

International Journal of Learning, Teaching and Educational Research
 Vol. 25, No. 5, pp. 820-839, May 2026
<https://doi.org/10.26803/ijlter.25.5.36>
 Received Jan 12, 2026; Revised Apr 30, 2026; Accepted May 4, 2026

Perspectives of EFL Learners on ELSA Speak: Speaking Skills, Personalised Learning and Self-Regulation

Mochamad Rizqi Adhi Pratama*^{ID}, Zulfa Sakhiyya^{ID},
 Seful Bahri^{ID} and Yuliati^{ID}
 Universitas Negeri Semarang, Semarang,
 Central Java, Indonesia

Abstract. The advancement of technology, especially artificial intelligence, has great potential to support EFL teaching and learning. This study explores the perspectives of EFL learners on using ELSA Speak as a speaking partner to develop speaking skills and foster personalised learning and self-regulation in and out of the classroom. It involved 20 Indonesian learners learning English as a foreign language (EFL). This study employed a qualitative approach. Open-ended questionnaires and semi-structured interviews were used to investigate the perspectives, experiences, and interactions of EFL learners with ELSA Speak. A phenomenological approach was adopted to understand the benefits and challenges of experiencing ELSA Speak as a speaking partner and co-teacher. The findings of the research reveal several benefits gained from using ELSA Speak for learning speaking skills, especially casual speaking and fostering learning, personalisation, and self-regulation. Among others, these are an abundance of topics and scenarios, especially for the premium version, native-like exposure, natural interactions, real-time tailored feedback for self-correction and improvement, confidence, speaking skill, and creativity improvement, and flexibility in terms of time and place. This study concluded that ELSA Speak-based instruction possesses strong potential to foster EFL learning through interactive, self-regulated, and personalised learning. However, the free version is limited in terms of the topics and available role-plays provided. Learners should have strong internet connections; otherwise, speech recognition is not always accurate, or ELSA Speak takes a longer time to think and respond. The results of this study contribute essential implications for EFL education, especially in the Indonesian context, where native speakers of English are rarely available to facilitate direct English-speaking practice.

Keywords: artificial intelligence; personalised learning; self-regulation; speaking skill

Citation:

Pratama, M. R. A.,
 Sakhiyya, Z., Bahri, S., &
 Yuliati. (2026).
 Perspectives of EFL
 Learners on ELSA Speak:
 Speaking Skills,
 Personalised Learning
 and Self-Regulation.
*International Journal of
 Learning, Teaching and
 Educational Research*, 25(5),
 820–839.
<https://doi.org/10.26803/ijlter.25.5.36>

*Corresponding authors: Mochamad Rizqi Adhi Pratama; mochamadrizqiadhi@students.unnes.ac.id

1. Introduction

Information technology integrated into education has revolutionised the methodologies of instruction, especially in language learning (Akhmedov, 2022; Fathi et al., 2023; Garcia & Garcia, 2023; Gikas & Grant, 2013; Liu et al., 2025; Ruiz-Mercader et al., 2006; Shatri, 2020; Sheikh et al., 2021). Aligning with the advancement of technology, artificial intelligence (AI) has demonstrated strong potential in the realm of education, especially in oral communication, which has shown considerable progress (Pokulevska, 2018). Integrating AI into language learning to support learners in virtual environments has emancipated language learners from time limitations and physical interactions, thus supporting unlimited accessibility to learning materials and communication with teachers and speaking partners (Ahmad et al., 2021; Gardner et al., 2021; Hamuddin, 2018;).

In addition, AI has been shown to be a transformative tool in encouraging the enthusiasm of students and facilitating interactive language learning activities (Wekke et al., 2017). Moreover, the field of EFL has recently experienced the contributory influence of AI (Hamuddin, 2018). For practising speaking in English, AI like ELSA Speak is equipped with automatic speech recognition technology, which exhibits an ability to detect and comprehend the pronunciation and speech of learners. This ability is very fruitful in contexts where native English speakers might not be present readily to improve the skills of learners in speaking effectively (Soleimani et al., 2022; Zou et al., 2020). This capacity is therefore supposed to help enhance the skills of EFL learners where native English speakers might not be available.

The investigation of self-regulated learning has been given crucial significance as it becomes the key to understanding the complicated dynamics when AI-based language learning converges with the active engagement, motivation, and cognitive strategies of learners throughout their language acquisition process (Chang, 2005). This comprehensive analysis explains the effects of AI on these essential aspects and provides a profound understanding of the mechanisms that facilitate effective language acquisition.

Thus, the results obtained from this study are anticipated to provide essential insights into improving and optimising the development of learners in learning English speaking by utilising ELSA as their speaking partner. It is essential to investigate the perspectives of students on using ELSA Speak as a speaking partner to enhance their speaking skills and to foster self-regulated and personalised learning, especially outside the classroom when their English teachers and peers are absent, and in the Indonesian context, in which native English speakers are rarely available to facilitate direct speaking practice.

During the period from 2020 to 2023, several studies investigated the impact of using AI on various English language learning, both in second language and foreign language contexts. Twenty-three studies were considered suitable for the present investigation. Table 1 shows a comprehensive overview of the focus and research.

Table 1: Previous studies on Artificial Intelligence in education from 2020 to 2025

Focus	Authors
Listening	Hsu et al., 2023 ; Kesuma, 2025 ; Suryana et al, 2020 ; Zheldibayeva, 2025.
Reading	Chea & Xiao, 2024 ; Liu, 2021 ; Liu, et al., 2025.
Speaking	Divekar et al., 2022; El Shazly, 2021; Farooqi, 2025; Kang, 2022; Kessler, 2023; Li & Bonk, 2023; Maknun, 2020; Makhoulf, 2021; Rustamova & Rakhmatullaeva, 2023; Safadi et al., 2022; Shortt et al., 2023; Suciati et al., 2022; Williyen et al., 2024; Yang et al., 2022.
Writing	Fitria, 2023; Yan, 2023; Zheldibayeva 2025.

Table 1 illustrates the expanding focus of the studies on artificial intelligence in EFL learning. It is revealed that one of the fields getting more attention in the research on artificial intelligence is speaking skills, as exemplified by Maknun (2020), Makhoulf (2021), Suciati et al. (2022), Li and Bonk (2023), and Farooqi (2025). The increasing number of research studies on artificial intelligence incorporated in EFL learning, specifically speaking skills, demonstrates the high contribution that artificial intelligence has made in supporting the development of speaking skills among students.

Previous studies on artificial intelligence related to English-speaking skills were mostly concerned with how artificial intelligence contributed to the development of speaking skills and the reduction of speaking anxiety realised in the classroom contexts. Only a few of them addressed how artificial intelligence also has the potential to promote self-regulation and learning personalisation for each language learner, both inside and outside of the classroom. For instance, the AI Chatbot successfully improves learners' understanding in having English conversations, and the students perceived the learning process positively using AI Chatbot in addition to uncovering several limitations (Yang et al., 2022). AI-generated feedback from SmallTalk2Me improves the speaking skills of learners (Farooqi, 2025). Moreover, Duolingo contributed to self-directed language learning outside the classroom (Li & Bonk, 2023). Orai AI also contributes positively to the development of native English students with regard to their speaking skills (Maknun, 2020). Furthermore, AI is integrated in developing the teaching of various contents, including that for teaching speaking skills (Williyen et al., 2024).

The present study, contextualised in Indonesia, where English is a foreign language, presents an opportunity to contribute fruitfully by investigating the role of AI in a certain context of culture and education. Furthermore, the present study attempts to illuminate how ELSA AI works with the self-regulated learning strategies proposed by Zimmerman (2021) to promote self-regulation and personalised learning. Despite the extensive exploration of AI in education (Williyen et al., 2024), there is a considerable gap in the literature regarding the dynamics between EFL teachers and AI in teaching EFL speaking skills. This study explores more deeply into this untouched territory, uncovering the intricacies of how ELSA AI can contribute effectively to the development of learners' English-speaking skills outside of the classroom. Taking this aspect into account, this study is expected to contribute to the development of effective

practices. To fulfil the goal of the present research, the perceptions of EFL learners regarding ELSA AI applied in learning casual speaking to enhance their speaking skills and foster self-regulated learning and personalised learning were investigated to understand how ELSA AI works as the speaking partner of the learners. The results of the study are expected to contribute to the successful advancement of EFL teaching and learning processes both inside and outside the classroom.

2. Literature Review

AI has revolutionised to become an effective approach, especially in language education, which provides students with opportunities to improve their performance in language learning (Sun et al, 2021; Zhang, 2022; Zhang & Zhou, 2020). Furthermore, AI has been demonstrated to have the capacity to foster positive perspectives and attitudes among language learners (Xia et al., 2022). AI has been defined as a system programmed to create powerful applications for both computers and smartphones that can perform various tasks with human assistance (Aldosari, 2020). Hence, with these capacities, AI possesses great potential to support EFL teachers in teaching both individuals and groups of learners.

AI has been equipped with the capability to make intelligent decisions just like those made by humans (Akerkar, 2014; Ginsberg, 2012). Moreover, various AIs have been equipped with automatic speech recognition that can detect and recognise human utterances and decide on appropriate responses. This feature has been developed and implemented in ELSA Speak to facilitate and support students as they practise oral communication and improve their speaking skills. Kim (2018) underlines this capacity as an effective way to enhance spoken skills, especially in learning, listening, and speaking.

Lee et al. (2019) defined self-regulated learning as active and constructive learning in which students are able to set their own learning goals, monitor their progress, regulate their learning process, control their understanding, motivation, and behaviour, guided by the goals and features of the environment. This study defines self-regulated learning (SRL) based on the model by Seker (2016), which is influenced by recognised SRL frameworks in second language acquisition, particularly the models by Boekaerts (1997) and the Oxford (1990) L2 learning strategy inventory. Self-regulated learning (SRL) is a fundamental idea in education that has received significant attention, especially in the field of language learning.

Zimmerman (1989) describes self-regulated learning (SRL) precisely as the active process by which learners govern and supervise their own emotional, metacognitive, cognitive, and motivational aspects proactively in the pursuit of their own goals in education. This intricate concept covers various strategies and processes, namely goal setting, self-monitoring, strategic planning, metacognitive awareness, and motivation control (Zimmerman, 2002). Through SRL, learners are enabled to own responsibility for their experience in education, execute essential requirements, and enhance their learning results (Pintrich, 2000). The

process manifests as a cyclical journey of anticipation, execution, and introspection, during which individuals establish objectives, conduct methods, and assess their progress, all of which affect their academic success profoundly (Zimmerman, 2002).

In the field of English acquisition, SRL consistently contributes to establishing linguistic proficiency and autonomy. It enables individuals to interact actively with linguistic material, utilise their learning resources skilfully, and manoeuvre through the complexities of language activities (Teng & Zhang, 2016). Scholars have emphasised the essential significance of examining SRL in language acquisition settings, as it has the capacity to improve teaching methodologies and to promote the autonomy of learners (Bowen & Thomas, 2022; Oxford, 2016). It is, therefore, paramount to understand how language learners regulate their learning, decide on their goals, and use strategies to devise efficacious language education, fostering autonomous language learning.

According to UNESCO (2017), personalised learning (PL) is defined as an educational approach that places the learner at the centre, taking into consideration their prior knowledge, needs, and capacities. In this sense, because the learners possess different prior knowledge, needs, and capacities, there should be differentiation or individualisation in terms of their learning. The differentiation might focus on adapting the instructions to the students' preferences, for instance, offering personalised options for setting goals and content (Castro et al., 2024).

Personalised learning has been defined by several scholars. Lee et al. (2019) argued that personalised learning is a student-centred system that supports the diverse needs of students and the development of their abilities. In this system, personalised learning methods and educational content are developed for students with unique characteristics and interests. From this view, language learners are seen to possess different preferences for their learning depending on their interests, characteristics, and passions.

3. Methodology

3.1 Pedagogical Setting and Participants

The investigation involved 20 EFL learners taking the Speaking for Informal Interactions course in the academic year 2024–2025. The sampling technique used was guided methodically by a purposive sampling strategy to ensure a thorough portrayal of students with various levels of perspectives, experience, and roles (Fraenkel et al., 2023). The respondents were chosen based on the improvement of their speaking skills and their active participation in the speaking classes. A group of 20 students was selected with the most significant improvement in speaking skills, as they were expected to give fruitful insight into collaborating with ELSA AI as a speaking partner. To ensure confidentiality, participants were coded pseudonymously as S1–S20, representing Student 1 through Student 20. Moreover, the identities of the respondents are anonymised in the process of reporting the findings. Consideration of ethics is regarded highly in this study, in

which informed consent was an important requirement. All of the participants engaged willingly with a very clear comprehension of the research goals.

3.2 Design of the Study

A qualitative approach was chosen as the root of this study because of its ability to illuminate the interactions, experiences, and perspectives of the participants (Creswell & Creswell, 2018). The main method employed was an open-ended questionnaire and semi-structured interview, which enabled participants to share their perceptions, insights, and experiences in their own words. Tailored strategically, the questionnaire and interview questions cover various dimensions of using ELSA AI in learning English speaking skills, including the advantages, challenges, weaknesses, and perceived effects of this artificial intelligence. This research design was supported by a phenomenological approach to reveal the essence of the students' perceptions in using ELSA AI as a co-teacher to help them learn English speaking skills to promote self-regulation and personalised learning. This perspective is aligned with the investigation of lived experience and individual perspectives on the role of AI as a co-teacher, especially in learning informal speaking outside of the classroom.

3.3 Research Instruments

3.3.1 Open-ended Questionnaire

The open-ended questionnaire was used in this investigation. It is a process of data collection that enables the respondent to express their opinions and arguments deliberately without being confined to a pre-determined answer as an option (Creswell & Creswell, 2018). The open-ended questions in the questionnaires examined the students' thoughts and perspectives after experiencing the teaching and learning process with ELSA Speak in learning speaking skills and fostering personalised learning and self-regulation in and outside of the classroom.

In developing the questions, the Constructivist Online Learning Environment Survey (COLLES) of Taylor and Maor (2000) was adapted. This survey employed a Likert scale designed to check the constructivist learning environment. However, this study modified it into open-ended questions so that students could articulate their experience in detail. The survey contained six main scales to develop open-ended questions in this questionnaire: Relevance, Reflection, Interactivity, Tutor Support, Peer Support, and Interpretation. The following is the list of questions in the open-ended questionnaire:

1. Reflecting on your teaching and learning process in the Speaking for Informal Interactions class, how did the strategies contribute to your understanding of the course material and improvement of your English speaking?
2. What did you do to fulfil your learning interests/needs/characteristics in the Speaking class? Please describe your experience.
3. In what ways did the artificial intelligence-based language learning support or hinder your engagement and participation in the teaching and learning process? How did it affect your speaking skills? How did it affect your self-regulation?

4. In what ways did the artificial intelligence-based language learning help you to become personalised learners?
5. In what ways did the artificial intelligence-based language learning help you to become independent learners?
6. How did personalised learning support or hinder your success in learning to speak?
7. How did independent learning support or hinder your success in learning to speak?
8. In what ways did the artificial intelligence-based language learning strategies augment your creativity?
9. In what ways did the artificial intelligence-based language learning enhance or hinder your communication with peers and lecturers?
10. Can you describe any challenges you encountered while learning listening and speaking by using artificial intelligence-based language learning, and how you overcame them?

3.3.2 *Semi-structured Interview*

The interview questions for students were adapted from the Constructivist Online Learning Environment Survey (COLLES) proposed by Taylor and Maor (2000). The scales of this survey outlined the semi-structured interview questions that gathered the students' perceptions of the implementation. The arguments of the students determined the success of implementing the artificial intelligence-based language learning through SRL strategies supported by ELSA Speak in the teaching and learning process. The following is the list of questions for the students' interview:

1. Can you describe your experience with artificial intelligence-based language learning to promote independent and personalised learning in the classroom?
2. How do you think employing artificial intelligence-based language learning was able to improve your speaking skills and self-regulation?
3. What is your most memorable moment during the teaching and learning process?
4. Did the artificial intelligence-based language learning influence the teaching and learning activities positively or negatively? In what way?
5. Did you use materials or media considering your interests, needs, and characters?
6. Were there any challenges you encountered while engaging in artificial intelligence-based language learning? If so, how did you overcome them?
7. How do your lecturers guide and lead you to participate actively in following artificial intelligence-based language learning? Please give an example.
8. How do your lecturers encourage you to participate actively in following the artificial intelligence-based language learning? Please explain how they acted to support you.
9. How did the interaction throughout the teaching and learning process, feedback from the lecturer, and the use of artificial intelligence-based language learning help you to improve your English listening/speaking skills?

10. How did the artificial intelligence-based language learning help you to understand the content of the discussion during the teaching and learning process? Please explain.
11. Did you feel the artificial intelligence-based language learning contributed to speaking skills? If yes or no, how?
12. Did the artificial intelligence-based language learning lead to innovative approaches to solving problems or completing tasks? If yes or no, how?

3.3.2 Data Collection and Analysis

The main techniques of data collection included open-ended questionnaires and semi-structured interviews with the selected Indonesian EFL students. This technique provided flexibility, which allows participants to share insights using their own words (Fraenkel et al., 2023). The questionnaire and interview questions were tailored to explore the diverse attributes of advantages, challenges, weaknesses, and perceived effects by following the thematic analysis process (Braun & Clarke, 2006). This approach involved data familiarisation, generating initial codes, theme construction, reviewing themes, defining and naming themes, and producing the report. Through this process, essential themes were revealed that related to the students' perspectives on utilising ELSA as a co-teacher in learning English informal speaking outside of the classroom, providing the basis for thorough discussions. Informed consent and participant confidentiality were carefully administered in the procedures to ensure the integrity of the research.

4. Results and Findings

This section presents an overview of the perceptions of EFL learners of using ELSA Speak in learning English informal speaking, as derived from the semi-structured interviews. Furthermore, this section covers a detailed discussion of the findings and exploration of the learners' perceptions.

4.1 Indonesian EFL Learners' Perceptions of Using ELSA Speak in Learning Informal Speaking

The main point of this study is derived from the semi-structured interviews adapted from the Constructivist Online Learning Environment Survey (COLLES) proposed by Taylor and Maor (2000), which focuses on exploring the EFL learners' perceptions of using ELSA Speak to learn informal speaking. Table 2 provides information about the learners' experience with ELSA AI to promote self-regulation and personalised learning.

Table 2: Learner's experience with ELSA Speak to promote personalised learning

Participants	Interview excerpts (Representative)	Questionnaire answers (Representative)
S2	"ELSA offers various topics so I can choose which one is interesting for me. The AI speaks like a native English speaker. It is very helpful because I rarely meet native English speakers."	"The automatic speech recogniser is cool; it can understand what we say. When signing up, I can choose my level of English speaking and the English accents I prefer."
S4	"The feedback given at the end of role-plays is very helpful and complete for self-correction and development."	"I can choose the level of difficulty in my role-plays. It is very important not to choose too advanced levels of role-plays."

In Table 2, the participants (coded as S2 & S4) shared diverse experiences in using ELSA Speak to promote personalised learning. S2 underscored the abundance of topics provided by ELSA so that she can choose which one interests her. In addition, she stated that ELSA speaks like a native English speaker who performs very accurate pronunciation, grammar, and vocabulary, as evidenced by the learning sources. This aligns with Nguyen et al. (2025) that AI-powered applications have the potential to enhance EFL learners' pronunciation competency. It is very helpful as native speakers are rarely found in Indonesia, especially where the participants live.

In the questionnaire, S2 highlighted the presence of an automatic speech recogniser, which amazed her with its performance. Moreover, S2 also stated that the choice of different English levels and accents was very helpful. S4 focused on the feedback tailored to the learners' performance. The feedback given is accurate and complete, including pronunciation, grammar, and vocabulary. In the questionnaire, S4 highlighted the importance of choosing the appropriate level of role-plays, which can be adjusted to the learners' level of English-speaking skills.

Table 3: Learner's experience with ELSA Speak to improve self-regulation

Participants	Interview excerpts (Representative)	Questionnaire answers (Representative)
S5	"I can improve the accuracy of my grammar and pronunciation by learning the feedback ELSA AI provides at the end of each role-play I finish."	"The given feedback is comprehensive and helpful for self-correction and development. ELSA gives me clues on how to improve my weaknesses and avoid mistakes."
S7	"ELSA AI helps me recognise my mistakes or errors by giving real-time feedback at the end of a role-play."	"I can learn new vocabulary suggested by ELSA AI in real-time feedback so I can use it in future performances."

Table 3 presents insights from two participants (S5 and S7) on their experience with ELSA Speak to improve self-regulation. S5 focused on the fruitful advantages of the real-time feedback that ELSA Speak provides at the end of the role-plays she finished. ELSA Speak highlights the inappropriate use of grammar or pronunciation that the learner performed and gives suggestions on how to improve them. In addition, ELSA corrects her and suggests how to fix it.

In the questionnaire, S5 emphasised the useful real-time feedback in informing the learner of errors she made. This feature is beneficial as language teachers might not be able to do it, especially when their classes consist of a large number of students. S7 concluded that the real-time feedback given by ELSA Speak assesses the learner's speaking performance comprehensively. ELSA provides thorough feedback, including pronunciation, grammar, vocabulary, relevance, register, politeness, and confidence. In the questionnaire, S7 stated that real-time feedback was very fruitful as a phase to evaluate their own speaking performances and to learn things to improve future performances. For instance, S7 learned new vocabulary from the feedback given by ELSA Speak.

Table 4: Learner's experience with ELSA Speak to succeed in learning English speaking skills

Participants	Interview excerpts (Representative)	Questionnaire answers (Representative)
S6	"By choosing topics I am interested in, I am more motivated to practise my English through role-plays provided by ELSA. As a result, I am more confident in speaking English."	"Because I can talk to ELSA AI anytime and anywhere, I have many opportunities to practise my English. I can speak more fluently."
S10	"Without my teacher near me, I can practise speaking with ELSA and learn from my mistakes in the feedback given by ELSA. I can have better pronunciation and learn new words. I also feel more worry-free because my teacher or my friends are not near me."	"The feedback is accurate and helpful. It does address what I did in my speech. Step by step, I can fix my mistakes and errors. The possibility of choosing a different difficulty level was also very helpful."

Table 4 summarises how ELSA Speak contributes to developing learners' speaking skills. S6 underlines the improvement of motivation to practise her speaking through role-plays, which results in the improvement of her confidence in speaking English. In the questionnaire, S6 experienced improvement in her speaking fluency owing to her consistent practice with ELSA Speak. Experiencing an improvement through practice, S10 highlights her better and more accurate pronunciation as well as her newly acquired vocabulary from the real-time feedback given by ELSA. Still focusing on real-time feedback, in the questionnaire, S10 accentuates the accuracy of the feedback and the learner's opportunity to overcome her weaknesses, mistakes, and difficulties. The possibility of learning from difficulties and mistakes is considered to work effectively to improve

speaking skills. In addition, S10 foregrounds the levels of difficulty that ELSA Speak provides. A good learning process can occur when a learner learns something that is neither too easy nor too difficult. A learner is supposed to learn slightly more than their proficiency. It is in line with the Zone of Proximal Development (ZPD) concept, which suggests that learners should be challenged with tasks slightly beyond their current capabilities.

Table 5: Challenges faced by learners in using ELSA Speak as a speaking partner

Participants	Interview excerpt (Representative)	Questionnaire answers (Representative)
S9	"There are only three available role-plays for the non-premium version."	"To have more than three role-plays a day, I have to upgrade to the premium version."
S17	"When the internet connection is unstable, ELSA does not accurately recognise the users' speech."	"It needs a stable internet connection to work well, especially when having role-play. It takes time to respond when the internet is not stable."

Table 5 provides insights from the participants about the challenges they faced when using ELSA Speak as a speaking partner. S9 was concerned with the requirement to upgrade to the premium version. ELSA Speak provides limited features when the free version is used. For instance, it only provides three free role-plays every day and requests an upgrade to unlock more role-plays. For some students coming from a simple family, the funds requested are considered quite costly.

In the questionnaire, S9 also highlighted limited free role-plays in the free version and the requirement to upgrade to the premium version. S17 focused on the challenges faced when the internet connection is unstable, revealing that the automatic speech recognition (ASR) of ELSA Speak does not work well when the internet is unstable. In addition, in the questionnaire, S17 uncovered that ELSA takes a longer time to respond owing to an unstable internet connection. This challenge can be solved by maintaining a stable internet connection through connecting to Wi-Fi or going outside to get a better connection.

5. Discussion

The findings of this study illuminate the benefits and challenges of ELSA Speak as a speaking partner in the context of Indonesian EFL education. What emerged from the learners' narratives is a range of information about how ELSA Speak benefits the students, as well as the challenges they experience in using ELSA as their speaking partner. These results are in line with previous studies by Hill et al. (2015), Kang (2022), and Suciati et al. (2022), which revealed the considerable effects of AI on the speaking performance of learners. It is confirmed that the most useful features that ELSA AI offers are the automated speech recognition to support an interactive role-play and tailored feedback. It has been proven that

learners who communicate and utilise AI in more interactive and stimulating ways improve their speaking skills considerably. The virtual interaction with AI encourages the learners to be involved communicatively in a new environment, potentially serving to improve their speaking proficiency.

This study revealed that ELSA offers a flexible time and place to access an abundance of topics, a choice of difficulty levels, and real-time, tailored feedback. It confirms that AI-based language learning offers learners personalised and self-regulated learning experiences, enabling them to monitor their speaking performance and to identify weaknesses, as well as the availability of personalised feedback (Dupoux, 2018; Yan, 2023). The personalised approach enables learners to focus on their particular interests, level of difficulty, and specific language needs, thereby promoting language enhancement (Yang et al., 2021). In addition, ELSA also provides interactive and extensive language input through interactive simulation, virtual environments, AI-powered chatbots, and automatic speech recognition. Through the engagement of the learners in these speaking activities, they are exposed to authentic language use to facilitate the development of grammatical accuracy, fluency, vocabulary, and relevance for effective spoken communication (Bahrani & Sim, 2012).

One of the most beneficial features that ELSA provides is real-time and tailored feedback, which supports self-regulation and personalised learning. It is confirmed by Kim et al. (2022) and Dodigovic (2007) that AI-based instruction provides instant feedback ad infinitum, addressing their speaking performance. By incorporating automatic speech recognition in ELSA, the learners' grammatical accuracy, vocabulary, pronunciation, and discourse can be analysed to provide instant feedback (Divekar et al., 2022; Dodigovic, 2005). The presence of this tailored feedback allows learners to identify their weaknesses, mistakes, or difficulties and enables them to monitor and correct themselves (Li, 2023; Loncar et al., 2023).

The research findings reveal that ELSA-supported communication nurtured the enhancement of EFL learners' self-regulated learning, personalisation, and learning independence. These findings are in line with the concept of social constructivism by Vygotsky (1984), underlying the role of ELSA as the means to facilitate the development of students' self-regulated learning. Having communicative speaking activities with AI enables learners to regulate their speaking performance. By doing these activities, students deliberately develop self-regulation and show independent speaking performance.

The idea of scaffolding proposed by the sociocultural theory of Vygotsky (1986) accentuates the essence of external support in assisting learners' cognitive and linguistic development. ELSA can play an important role in fruitful scaffolding by providing real-time, tailored feedback, highlighting their specific and personal needs. This individualised aid helps learners to conduct self-regulation in their learning, set goals, monitor their progress, and adjust accordingly, promoting the development of self-regulation skills. In addition, the social cognitive theory of Bandura (1989) states that learning takes place through observing, imitating, and

modelling the behaviours of others. In the context of communicative interaction with ELSA, learners have the chance to observe, explore, and engage with the interactive language produced by ELSA. This AI-powered application is able to provide adaptive feedback and natural English that can be a source of learning. By observing those behaviours, learners gain the ability to internalise and imitate them, promoting the enhancement of skills in self-regulation. Moreover, the tailored feedback enables learners to recognise their weaknesses, progress, and identify the areas that need enhancement. By carrying out self-reflection and self-adjustments, considering ELSA's feedback, learners can develop metacognitive comprehension and self-regulation (Zimmerman, 2002).

This study also revealed that the learners experienced improvements in their speaking skills because of the flexibility to access ELSA anywhere and at any time. One of the benefits that ELSA offers compared to a traditional classroom setting is that learners are not limited by time and location, enabling them to access an English-speaking partner at their convenience. It aligns with Hamuddin (2018), and Gardner et al. (2021), who claimed that artificial intelligence provides learners with chances to communicate in a variety of convenient times and places. In addition, one of the learners revealed that communicating with ELSA is worry-free and without stress because none of her teachers or friends are near her.

Speaking anxiety might hamper learners from communicating actively with speaking partners. In this sense, ELSA provides greater involvement in speaking activities, which later contributes to the development of learners' speaking skills and self-regulated learning. The joy and comfort the learners felt when communicating with ELSA is confirmed by Kang (2023), who states that EFL learners found that engaging with AI is more pleasant than interacting with their classmates, which probably enhanced their speaking performance. This is also supported by Zhang (2022), and Sun et al. (2021): that an AI environment benefits learners with easy-to-operate features that support portable and accessible use. These features might contribute to the enhancement of learners' speaking performance and self-regulated learning.

The next benefit is learning independence, which the learners can possess as they are engaged dynamically in communicative interactions with ELSA as their speaking partner in the absence of their teachers or peers. Instead of only promoting self-regulation, ELSA-powered learning also contributes to the establishment of learners' self-regulated learning. Because of the flexibility of times and places, the learners are enabled to engage in communicative interactions with ELSA at any time and from anywhere at their convenience in the absence of their English teachers or peers. It leads to more exposure of the learners to English-speaking activities, which ultimately results in more language input and habits.

Furthermore, as revealed by the research participants, the intense exposure to English-speaking interactions not only enhances their speaking skills but also boosts their confidence when they use the target language in real communication with peers and teachers. The increasing number of speaking practices also results

in better automation of the learners' speech organs in producing the target language, as revealed by one of the research participants who experienced better pronunciation.

However, ELSA, as an AI-powered application, also possesses weaknesses and drawbacks. The first thing the research participants stated was that it is quite expensive for some research participants to upgrade to the premium version to access the unlimited features. For the free version, only three role-plays are available every day for speaking practice. The other weakness is the absence of an avatar as the visualisation of a human to make the interactive communication more engaging. Another drawback is the long wait for ELSA to think, and the inaccuracy of the automatic speech recognition in detecting and recognising the learners' speech when the internet connection is weak or unstable. The failures made by ELSA to detect the learners' speech accurately and the long time that ELSA takes to respond to the learners often drive the learners to frustration, hindering the process of learning. This may become a crucial challenge, especially for learners living in remote areas.

Finally, the findings regarding the benefits and challenges offered by ELSA as a speaking and learning partner for EFL learners provide valuable insights into the dynamic complexity of this phenomenon. More specifically, the presence of ELSA Speak as a speaking and learning partner for EFL learners contributes to the development of their English-speaking skills and promotes independent learning as well as self-regulation. The EFL learners experienced greater confidence after having intense speaking practice with ELSA and considerable improvement in their pronunciation, vocabulary, grammatical accuracy, relevance, and politeness through learning from real-time tailored feedback.

These results indicate that the EFL learners are able to improve their speaking skills and to establish independent learning and self-regulation with the assistance of the AI-powered application, ELSA. Through understanding the challenges faced when interacting with ELSA, the drawbacks are expected to be mitigated. This nuanced understanding of the relationship between ELSA, English-speaking skills, independent learning, and self-regulation can inform further interventions to enhance thorough English speaking through oral proficiency and to minimise the negative effects of the drawbacks when interacting with ELSA.

6. Conclusion

The ultimate goal of the present research was to illuminate the potential of ELSA Speak in improving speaking skills and promoting self-regulation, as well as personalised learning, and to understand the challenges and drawbacks that EFL learners faced when using ELSA as a speaking partner. The findings revealed that EFL learners using ELSA experienced greater enhancement in speaking skills, self-regulation, and personalised learning. These positive results can be attributed to the personalised and engaging environment that ELSA provides for interactive oral communication. The useful features that ELSA provides, which utilise AI technologies, such as the accommodation of learners' preferences in terms of

difficulty levels, English accents and topics, natural, adaptive and interactive language processing, native-like speakers, real-time, accurate and tailored feedback, including grammar, vocabulary, pronunciation, relevance, and politeness, as well as the accurate automatic speech recognition, contributed to the enhancement of the EFL learners' speaking skills, personalised learning, and self-regulation. These findings accentuate that ELSA-based instruction possesses the potential to foster EFL learning through interactive and personalised learning.

The interview results show that EFL learners experience higher levels of self-regulation. This shows that ELSA can support EFL learners in self-regulating their learning process, deciding on goals, evaluating their progress, and making essential adjustments by taking into account the feedback that ELSA provides. The personalised and tailored feedback, completed with corrections and suggestions, allows learners to regulate their learning and improve metacognitive strategies to improve their speaking skills.

The results of this study contribute essential implications for EFL education, particularly in informal education, especially where teachers and peers are absent. AI is mostly associated with approaches of student-centredness in learning and improves EFL learners' speaking skills, personalised learning, and self-regulation significantly. These findings indicate that ELSA-based instruction is promising in addressing the unique challenges faced by Indonesian EFL learners in developing speaking skills, personalised learning, and self-regulation in the Indonesian context, where native speakers of English are rarely available to facilitate speaking practice.

Despite the implications of this study, there are several limitations to take into account. First, the generalisability of the findings might be limited to the specific sample of Indonesian EFL learners in the natural setting of informal education, meaning that the learning process mostly takes place outside the campus in the absence of their teachers and peers. It might be different when the results are applied to language learners from diverse language backgrounds or different cultures and contexts of education. The other limitation is dealing with the length of exposure to ELSA, as the effect on speaking skills, personalised learning, and self-regulation might vary based on the duration of intervention. Intervention for a longer period might yield different results and a more thorough understanding of the effects.

The present study focused on the benefits and challenges of ELSA-based instruction on speaking skills, self-regulation, and personalised learning. Future studies should investigate the use of other AI-powered applications that might have diverse features, benefits, and challenges. Understanding the strengths and weaknesses of multiple AI-powered applications would allow learners and educators to gain various insights to determine which AI-powered application is the most appropriate for them. Further investigation should also be conducted in different sociocultural contexts, which is expected to contribute to a more thorough understanding of the contribution of AI-powered applications in language learning. Investigating the presence of speaking anxiety when learners

communicate with a real human and AI-powered applications could also be an alternative for future research.

Acknowledgements

This present research is funded by the Indonesia Endowment Fund for Education Agency as part of the scholarship awarded to one of the researchers by the Ministry of Finance, Republic of Indonesia.

Generative AI Disclosure Statement

The authors were assisted by Grammarly to help ensure the English grammatical accuracy of the texts in this manuscript. All the writing and editing processes were done manually.

7. References

- Ahmad, S. F., Rahmat, M. K., Mubarik, M. S., Alam, M. M., & Hyder, S. I. (2021). Artificial intelligence and its role in education. *Sustainability*, 13(22). <https://doi.org/10.3390/su132212902>
- Akerkar, R. (2014). *Introduction to artificial intelligence* 2nd ed. PHI Learning.
- Akhmedov, B. (2022). A new approach to teaching information technologies in education. *Central Asian Journal of Education and Computer Sciences*, 1(2), 73–78. <http://www.cajecs.com/index.php/cajecs/article/view/28>
- Aldosari, S. A. M. (2020). The future of higher education in the light of artificial intelligence transformations. *International Journal of Higher Education*, 9(3), 145–151. <https://doi.org/10.5430/ijhe.v9n3p145>
- Bahrani, T., & Sim, T. S. (2012). Informal language learning setting: Technology or social interaction? *Turkish Online Journal of Educational Technology*, 11(2), 142–149. <https://doi.org/10/7456/10203100/002>
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44(9), 1175. <https://doi.org/10.1037/0003-066X.44.9.1175>
- Boekaerts, M. (1997). Self-regulated learning: a new concept embraced by researchers, policy makers, educators, teachers, and students. *Learning and Instruction*, 7(2), 161–186. [https://doi.org/10.1016/S0959-4752\(96\)00015-1](https://doi.org/10.1016/S0959-4752(96)00015-1)
- Bowen, N. E. J. A., & Thomas, N. (2022). Self-regulated learning and knowledge blindness: Bringing language into view. *Applied Linguistics*, 43(6), 1207–1216. <https://doi.org/10.1093/applin/amac062>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Castro, G. P. B., Chiappe, A., Rodríguez, D. F. B., & Sepulveda, F. G. (2024). Harnessing AI for Education 4.0: Drivers of personalized learning. *Electronic Journal of eLearning*, 22(5), 01–14. <https://doi.org/10.34190/ejel.22.5.3467>
- Chang, M. M. (2005). Applying self-regulated learning strategies in a web-based instruction—an investigation of motivation perception. *Computer Assisted Language Learning*, 18(3), 217–230. <https://doi.org/10.1080/09588220500178939>
- Chea, P., & Xiao, Y. (2024). Artificial intelligence in higher education: The power and damage of AI-assisted tools on academic English reading skills. *Journal of General Education and Humanities*, 3(3), 287–306. <https://doi.org/10.58421/gehu.v3i3.242>
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative and mixed methods approaches*. Sage.
- Divekar, R. R., Drozdal, J., Chabot, S., Zhou, Y., Su, H., Chen, Y., Hendler, J. A., & Braasch, J. (2022). Foreign language acquisition via artificial intelligence and extended reality: Design and evaluation. *Computer Assisted Language Learning*, 35(9), 2332–2360. <https://doi.org/10.1080/09588221.2021.1879162>

- Dodigovic, M. (2007). Artificial intelligence and second language learning: An efficient approach to error remediation. *Language Awareness, 16*(2), 99–113. <https://doi.org/10.2167/la416.0>
- Dupoux, E. (2018). Cognitive science in the era of artificial intelligence: a roadmap for reverse-engineering the infant language-learner. *Cognition, 173*, 43–59. <https://doi.org/10.1016/j.cognition.2017.11.008>
- El Shazly, R. (2021). Effects of artificial intelligence on English speaking anxiety and speaking performance: A case study. *Expert Systems, 38*(5), 1–15. <https://doi.org/10.1111/exsy.12667>
- Farooqi, S. H., (2025). Efficacy of AI-generated feedback by SmallTalk2Me for improving speaking skill of Saudi EFL learners. *Forum for Linguistic Studies, 7*(3), 714–728. <https://doi.org/10.30564/fls.v7i3.8294>
- Fathi, J., Rahimi, M., & Liu, G. Z. (2023). A preliminary study on flipping an English as a foreign language collaborative writing course with video clips: Its impact on writing skills and writing motivation. *Journal of Computer Assisted Learning, 39*(3), 659–675. <https://doi.org/10.1111/jcal.12772>
- Fitria, T. N. (2023). Artificial intelligence (AI) technology in OpenAI ChatGPT application: A review of ChatGPT in writing English essay. *ELT Forum, 12*(1), 44–58. <https://doi.org/10.15294/elt.v12i1.64069>
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2023). *How to design and evaluate research in education*. McGraw-Hill Higher Education.
- Garcia, M. B., & Garcia, P. S. (2023). Intelligent tutoring system as an instructional technology in learning basic nutrition concepts: An exploratory sequential mixed methods study. In M. B. Garcia, L. Cabrera, M. Vanessa, A. De Almeida & R. P. Pereira (Eds.), *Handbook of research on instructional technologies in health education and allied disciplines*. pp. 265–284. IGI Global. <https://doi.org/10.4018/978-1-6684-7164-7.ch012>
- Gardner, J., O’Leary, M., & Yuan, L. (2021). Artificial intelligence in educational assessment: Breakthrough? Or buncombe and ballyhoo? *Journal of Computer Assisted Learning, 37*(5), 1207–1216. <https://doi.org/10.1111/jcal.12577>
- Gikas, J., & Grant, M. M. (2013). Mobile computing devices in higher education: Student perspectives on learning with cell phones, smartphones, and social media. *Internet and Higher Education, 19*, 18–26. <https://doi.org/10.1016/j.iheduc.2013.06.002>
- Ginsberg, M. (2012). *Essentials of artificial intelligence*. Newnes.
- Hamuddin, B. (2018). Blogs as powerful learning tools: The perception from EFL students in Riau main island Indonesia. *IOP Conference Series: Earth and Environmental Science, 156*, 1–6. <https://doi.org/10.1088/1755-1315/156/1/012060>
- Hill, J., Ford, W. R., & Farreras, I. G. (2015). Real conversations with artificial intelligence: A comparison between human–human online conversations and human–chatbot conversations. *Computers in Human Behavior, 49*, 245–250. <https://doi.org/10.1016/j.chb.2015.02.026>
- Hsu, T. C., Chang, C., & Jen, T. H. (2023). Artificial intelligence image recognition using self-regulation learning strategies: Effects on vocabulary acquisition, learning anxiety, and learning behaviours of English language learners. *Interactive Learning Environments, 1–19*. <https://doi.org/10.1080/10494820.2023.2165508>
- Kang, H. (2022). Effects of artificial intelligence and native speaker interlocutors on ESL learners’ speaking ability and affective aspects. *Multimedia-Assisted Language Learning, 25*(2), 9–43. <https://doi.org/10.15702/mall.2022.25.2.09>
- Kesuma, C. (2025). How effective is SUNO.AI in enhancing Arabic listening skills? An evaluation of AI-based personalized learning. *International Journal of Information and Education Technology, 15*(2). <https://doi.org/10.18178/ijiet.2025.15.2.2251>
- Kessler, M. (2023). Supplementing mobile-assisted language learning with reflective journal writing: A case study of Duolingo users’ metacognitive awareness.

- Computer Assisted Language Learning*, 36, 1040–1063. <https://doi.org/10.1080/09588221.2021.1968914>
- Kim, J. (2018, November 12). *Artificial intelligence and retention: The future of persistence in the age of 'narrow' AI, or deep learning*. Inside Higher Ed. <https://www.insidehighered.com/digital-learning/blogs/technology-and-learning/artificial-intelligence-and-retention>
- Kim, J., Lee, H., & Cho, Y. H. (2022). Learning design to support student-AI collaboration: Perspectives of leading teachers for AI in education. *Education and Information Technologies*, 27(5). <https://doi.org/10.1007/s10639-021-10831-6>
- Lee, J. C. K., Wan, Z. H., Hui, S. K. F., & Ko, P. Y. (2019). More student trust, more self-regulation strategy? Exploring the effects of self-regulatory climate on self-regulated learning. *The Journal of Educational Research*, 112(4), 463–472. <https://doi.org/10.1080/00220671.2018.1553840>
- Li, R. (2023). Investigating effects of computer-mediated feedback on L2 vocabulary learning. *Computers & Education*, 198. <https://doi.org/10.1016/j.compedu.2023.104763>
- Li, Z., & Bonk, C. J. (2023). Self-directed language learning with Duolingo in an out-of-class context. *Computer Assisted Language Learning*, 38(2), 1–23. <https://doi.org/10.1080/09588221.2023.2206874>
- Liu, Z. (2021). Sociological perspectives on artificial intelligence: A typological reading. *Sociology Compass*, 15(3), 1–13. <https://doi.org/10.1111/soc4.12851>
- Liu, G. Z., Fathi, J., & Rahimi, M. (2025). Enhancing EFL learners' intercultural communicative effectiveness through telecollaboration with native and non-native speakers of English. *Computer Assisted Language Learning*, 38(1-2), 97–127. <https://doi.org/10.1080/09588221.2022.2164778>
- Loncar, M., Schams, W., & Liang, J. S. (2023). Multiple technologies, multiple sources: Trends and analyses of the literature on technology-mediated feedback for L2 English writing published from 2015–2019. *Computer Assisted Language Learning*, 36, 722–784. <https://doi.org/10.1080/09588221.2021.1943452>
- Maknun, L. L. (2020, February). The implementation of Orai as artificial intelligence for digital native students in English-speaking learning. In *Proceedings of the 2nd Indonesian Technology-Enhanced Language Learning Conference*, Bogor, Indonesia. <https://itell.or.id/conference/index.php/itell/itell20/schedConf/presentations>
- Makhlouf, M. K. I. (2021). Effect of artificial intelligence-based application on Saudi preparatory-year students' EFL speaking skills at Albaha University. *International Journal of English Language Education*, 9(2), 36–57. <https://doi.org/10.5296/ijele.v9i2.18782>
- Nguyen, N. V., Vo, T. T., & Tran, V. D. T. (2025). AI-driven pronunciation assessment: The impact of Speechace on EFL learners' pronunciation competency. *Computer-Assisted Language Learning Electronic Journal*, 26(3), 84–106. <https://doi.org/10.54855/callej.252635>
- Oxford, R. L. (1990). *Language learning strategies: What every teacher should know*. Heinle & Heinle.
- Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 452–502). Academic Press.
- Pokulevska, A. I. (2018). Experience of using Skype as a means of foreign language teaching efficiency improving. *Information Technologies and Learning Tools*, 68, 155–165. <https://doi.org/10.33407/itlt.v68i6.2150>
- Ruiz-Mercader, J., Meroño-Cerdan, A. L., & Sabater-Sánchez, R. (2006). Information technology and learning: Their relationship and impact on organisational performance in small businesses. *International Journal of Information Management*, 26, 16–29. <https://doi.org/10.1016/j.ijinfomgt.2005.10.003>

- Rustamova, A. E., & Rakhmatullaeva, S. N. (2023). How to improve speaking skill with the help of innovative technology. In *International Conferences* (pp. 1104–1106). <https://erus.uz/index.php/cf/article/view/1427>
- Safadi, H. A., Shgair, M. S. A., & Qatawnih, K. S. (2022). The effectiveness of designing e-learning environment based on mastery learning and artificial intelligence on developing English speaking skills among tenth graders in Palestine. *Journal of Educational and Psychological Sciences*, 31, 475–507. <https://doi.org/10.33976/IUGJEPS.31.1/2023/22>
- Seker, M. (2016). The use of self-regulation strategies by foreign language learners and its role in language achievement. *Language Teaching Research*, 20, 600–618. <https://doi.org/10.1177/1362168815578550>
- Shatri, Z. G. (2020). Advantages and disadvantages of using information technology in learning process of students. *Journal of Turkish Science Education*, 17(3), 420–428. <https://doi.org/10.36681/tused.2020.36>
- Sheikh, A., Anderson, M., Albala, S., Casadei, B., Franklin, B. D., & Richards, M. (2021). Health information technology and digital innovation for national learning health and care systems. *The Lancet Digital Health*, 3, e383–e396. [https://doi.org/10.1016/S2589-7500\(21\)00005-4](https://doi.org/10.1016/S2589-7500(21)00005-4)
- Shortt, M., Tilak, S., Kuznetcova, I., Martens, B., & Akinkuolie, B. (2023). Gamification in mobile-assisted language learning: A systematic review of Duolingo literature from public release of 2012 to early 2020. *Computer Assisted Language Learning*, 36, 517–554. <https://doi.org/10.1080/09588221.2021.1933540>
- Soleimani, H., Mohammaddokht, F., & Fathi, J. (2022). Exploring the effect of assisted repeated reading on incidental vocabulary learning and vocabulary learning self-efficacy in an EFL context. *Frontiers in Psychology*, 13, 851812. <https://doi.org/10.3389/fpsyg.2022.851812>
- Suciati, S., Faridi, A., Mujiyanto, J., & Arifani, Y. (2022). Artificial intelligence-based application cake as the alternative for learning speaking: Opportunities and challenges. In *Proceedings of the International Conference on Science, Education, and Technology (ISET)*, 8, 202–205. <https://doi.org/10.2139/ssrn.3576045>
- Sun, Z., Anbarasan, M., & Praveen Kumar, D. J. C. I. (2021). Design of online intelligent English teaching platform based on artificial intelligence techniques. *Computational Intelligence*, 37, 1166–1180. <https://doi.org/10.1111/coin.12351>
- Suryana, I., Asrianto, A., & Murwantono, D. (2020). Artificial intelligence to master English listening skills for non-English major students. *Journal of Languages and Language Teaching*, 8, 48–59. <https://doi.org/10.33394/jollt.v8i1.2221>
- Taylor, P. C., & Maor, D. (2000). Assessing the efficacy of online teaching with the Constructivist Online Learning Environment Survey. In *Flexible Futures in Tertiary Teaching: Proceedings of the 9th Annual Teaching Learning Forum* (2–4 February, 2000). <http://lsn.curtin.edu.au/tlf/tlf2000/taylor.html>
- Teng, L. S., & Zhang, L. J. (2016). A questionnaire-based validation of multidimensional models of self-regulated learning strategies. *Modern Language Journal*, 100, 674–701. <https://doi.org/10.1111/modl.12339>
- UNESCO. (2017). *Herramientas de formación para el desarrollo curricular: Una caja de recursos*. OIE-UNESCO. UNESCO Digital Library
- Vygotsky, L. S. (1984). The problem of age. In R. W. Rieber (Ed.), *Child psychology*. Pedagogical.
- Vygotsky, L. S. (1986). *Thought and language*. MIT Press.
- Wekke, I. S., Yandra, A., & Hamuddin, B. (2017). Learning strategy in class management: A reflection from Manado case. *IOP Conference Series: Earth and Environmental Science*, 97, 1–5. <https://doi.org/10.1088/1755-1315/97/1/012053>
- Williyan, A., Fitriati, S. W., Pratama, H., & Sakhiyya, Z. (2024). AI as Co-creator: Exploring Indonesian EFL Teachers' Collaboration with AI in content development. *Teaching*

- English with Technology*, 24(2), 5–21.
<https://doi.org/10.56297/vaca6841/LRDX3699/RZOH5366>
- Xia, Q., Chiu, T. K., Lee, M., Sanusi, I. T., Dai, Y., & Chai, C. S. (2022). A self-determination theory (SDT) design approach for inclusive and diverse artificial intelligence (AI) education. *Computers & Education*, 189. <https://doi.org/10.1016/j.compedu.2022.104582>
- Yan, D. (2023). Impact of ChatGPT on learners in an L2 writing practicum: An exploratory investigation. *Education and Information Technologies*. <https://doi.org/10.1007/s10639-023-11742-4>
- Yang, X., Kuo, L. J., Eslami, Z. R., & Moody, S. M. (2021). Theoretical trends of research on technology and L2 vocabulary learning: A systematic review. *Journal of Computers in Education*, 8, 465–483. <https://doi.org/10.1007/s40692-021-00187-8>
- Yang, H., Kim, H., Lee, J. H., & Shin, D. (2022). Implementation of an AI chatbot as an English conversation partner in EFL speaking classes. *ReCALL*, 34, 327–343. <https://doi.org/10.1017/S0958344022000039>
- Zhang, Y. (2022). Construction of English language autonomous learning center system based on artificial intelligence technology. *Mathematical Problems in Engineering*, 2022, 1–15. <https://doi.org/10.1155/2022/7900493>
- Zhang, R., & Zou, D. (2020). Types, purposes, and effectiveness of state-of-the-art technologies for second and foreign language learning. *Computer Assisted Language Learning*, 33, 1–47. <https://doi.org/10.1080/09588221.2020.1744666>
- Zheldibayeva, R. (2025). GenAI as a learning buddy for non-English majors: Effects on listening and writing performance. *Educational Process: International Journal*, 14(1), 1–16. <https://doi.org/10.22521/edupij.2025.14.51>
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41, 64–70. https://doi.org/10.1207/s15430421tip4102_2
- Zou, B., Liviero, S., Hao, M., & Wei, C. (2020). Artificial intelligence technology for EAP speaking skills: Student perceptions of opportunities and challenges. In M. R. Freiermuth & N. Zarrinabadi (Eds.), *Technology and the psychology of second language learners and users* (pp. 433–463), Palgrave Macmillan. https://doi.org/10.1007/978-3-030-34212-8_17