend, and in some cases challenge existing research.

The correlation coefficients obtained in this study were generally comparable to previous studies reporting moderate positive relationships between AI use and student engagement. However, the behavioral engagement correlation (r = .68) appeared slightly stronger than the average effect sizes commonly reported in prior research, suggesting that AI tools may have a particularly strong influence on students' participation and learning behaviors in the Indonesian EFL context.

The correlation coefficients identified in this study also indicate meaningful practical implications for educational settings. The correlation between AI use and behavioral engagement (r = .68) represents a large effect size, suggesting that approximately 46% of the variance in behavioral engagement can be explained by AI use (r^2 = .46). This finding indicates that AI-assisted learning tools have substantial potential to enhance students' participation, task involvement, and learning activity engagement (Seo, 2024). Similarly, the correlation with cognitive engagement (r = .62) indicates that approximately 38% of the variance in cognitive engagement is associated with AI use, demonstrating a strong influence on students' critical thinking and learning processes. Meanwhile, the correlation with emotional engagement (r = .55) suggests that AI use explains approximately 30% of the variance in emotional engagement, indicating a moderate-to-strong contribution to students' motivation, confidence, and enjoyment in language learning activities.

With regard to behavioral engagement, the findings of this study are consistent with previous research indicating that AI tools can increase students' participation and task completion. Prior studies have shown that AI-supported environments, particularly those incorporating interactive and adaptive features, encourage students to become more actively involved in learning activities (Guo et al., 2024; Quan et al., 2024). Research on AI-based language platforms has demonstrated that immediate feedback and structured progression systems can sustain learners' attention and persistence (Nazari et al., 2021; Utami et al., 2023).

The present study confirms these findings by showing that AI Adaptive Learning Platforms yielded the highest level of behavioral engagement among students. This supports the argument that structured and goal-oriented AI systems are effective in promoting consistent learning behaviors. However, the current study extends previous research by demonstrating that not all AI tools contribute equally to engagement. Specifically, AI Writing Assistants were found to have a relatively lower impact on behavioral engagement, suggesting that interactivity is a critical factor in determining effectiveness (Feng et al., 2025; Tate et al., 2025). This finding adds a more nuanced perspective to the literature by highlighting differences across types of AI tools. AI Writing Assistants recorded the lowest mean scores across all engagement dimensions compared to AI chatbots and adaptive learning platforms. One possible explanation is that writing assistants tend to function mainly as corrective tools focused on grammar and language accuracy rather than interactive learning support (Feng et al., 2025). As a result, students may use these tools more passively for editing purposes instead of engaging actively in the learning process. In contrast, AI chatbots and adaptive platforms provide more interactive, personalized, and responsive learning experiences, which may contribute to higher levels of behavioral, cognitive, and emotional engagement.

In terms of cognitive engagement, the results of this study also align with previous research emphasizing the role of AI in supporting deeper learning processes. Earlier studies have suggested that AI can facilitate cognitive engagement by providing personalized feedback, enabling self-regulated learning, and encouraging critical thinking (Barrot, 2021; Link et al., 2024). The findings of this study support these claims, as students reported that AI helped them understand their mistakes and explore alternative responses. In particular, AI Adaptive Learning Platforms and Chatbot Interactions were found to promote higher levels of cognitive engagement, which is consistent with research highlighting the benefits of interactive and adaptive technologies (Kwon and Shin, 2023; Silitonga et al., 2024).

Despite the significant findings, this study has several limitations that should be acknowledged. First, the study was conducted within a single higher education institution, which may limit the generalizability of the findings to other educational

contexts. Second, the study relied heavily on self-reported data, which may be influenced by social desirability bias, as participants may have provided responses perceived as favorable or socially acceptable. Third, the cross-sectional nature of the study limits the ability to examine long-term changes in student engagement over time.

In addition, although thematic analysis was conducted carefully, the study did not employ extensive inter-rater reliability procedures throughout the entire qualitative coding process, which may influence the consistency of theme interpretation. The absence of a control group also limits the ability to determine causal relationships between AI use and student engagement. Furthermore, the study did not include long-term follow-up observations, making it difficult to assess whether the positive effects of AI-assisted learning on engagement can be sustained over extended periods. Future studies are therefore encouraged to involve multiple institutions, longitudinal designs, control-group comparisons, and more rigorous qualitative validation procedures to provide a more comprehensive understanding of AI-assisted engagement in EFL learning contexts.

The findings related to emotional engagement present a more complex picture and partially align with previous studies. Many earlier studies have reported that AI can enhance students' motivation, interest, and enjoyment by creating interactive and low-anxiety learning environments (Erito, 2020; Ismail and Alharkan, 2024). The current study supports these findings, as students expressed increased confidence and enjoyment when using AI, particularly through chatbot interactions. This is consistent with research suggesting that AI can reduce fear of making mistakes and create a supportive learning atmosphere. However, unlike some previous studies that report consistently positive emotional outcomes, this study found that emotional engagement was more variable. Some students experienced confusion and frustration, particularly when AI feedback was unclear or difficult to interpret. This finding highlights a limitation that has not been sufficiently addressed in earlier research. It suggests that emotional engagement is not solely determined by the presence of AI but also by the quality and clarity of its interaction with users. Therefore, this study extends the literature by demonstrating that emotional responses to AI are more context-dependent and individualized.

Furthermore, the correlation analysis in this study provides additional insights that both support and refine previous findings. The strong correlation between AI use and behavioral engagement is consistent with earlier research emphasizing the role of technology in increasing participation and activity levels. Similarly, the positive correlation with cognitive engagement aligns with studies that highlight AI's capacity to support deeper learning processes. However, the relatively weaker correlation with emotional engagement adds a new dimension to existing knowledge. While previous research often assumes a direct positive relationship between AI and emotional outcomes, the current findings suggest that this relationship is more complex and mediated by various factors (Teng, 2024b; Wang et al., 2024). This indicates that emotional engagement may require additional pedagogical support beyond technological intervention. As such, this study contributes to a more differentiated understanding of how AI influences different aspects of engagement.

Another important contribution of this study lies in its contextual focus. Much of the existing research on AI in language learning has been conducted in technologically advanced settings, where access to digital resources and infrastructure is relatively high (Weng and Chiu, 2023). In contrast, this study was conducted in an Indonesian EFL context, which may present different challenges and opportunities. The findings suggest that AI can still have a positive impact on engagement in such contexts, although its effectiveness may depend on factors such as digital literacy and familiarity with technology. This supports previous calls for more context-sensitive research in the field of educational technology. At the same time, the study highlights the importance of considering local conditions when implementing AI in education. This contextual perspective adds to the literature by providing evidence from an underrepresented setting.

Finally, the findings of this study have important implications for both research and practice. From a research perspective, the study supports the multidimensional conceptualization of engagement and demonstrates the value of examining behavioral, cognitive, and emotional aspects simultaneously. This approach provides a more comprehensive understanding of how AI influences learning. From a practical perspective, the findings suggest that educators should carefully select and integrate AI tools based on their specific features and intended outcomes. While adaptive and interactive tools appear to be more effective in enhancing engagement, less interactive tools may

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require additional pedagogical support. Moreover, the potential risks of over-reliance and negative emotional responses should be addressed through guided use and teacher intervention. Overall, this study not only confirms existing knowledge but also extends it by offering a more nuanced and contextually grounded understanding of AI in EFL learning.

CONCLUSION

This study investigated how Artificial Intelligence (AI) influences EFL students' behavioral, cognitive, and emotional engagement, as well as the relationships between AI use and these dimensions of engagement. The findings revealed that AI positively influenced all three dimensions of engagement, although the degree of influence varied across dimensions. Behavioral engagement demonstrated the strongest relationship with AI use (r = .68), indicating that AI effectively promotes active participation, task completion, and sustained involvement in learning activities. Cognitive engagement also showed a strong positive relationship (r = .62), suggesting that AI supports deeper understanding, critical thinking, and reflective learning processes. Meanwhile, emotional engagement demonstrated a moderate positive relationship (r = .55), indicating that students' emotional responses toward AI-supported learning were more variable and influenced by individual experiences and the quality of interaction with AI tools. The study also found that different AI tools contributed to engagement in different ways. AI Adaptive Learning Platforms were the most effective in supporting behavioral and cognitive engagement, while AI Chatbot Interaction contributed more strongly to emotional engagement. In contrast, AI Writing Assistants demonstrated comparatively lower engagement outcomes across all dimensions.

The study further revealed that different AI tools contribute to engagement in different ways. AI Adaptive Learning Platforms were found to be the most effective in enhancing behavioral and cognitive engagement due to their personalized and feedback-driven features. AI Chatbot Interaction contributed significantly to emotional engagement by creating a more interactive and less anxiety-inducing learning environment. In contrast, AI Writing Assistants showed comparatively lower impact across all engagement dimensions, possibly because students perceived them primarily as corrective tools rather than interactive learning supports.

Correlation analysis confirmed positive relationships between AI use and all engagement dimensions, with the strongest relationship observed in behavioral engagement. These findings suggest that AI has a substantial influence on students' learning participation and cognitive involvement, while its effect on emotional engagement is more complex and dependent on contextual and individual factors. The qualitative findings also indicated that students valued the immediacy and interactivity of AI tools, although concerns regarding unclear feedback and over-reliance were still evident.

This study contributes to the growing literature on AI-assisted language learning by providing a multidimensional analysis of engagement within the underrepresented Indonesian EFL higher education context. Practically, the findings suggest that educators should adopt a balanced and critical approach to AI integration by selecting tools that align with learning objectives and encourage meaningful interaction. Overall, AI should be viewed as a complementary tool that supports, rather than replaces, the role of teachers in facilitating effective language learning.

Future research is recommended to further explore the long-term impact of AI on student engagement through longitudinal research designs. Comparative studies examining the effectiveness of specific AI tools in different language learning tasks would also provide more detailed insights into how particular technologies influence engagement dimensions. In addition, future studies should investigate the role of teacher guidance and instructional strategies in maximizing the benefits of AI-assisted learning while minimizing potential over-reliance on technology. Further research involving diverse Indonesian educational contexts, including public universities, secondary schools, and rural learning environments, is also necessary to improve the generalizability and contextual understanding of AI integration in EFL education.

REFERENCES

Arndt, H. L. (2023). Construction and validation of a questionnaire to study engagement in informal second language learning. *Studies in Second Language Acquisition, 45*(5), 1456–1480. https://doi.org/10.1017/S0272263122000572

Ary, D., Jacobs, L. C., Sorensen, C., & Razavieh, A. (2010). *Introduction to research in education* (8th ed.). Cengage Learning. *(Catatan: Menambahkan nama penerbit umum untuk edisi ini)*

Barrot, J. S. (2021). Using automated written corrective feedback in the writing classrooms: Effects on

L2 writing accuracy. *Computer Assisted Language Learning*, *36*(4), 584–607. https://doi.org/10.1080/09588221.2021.1936071

Bin-Hady, W. R. A., Ali, J. K. M., & Al-humari, M. A. (2024). The effect of ChatGPT on EFL students' social and emotional learning. *Journal of Research in Innovative Teaching and Learning*, *17*(2), 243–255. https://doi.org/10.1108/JRIT-02-2024-0036

Cengiz, B. C., Bilki, Z., Ataş, A. H., & Celik, B. (2025). Exploring second language writers' engagement with ChatGPT feedback: Revision behaviors and perceptions. *System*, *134*, Artikel 103837. https://doi.org/10.1016/j.system.2025.103837

Chen, Y. C. (2024). Perceptions of AI-facilitated creativity in language education: A study on digital storytelling. *JALT CALL Journal*, *20*(3). https://doi.org/10.29140/jaltcall.v20n3.2089

Chiu, T. K. F. (2023). Student engagement in K-12 online learning amid COVID-19: A qualitative approach from a self-determination theory perspective. *Interactive Learning Environments*, *31*(6), 3326–3339. https://doi.org/10.1080/10494820.2021.1926289

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.

Dilzhan, B. (2024). *Teaching English and artificial intelligence: EFL teachers' perceptions and use of ChatGPT* [Tesis Magister/Disertasi Doktoral tidak diterbitkan]. Nama Universitas. *(Catatan: Silakan lengkapi nama kampus atau jenis dokumennya jika ini merupakan skripsi/tesis)*

Durak, H. Y. (2025). Impact of ML-LA feedback system on learners' academic performance, engagement and behavioral patterns in online collaborative learning environments: A lag sequential analysis and Markov chain approach. *Education and Information Technologies*, *30*(2), 2623–2644. https://doi.org/10.1007/s10639-024-12911-9

Ebadi, S., & Amini, A. (2024). Examining the roles of social presence and human-likeness on Iranian EFL learners' motivation using artificial intelligence technology: A case of CSIEC chatbot. *Interactive Learning Environments*, *32*(2), 655–673. https://doi.org/10.1080/10494820.2022.2096638

EL Hosayny, O., Razkane, H., & Yeou, M. (2026). Metacognitive regulation and ChatGPT-assisted writing: Introducing an interactive model for cultivating strategic engagement. *Discover Education*, *5*(1), Artikel 246. https://doi.org/10.1007/s44217-026-01282-7

Erito, S. N. P. (2020). Exploring ESP students' perception toward the potential of artificial intelligence to promote students' self-efficacy in english writing skill. *Journal of English Language Learning (JELL)*, *7*(1), 457–464.

Erito, S. N. P. (2023). Exploring ESP students' perception toward the potential of artificial intelligence to promote students' self-efficacy in english writing skill. *Journal of English Language Learning (JELL)*, *7*(1), 457–464. *(Catatan: Identik dengan entri 2020, mohon periksa kembali tahun publikasi yang benar)*

Feng, H., Li, K., & Zhang, L. J. (2025). What does AI bring to second language writing? A systematic review (2014-2024). *Language Learning & Technology*, *29*(1), 1–27. https://doi.org/10.64152/10125/73629

Franjić, M., & Božinovski, B. (2025). Exploring ChatGPT's impact on ESL writing proficiency: An experimental research. *Teaching English with Technology*, *2025*(2), 53–81. https://doi.org/10.56297/vaca6841/ZDDD4208/LUZG7476

Frederick, J. K., Blumenfeld, C., Friedel, J., & Paris, A. (2005). School engagement. Dalam K. A. Moore & L. H. Lipmann (Ed.), *What do children need to flourish: Conceptualizing and measuring indicators of positive development* (hlm. 305–321). Springer Science and Business Media.

Ge, Z.-G., & Qi, Z.-H. (2026). Improving L2 vocabulary retention and learning engagement through L1 traditional stories in review activities using ChatGPT-generated questions. *Language Teaching Research*. Advance online publication. https://doi.org/10.1177/13621688251413650

Guo, K., Zhong, Y., Qin, J., & Chu, S. K. W. (2024). Investigating EFL teachers' lesson planning for chatbot-assisted learning of argumentative writing: A TPACK perspective. *Interactive Learning Environments*, *33*(2), 1520–1541.

Han, J., & Li, M. (2024). Exploring ChatGPT-supported teacher feedback in the EFL context. *System*, *126*, Artikel 103502. https://doi.org/10.1016/j.system.2024.103502

Harintama, F., & Muslimin, A. I. (2024). Enhancing EFL teaching in Indonesian Islamic senior high schools through artificial intelligence integration. *Schemata: Jurnal Pascasarjana UIN Mataram*, *13*(2). http://journal.uinmataram.ac.id/index.php/schemata

Hiver, P., Al-Hoorie, A. H., Vitta, J. P., & Wu, J. (2024). Engagement in language learning: A systematic review of 20 years of research methods and definitions. *Language Teaching Research*, *28*(1), 201–230. https://doi.org/10.1177/13621688211001289

Hong, A. J., & Kim, H. J. (2018). College students' digital readiness for academic engagement (DRAE) scale: Scale development and validation. *Tertiary Education and Management*, *27*. *(Catatan: Mohon lengkapi nomor isu dan halaman jika sudah terbit formal)*

p-ISSN 2301-7554, e-ISSN 2541-3643
Volume 14, Issue 2, June 2026

Ismail, S. M., & Alharkan, A. (2024). EFL learners' positive emotions in the era of technology: Unpacking the effects of artificial intelligence on learning enjoyment, self-efficacy, and resilience. *Computer Assisted Language Learning Electronic Journal (CALL-EJ)*, *25*(4).

Karataş, F., & Ataç, B. A. (2025). When TPACK meets artificial intelligence: Analyzing TPACK and AI-TPACK components through structural equation modelling. *Education and Information Technologies*, *30*(7).

Kleine, A.-K., Schaffernak, I., & Lermer, E. (2025). Exploring predictors of AI chatbot usage intensity among students: Within- and between-person relationships based on the technology acceptance model. *Computers in Human Behavior: Artificial Humans*, *3*, Artikel 100113. https://doi.org/10.1016/j.chbah.2024.100113

Koltovskaia, S., Rahmati, P., & Saeli, H. (2024). Graduate students' use of ChatGPT for academic text revision: Behavioral, cognitive, and affective engagement. *Journal of Second Language Writing*, *65*, Artikel 101130. https://doi.org/10.1016/j.jslw.2024.101130

Kwon, S. K., & Shin, D. (2023). The application of chatbot as an L2 writing practice tool. *Language Learning & Technology*, *27*(1), 1–19. https://doi.org/10.64152/10125/73541

Lambert, S. I., Madi, M., Sopka, S., Lenes, A., Stange, H., Buszello, C.-P., & Stephan, A. (2023). An integrative review on the acceptance of artificial intelligence among healthcare professionals in hospitals. *Npj Digital Medicine*, *6*(1), Artikel 111. https://doi.org/10.1038/s41746-023-00852-5

Lee, C. (2019). A study of adolescent English learners' cognitive engagement in writing while using an automated content feedback system. *Computer Assisted Language Learning*, *33*(1–2), 26–57. https://doi.org/10.1080/09588221.2018.1544152

Li, J., & Huang, J.-S. (2020). Dimensions of artificial intelligence anxiety based on the integrated fear acquisition theory. *Technology in Society*, *63*, Artikel 101410. https://doi.org/10.1016/j.techsoc.2020.101410

Li, Y., Zhou, X., & Chiu, T. K. F. (2025). Systematics review on artificial intelligence chatbots and ChatGPT for language learning and research from self-determination theory (SDT): What are the roles of teachers? *Interactive Learning Environments*, *33*(3), 1850–1864. https://doi.org/10.1080/10494820.2024.2400090

Li, Z., & Wang, Y. (2023). Adopting online flipped teaching to improve learner engagement in an English for Specific Purposes (ESP) course in China: A mixed-methods study. *Journal of China Computer-Assisted Language Learning*, *3*(2), 335–361. https://doi.org/10.1515/jccall-2023-0001

Link, S., Redmon, R., Shamsi, Y., & Hagan, M. (2024). Generating genre-based automatic feedback on English for research publication purposes. *CALICO Journal*, *41*(3), 319–346. https://doi.org/10.1558/cj.26273

Liu, Y., Zhang, H., Jiang, M., Chen, J., & Wang, M. (2024). A systematic review of research on emotional artificial intelligence in English language education. *System*, *126*, Artikel 103478. https://doi.org/10.1016/j.system.2024.103478

Luo, N., Wang, Y., Zhang, Z., Zhou, Y., & Zhao, R. (2025). Impact of prompt sophistication on ChatGPT's output for automated written corrective feedback. *ReCALL*, 1–15. Advance online publication. https://doi.org/10.1017/S095834402510044X

Merriam, S. B., & Tisdell, E. J. (2015). *Qualitative research: A guide to design and implementation* (4th ed.). Jossey-Bass.

Min, S., Gao, Y., & Zhang, J. (2026). Exploring L2 learner engagement in spoken English practices with a GenAI-powered chatbot. *System*, *138*, Artikel 103982. https://doi.org/10.1016/j.system.2026.103982

Moybeka, A. M. S., Syariatin, N., Tatipang, D. P., Mushthoza, D. A., Putu, N., Dewi, J. L., & Tineh, S. (2023). Artificial intelligence and English classroom: The implications of AI toward EFL students' motivation. *Edumaspul: Jurnal Pendidikan*, *7*(2), 1–12.

Mun, C. (2024). EFL learners' English writing feedback and their perception of using ChatGPT. *STEM Journal*, *25*(2), 26–39. https://doi.org/10.16875/stem.2024.25.2.26

Muñoz Muñoz, B. C., Nassaji, H., & Bello Carrillo, F. I. (2025). ChatGPT-generated versus human direct corrective feedback on L2 writing. *System*, *134*, Artikel 103805. https://doi.org/10.1016/j.system.2025.103805

Nazari, N., Shabbir, M. S., & Setiawan, R. (2021). Application of artificial intelligence powered digital writing assistant in higher education: Randomized controlled trial. *Heliyon*, *7*(5), Artikel e07014. https://doi.org/10.1016/j.heliyon.2021.e07014

Nguyen, H. H. (2025). ChatGPT-assisted language learning: Effects on Vietnamese English majors' writing skills and motivation. *JALT CALL Journal*, *21*(2). https://doi.org/10.29140/jaltcall.v21n2.102429

O'neill, R., & Russell, A. M. T. (2019). Stop! Grammar time: University students' perceptions of the automated feedback program Grammarly. *Australasian Journal of Educational Technology*, *35*(1). *(Catatan: Memperbaiki letak nomor volume dan isu)*

Pekrun, R., Goetz, T., Frenzel, A. C., Barchfeld, P., & Perry, R. P. (2011). Measuring emotions in students' learning and performance: The Achievement Emotions Questionnaire (AEQ). *Contemporary Educational Psychology*, *36*(1). *(Catatan: Mohon lengkapi nomor halaman jika diperlukan)*

Peng, L., Akhter, S., & Hashemifardnia, A. (2025). Podcast-integrated speaking instruction: Enhancing informal digital learning of English, academic engagement, and speaking skills. *Acta Psychologica*, *258Full*, 1–9.

Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. Dalam *Handbook of self-regulation* (hlm. 451–502). Elsevier. https://doi.org/10.1016/B978-012109890-2/50043-3

Quan, Z., Grant, L., Hocking, D., & Connor, A. (2024). Distinctive mobile learning: Where it is different and how it can make a difference. *Interactive Learning Environments*, *32*(1), 257–272. https://doi.org/10.1080/10494820.2022.2086267

Rachmawati, D. L., & Irawan, N. (2024). Integrating digital technologies in ESP classroom: A comprehensive overview of current practices and pedagogical implications. *International Journal of Pedagogical Language, Literature, and Cultural Studies (i-Plural)*, *1*(3), 27–35. https://doi.org/10.63011/ip.v1i3.23

Rachmawati, D. L., Maruf, N., & Fadhilawati, D. (2025). Emotional AI in EFL classrooms: Redefining human-machine affect in ELT research at Islamic university. *Register Journal*, *18*(2), 341–368. https://doi.org/10.18326/rgt.v18i2.341-368

Rahimi, A. R. (2024). When TPACK meets artificial intelligence: Analyzing TPACK and AI-TPACK components through structural equation modelling. *Education and Information Technologies*, *29*, 9061–9089.

Sang, H. T., & Van Loi, N. (2026). EFL learners' engagement in ChatGPT–generated speaking tasks from a text-driven approach: A case in Vietnam (hlm. 135–154). https://doi.org/10.1007/978-3-032-18392-7_7 *(Catatan: Masukkan nama editor dan judul buku induk jika ini merupakan bab buku)*

Seo, J. Y. (2024). Exploring the educational potential of ChatGPT: AI-assisted narrative writing for EFL college students. *Language Teaching Research Quarterly*, *43*(1). https://doi.org/10.32038/ltrq.2024.43.01

Silitonga, L. M., Wiyaka, W., & Prastikawati, E. F. (2024). Boosting students' ESP vocabulary by utilizing AI chatbot. *ETERNAL (English Teaching Journal)*, *15*(2), 275–283. https://doi.org/10.26877/eternal.v15i2.605

Tan, X., Cheng, G., & Ling, M. H. (2025). Investigating the mediating role of TPACK on teachers' AI competency and their teaching performance in higher education. *Computers and Education: Artificial Intelligence*, *9*, Artikel 100461. https://doi.org/10.1016/j.caeai.2025.100461

Tate, T. P., Harnick-Shapiro, B., Ritchie, D. R., Tseng, W., Dennin, M., & Warschauer, M. (2025). Incorporating generative AI into a writing-intensive undergraduate course without off-loading learning. *Discover Computing*, *28*(1), Artikel 72. https://doi.org/10.1007/s10791-025-09563-9

Teng, M. F. (2024a). "ChatGPT is the companion, not enemies": EFL learners' perceptions and experiences in using ChatGPT for feedback in writing. *Computers and Education: Artificial Intelligence*, *7*, Artikel 100270. https://doi.org/10.1016/j.caeai.2024.100270

Teng, M. F. (2024b). "ChatGPT is the companion, not enemies": EFL learners' perceptions and experiences in using ChatGPT for feedback in writing. *Computers and Education: Artificial Intelligence*, *7*. https://doi.org/10.1016/j.caeai.2024.100270 *(Catatan: Identik dengan 2024a, silakan hapus salah satu jika memang sama)*

Utami, S. P. T., Andayani, Winarni, R., & Sumarwati. (2023). Utilization of artificial intelligence technology in an academic writing class: How do Indonesian students perceive? *Contemporary Educational Technology*, *15*(4). https://doi.org/10.30935/cedtech/13419

Wang, C., Li, Z., & Bonk, C. (2024). Understanding self-directed learning in AI-assisted writing: A mixed methods study of postsecondary learners. *Computers and Education: Artificial Intelligence*, *6*, Artikel 100247. https://doi.org/10.1016/j.caeai.2024.100247

Weng, X., & Chiu, T. K. F. (2023). Instructional design and learning outcomes of intelligent computer assisted language learning: Systematic review in the field. *Computers and Education: Artificial Intelligence*, *4*, Artikel 100117. https://doi.org/10.1016/j.caeai.2022.100117

Wu, Z., & Zhao, J. (2025). Exploring learners' engagement with GenAI-generated feedback in EFL writing: A Chinese middle school case study. *Computer Assistant Language Learning*, 1–26. Advance online publication. https://doi.org/10.1080/09588221.2025.2600035

Yuan, S., & Dao, P. (2026). ESL tertiary learners' engagement in ChatGPT-assisted second language writing. *Language Awareness*, 1–24. Advance online publication. https://doi.org/10.1080/09658416.2026.2652333

Yuan, Y., Harun, J., Wong, B. Y., & Li, L. (2025). Technology-driven framework for college English courses: If and how mobile-assisted collaborative language learning affects EFL

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student engagement. *SAGE Open*, *15*(2). https://doi.org/10.1177/21582440251329687

Zare, J., Al-Issa, A., & Ranjbaran Madiseh, F. (2025). Interacting with ChatGPT in essay writing: A study of L2 learners' task motivation. *ReCALL*, *37*(3), 385–402. https://doi.org/10.1017/S0958344025000035

Zare, J., & Derakhshan, A. (2025). Task engagement in second language acquisition: A questionnaire development and validation study. *Journal of Multilingual and Multicultural Development*, *46*(9), 2761–2777. https://doi.org/10.1080/01434632.2024.2306166

Zhang, Z., & Hyland, K. (2025). The role of digital literacy in student engagement with automated writing evaluation (AWE) feedback on second language writing. *Computer Assisted Language Learning*, *38*(5–6), 1060–1085. https://doi.org/10.1080/09588221.2023.2256815

Zhou, S., & Du Preez, G. (2025). Bringing Cinderella to spotlight? Developing grammar through ChatGPT in writing. *Language Learning & Technology*, *29*(1), 1–25. https://doi.org/10.64152/10125/73639